

Using License Use Management Runtime

Note

Before using this information and the product it supports, be sure to read the general information under "Notices" on page 200.

Third Edition (February 2008)

This edition replaces SC32-1535-02. The major changes are described in Summary of Changes for Versions 5.1.1 to 5.1.2.

Third Edition (February 2008)

This edition applies to Version 5.1.2 of IBM License Use Management Runtime, Program Number 5764-G61, and to all subsequent releases and modifications until otherwise indicated in new editions. Make sure that you are using the correct edition for the level of the product.

This edition replaces SC32-1535-02. The major changes are described in "Summary of Changes for Versions 5.1.1 to 5.1.2" on page xv and "Summary of Changes for Versions 5.1.0 to 5.1.1" on page xv.

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Address your comments to:

License Use Management Information Development
SWG Krakow Laboratory
IBM Polska Sp.z o.o.
ul.Armi Krajowej 18
30-150 Krakow
Poland

Fax Number: (+48) 12 628 9400

Internet ID: LUMSERV@PL.IBM.COM

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About This Book

This book describes License Use Management Runtime for AIX® and Windows®. It contains information about how to set up:

- The servers where product licenses are to be installed
- The clients that use the products
- An environment that can support network licensing

Who Should Read This Book

This book is intended for the following types of user.

- The system administrator who is responsible for setting up and administering the license management environment. According to the platform where the product is installed, this person, depending on the platform being used, must have general knowledge of the following products and environments:
 - AIX or Windows
 - The TCP/IP transport protocol
 - The network environment
- The end users who run the software products and the License Use Management Runtime product. End users require only general knowledge of the AIX or Windows operating environment.
- The basic knowledge of Java environments is preferred but not recommended.

How This Book is Organized

This book is organized into the following sections:

Chapter 1, “Introduction” provides an overview of License Use Runtime features and benefits, describes supported license types, license policies, and license-enabling models, and presents some simple scenarios for the use of licensed products.

Chapter 2, “Planning Network Licensing” provides the basic NCS concepts you need to set up your network and manage licenses.

Chapter 3, “Installing License Use Management Runtime” explains how to install and uninstall License Use Runtime components.

Chapter 4, “Configuring License Use Management Runtime” provides scenarios for configuring License Use Runtime, administering product licenses, and implementing customer-controlled policies, using the License Use Runtime tools.

Chapter 5, “Administering License Use Management Runtime” describes daily tasks such as administering product licenses, and implementing customer-controlled policies.

Chapter 6, “License Use Management Runtime Command Line Interface” documents the License Use Runtime command line interface.

Chapter 7, “Hints and Tips” explains how to take better advantage of License Use Management Runtime.

Chapter 8, “Troubleshooting” explains how to improve performance and handle problems, should they arise when you use license-enabled products.

Appendix A, “License Use Management Runtime Configuration File” provides reference information on the configuration file.

Appendix B, “Environment Variables,” on page 185 describes the environment variables used by License Use Management Version 5.1.2.

Appendix C, “Using the Nodelock Directory,” on page 187 explains how to prepare the nodelock directory manually and how to use it.

Appendix D, “Operating Systems and License Use Management Support” identifies the operating systems supported by License Use Management and indicates, where appropriate, the conditions of their support.

Appendix E, “Accessibility” provides a summary of the implementations that make the use of the interface accessible to people with some physical disabilities.

The “Glossary” on page 203 explains terms used in this manual.

Prerequisite and Related Information

This section lists other sources of information for License Use Management Runtime.

README File

For changes to License Use Management Runtime that were made after the book was finished, see the README.ARK file in the download package from the License Use Management Web site.

Depending on the operating system you are working on, you can find the README.ARK file in the directories listed below:

AIX

/opt/LicenseUseManagement/doc

Windows

C:\Program Files\IBM\License Use Management\doc\en_us (for 32-bit)

C:\Program Files(x86)\IBM\License Use Management\doc\en_us (for 64-bit)

C:\Program Files\IBM\License Use Management\doc\en_us (for Vista)

where C: is the drive where License Use Management Runtime was installed.

MAN Pages for Command Syntax

To display the man pages, you might need to add an entry to the MANPATH environmental variable in the profile. The new entry must specify the directory.

If you are working on AIX platform, the files are in one of the following directories:

If only the **lum.base.cli** package is installed:

/opt/LicenseUseManagement/doc

If both the **lum.base.cli** and the **lum.html.en_US** packages are installed:

```
/opt/LicenseUseManagement/doc/en_US/cat1
```

To get help with the syntax of a particular command, go to the en_US directory and type:

```
man command_name
```

This displays the command syntax. For example, to get help with the command **LUMblt**, type:

```
man LUMblt
```

Note: MAN Pages are only on AIX or not Windows. If not we have to include the following directories.

HTML Files

To view an HTML file, open it in your Web browser.

If you are working on an AIX platform, the files are in one of the following directories:

- If only the **lum.base.cli** package is installed:
`/opt/LicenseUseManagement/doc`
- If both the **lum.base.cli** and the **lum.html.en_US** packages are installed:
`/opt/LicenseUseManagement/doc/en_US`

If you are working on Windows platform (2003, XP or Vista), the files are in the directory:

```
c:\Program Files\IBM\License Use Management\doc\en_US
```

There are HTML versions of:

- License Use Management Runtime Message References for non-IBM AIX and Windows:

```
lumusg.htm
```

- This book *Using License Use Management Runtime*

```
lumusg.htm
```

A PDF version of this book is available for download from the IBM® License Use Management Web site.

- *Using Application Developer's Toolkit* (if Application Developer's Toolkit is installed in your environment).

```
lumtkt.htm
```

This book describes how to license-enable software products for use with License Use Management.

License Use Management Web Site

For information and news about IBM License Use Management, and to download License Use Management Runtime publications and code, visit the IBM License Use Management Web sites.

Notational Conventions

This book uses the following notation in text:

Bold Bold print indicates something you click, select, or type, such as a menu option, field, or push button.

Italics Italics are used for variables, for new terms in the text, for directories and for emphasis.

Monospacing

Monospacing is used for system messages and examples.

When you see an operating system icon, the text applies only to the operating systems indicated by that icon until the next icon appears. Icons used in this book are described in the following table.



This icon identifies text that is common to all operating systems.



This icon refers to text for AIX systems only.



This icon refers to text for Windows systems only including the Windows.



This icon refers to text for AIX and Windows systems only.



This icon refers to text for NON-IBM UNIX[®] and Windows systems only.

Default Windows Installation

In all Windows examples and commands, this book uses the following notation:

- The default installation drive used is c:\. You can use any drive for installation, but remember to substitute the drive letter shown in this book from c:\ to the one you use for installation.
- The Program Files directory is used in this book, but the name of the directory might be different if you are using any version of Windows that is not an English version.
- The Documents and Settings\All Users\Application Data\IBM\License Use Management directory is used in this book, but the name of the directory might be different if you are using any version of Windows that is not an English version.

Note: For Windows Vista use the directory \ProgramData\IBM\License Use Management

Summary of Changes

Summary of Changes for Versions 5.1.1 to 5.1.2

This edition of the book incorporates changes made in Versions 5.1.1 through 5.1.2 of License Use Management Runtime, which were documented in the README.ARK files for those versions.

This section summarizes the changes made to this book to reflect new and changed function and support.

Additional operating systems supported

The License Use Management Runtime supports the additional operating system:

- Windows Vista

Summary of Changes for Versions 5.1.0 to 5.1.1

This edition of the book incorporates changes made in Versions 5.1.0 through 5.1.1 of License Use Management Runtime, which were documented in the README.ARK files for those versions.

This section summarizes the changes made to this book to reflect new and changed function and support.

Operating systems no longer supported

The following operating systems are no longer supported:

- HP-UX 11.i for 64 bit
- IRIX 6.5 for 32 bit
- Solaris 8, 9, and 10 for 64 bit
- Windows 2000

Custom Configuration Policy

Vendors can now offer a combination of products, tailored to the needs of each user, under a single custom configuration license.

Release Dependent Key

Vendors can now offer the capability to use the same licenses for different versions of the product.

Chapter 1. Introduction

ALL

License Use Management Runtime is part of IBM License Use Management, a combination of tools for software asset protection. The License Use Management tools enable software vendors and their customers to ensure that customers comply with the terms and conditions of license agreements. They check compliance through runtime monitoring of the usage of software assets.

License Use Management Version 5.1.2 Compatibility

License Use Management Runtime Version 5.1.2 is the product upgrade of License Use Management Version 5.1.1. No upgrade is possible from the release 4.6.8 to 5.1.x of License Use Management. However, both version 4.6.8 and version 5.1.x can coexist on the same machine.

License Use Management at a Glance

License Use Management consists of two components available with version 5.1.2.

License Use Management Application Developer's Toolkit (ADK)

Allows vendors to implement license management in an application. To implement license management, vendors embed API calls and API code in their products. The product is then described as *license-enabled*. Vendors can license-enable C-language programs and Java™ applications.

The License Use Management ADK offers the vendor great flexibility:

- Level of control that is used by the license-enabled application.
- Type of customer licensing environment for which the application is intended.
- Implementation of policies.

License Use Management Runtime (ARK)

Allows users of license-enabled software to manage the licensing environment. The License Use Management Runtime software is free of charge and is available for download from the IBM License Use Management Web site.

License Use Management Vendor Perspective

License Use Management benefits software vendors by enabling them to do the following:

- Ensure that customers use software licenses within entitled limits
- Base product prices on actual usage
- Protect intellectual property from unauthorized use
- Increase overall revenue as customers acquire all the licenses they need
- Distribute software for a trial period with trial licenses that can be replaced by production licenses, thus minimizing distribution cost

License Use Management Customer Perspective

License Use Management benefits the customers by enabling them to do the following:

- Ensure that they have enough licenses to satisfy their business requirements and, at the same time, that they are not paying for more licenses than they need

LUM Customer Perspective

- Base software charges within the enterprise on actual usage
- Demonstrate license use compliance to internal and external auditors
- Protect organizations from inadvertent violations of license agreements
- Change software assets to alternative pricing policies that the vendor offers

Basic Concepts of License Use Management

A *license*, in the context of License Use Management, is permission to use an instance of a licensed software product or service, according to the basis on which the vendor charges for the product or service. The term *license* in this context does not refer to the license agreement that governs use of, and rights to, a product.

License-Enabling a Product

Vendors deliver licenses to customers in the form of a *license password*. The password contains encrypted terms of the usage of the software product, such as the following:

- The number of licenses or concurrent copies of the product the customer can use
- The expiration date of the licenses
- The license type (see “License Types” on page 5)

In the license-enabling process, the vendor can do the following:

- Select among the various license types
- Decide to distribute licenses one-by-one or in packages of multiple licenses from which individual licenses can be extracted (see “License Passwords” on page 3)
- Implement direct controls over the use of licenses, or make it possible for the customer to control use of licenses (see “Use-Control Levels” on page 4)
- Impose, or allow the user to impose, various types of control over administration of licenses (see “License Policies” on page 7)

When the product is installed, License Use Management Runtime checks that a license is available each time the product is run.

Nodelocked and Network Licenses

Vendors can supply licenses in two forms: *nodelocked* licenses or *network* licenses.

A *nodelocked* license is a license for a specified workstation (node). It is stored on the specified workstation, and the license-enabled product will run on only that workstation.

A *network* license is a license, stored on a server, that can be used by any client workstation. Many License Use Management Runtime clients can share the licenses for enabled products.

The licenses are stored on one or more network license servers. Each client workstation must be connected to a server. When the user at a client starts a licensed program, License Use Management Runtime at the license server determines whether a license is available.

Managing Licenses

License Use Management Runtime includes the *basic license tool*, which manages network licenses. The basic license tool enables you to do the following:

- Add licenses to or delete licenses from the server database

- Display information about the licenses installed
- Distribute the licenses among the license servers available on the network
- Reserve licenses for the exclusive use of certain users
- Generate reports on license usage and server events

The basic license tool has a graphical user interface (GUI) and a command-line interface. For more information about what the basic license tool does, see Chapter 5, “Administering License Use Management Runtime,” on page 67.

License Use Management Runtime Platforms

Table 1 shows which platforms License Use Management Runtime supports, and where to get the License Use Management Runtime code.

Table 1. License Use Management Runtime Platforms

AIX 5.2.0.30 or higher	You can install Version 5.1.2 from the product package downloaded from the IBM License Use Management Web sites: http://www-306.ibm.com/software/awdtools/lum/component.html
Windows XP ¹ Windows Server 2003 ¹ Windows Vista	License Use Management Runtime, Version 5.1.2 can either be redistributed with the license-enabled product or be downloaded from the IBM License Use Management Web site: http://www-306.ibm.com/software/awdtools/lum/component.html
Notes:	
1. 64 bit version is supported only on X64 processor or any others systems.	

License Passwords

Vendors provide license passwords (also known as *license keys*) with their products.

A license password is an encrypted character string. It contains information about the license, such as the following:

- The types of licenses (see “License Types” on page 5)
- The date when the licenses become active
- The date when the licenses expire

There are two types of password: simple and compound. A *simple password* represents one or more licenses. A *compound password* contains multiple simple passwords, each of which represents one or more licenses.

Note: The expiration date of simple licenses that are contained in a compound password must fall on or before the expiration date of their compound password.

Compound passwords can be used as follows:

- Vendors use compound passwords to distribute multiple licenses to their customers.

License Passwords

- The customer installs the compound password on the assigned license server. The customer extracts the licenses and distributes them, as required, to different license servers. (These servers are not specified in the compound password.)

The vendor includes the password, along with other information about the application, in the *enrollment certificate file* (ECF). You then make licenses available to users of the product by *enrolling* the product using the license password. See “Enrolling the Product” on page 69.

Use-Control Levels

Products can have one of the following predefined use control levels:

- Vendor-managed use control
- Customer-managed use control

Vendor-Managed Use Products

With vendor-managed use (VMU) products, the vendor manages compliance with the terms of the acquisition of the software product.

When you request licenses for a vendor-managed use product, the product vendor asks you to supply the unique identifier (target ID) of each workstation where you intend to install the product licenses. For nodelocked licenses, this is the identification of the workstation where the enabled product is to be installed; for network licenses, this is the network license server. You must also supply the number of licenses that you want to acquire. The vendor uses this information to create the password that you use to install and activate the licenses.

Vendors ship a vendor-managed use product typically with a simple password. They can also use compound passwords for this purpose.

If you want to change the terms and conditions of the contract, (for example, to increase the number of licenses), you provide the vendor with similar information for each of the workstations on which you intend to install the licenses and get a new password.

A vendor can produce a vendor-managed use license password with target ID set to ANY, so that you can install it on any workstation. The vendor can deliver such a password with the product package without your specifying how many licenses you want to acquire. Instead, the vendor sets an upper limit, possibly very large, on the number of licenses you can install on each license server. By generating and delivering such a password, the vendor has decided not to perform the checks that are normally associated with vendor-managed use.

Customer-Managed Use Products

To provide vendors with greater flexibility in the way they deliver licensed software, License Use Management Runtime supports customer-managed use (CMU) control. With products that are enabled in this way, the vendor does not directly associate licenses with a particular license server (or group of license servers). The vendor does not set an upper limit on the number of licenses that you are entitled to use. Instead, it is your responsibility to set that upper limit, depending on the terms of the software product acquisition.

License Use Management Runtime provides you with the information on the usage of the enabled products, thereby helping you stay within the boundaries of the

acquisition agreement. Transactions, such as enrollment, distribution of licenses, updates, and deletions, are logged in a tamper-proof License Use Management Runtime database.

Vendors typically ship a customer-managed use product with a compound password that you can use to extract and distribute the number of licenses you have acquired. They can also use simple passwords for certain types of licenses.

License Types

This section describes the types of license the vendor can select. When you receive a license-enabled product, check the product documentation to determine the license type.

Nodelocked Licenses

A nodelocked license restricts the use of a product to the workstation specified in the license. Vendors typically use nodelocked licenses for standalone applications, rather than for client/server applications.

For nodelocked licenses, the license-enabled product itself, rather than License Use Management Runtime manages use of the nodelocked license. The password for such a product is stored in a *nodelock directory*. When you start the application, it checks the nodelock directory to ensure that you have a valid license. See “License-Enabling Models” on page 11 for more information about license-enabling models.



A nodelocked license allows an unlimited number of simultaneous uses of the licensed application on the local workstation. A word processor is a typical example of a product that uses nodelocked licenses.

Network Licenses

Network licenses, rather than being restricted to a single workstation, are stored on a network license server and shared among multiple network license clients.

Vendors can enable their products to use the following kinds of network licenses:

- Concurrent licenses
- Concurrent-offline licenses
- Reservable licenses
- Use-once licenses
- Per-seat licenses

Concurrent Licenses



A concurrent license is a network license that can be temporarily granted to run the licensed application on a client.

When the product is running, that license remains unavailable to other users of the product. When the product stops running, the license is returned to the server, where it becomes available to other users.

Concurrent licenses allow as many users to run a licensed application simultaneously as there are valid licenses for the product available from the network license servers in your licensing environment.

Network Licenses

A typical use of concurrent licenses is for products with relatively expensive licenses that each user will use only some of the time. The customer shares network licenses among users to optimize the usage of the licenses. Such applications might be either client/server applications, for which the client is enabled, or non-client/server applications.

Vendors can use concurrent licenses for both vendor-managed and customer-managed products.

Concurrent-Offline Licenses



The concurrent-offline license allows users to reserve a concurrent license for a certain number of days and to use it on a portable computer disconnected from the network. Only authorized users can exploit this feature. The users must be defined by the license administrator at the customer site. The portable computer can use supported Windows platforms only (see Table 1 on page 3 for a list of supported platforms).

A concurrent-offline license is installed on the network license server. It is similar to a normal concurrent license because it can also be used as a normal concurrent license.

For the duration of the reservation, the license remains unavailable to other users of the product. The license becomes available to other users when one of the following occurs:

- The reservation period expires
- The license is returned to the server from the portable computer

When the concurrent-offline license has been reserved for use, a copy is installed on a portable computer connected to the network. This copy of the concurrent-offline license is called an offline-nodelocked license. When the offline-nodelocked license has been installed on the portable computer, the portable computer can be disconnected from the network.

Reservable Licenses



A reservable license is a network license that the license administrator can reserve for the exclusive use of a user, a group, and a node. The reservation is for a specified time period. A reservable license that has been reserved is called a reserved license. A reservable license that has not been reserved is called an unreserved license.

The license administrator can reserve some of the reservable licenses for an application and leave others unreserved. Unreserved licenses are treated like concurrent licenses. Reserved licenses become available to other users when the reservation period expires or when the license administrator explicitly unreserves the license.

Vendors can use reservable licenses for both vendor-managed and customer-managed products.

Note: The reservation period is the time frame during which the license remains unavailable to other users. For a reservable license, this period starts when the license administrator defines the reservation. For a concurrent-offline license, the period starts only when the user actually requests the license from the portable computer.

Use-Once Licenses



A use-once license is a network license that permits a single use of a licensed product during the time the license is valid. Every time the product is started, one license is used.

A typical use of use-once licenses is to distribute promotional or demonstration versions of software.

Vendors also provide use-once licenses to supplement concurrent licenses when user demand for those products exceeds the number of available concurrent licenses.

Vendors can use use-once licenses for both vendor-managed and customer-managed products.

Per-Seat Licenses



Vendors use per-seat licenses to enable client/server applications constructed for multiple-server solutions. With per-seat licenses, the server of a licensed client/server application can request licenses for its clients. The application clients need not be license-enabled.

For per-seat licensing, unused application client licenses are kept in a central repository, which all the application servers share. They also share a central list of application clients to which a license has been assigned. When a license for a C or C++ application or for a Java application is assigned to an application client, that assignment is permanent. If an application client connects to multiple application servers, it is assigned only one license.

Per-seat licenses are valid only for customer-managed use products.

License Policies

Vendors can enable their products to implement various policy decisions regarding how licenses are managed.

Vendor Controlled Policies

The vendor can implement the license policies: capacity, value units policy, try-and-buy, multiuse rules, license annotation, custom configuration, custom attributes, and release dependent key.

Capacity

With this policy vendors can comply with the terms and conditions of products that are priced based on certain characteristics of the system on which the product is running, not only on the number of users who are using the product. This includes, for example, the number of processors on which the application can run or the maximum size of the physical memory.

In such cases the vendor can specify a *capacity type* that defines the unit of measure for the internal counter ("capacity units") associated to the license password. The capacity type is an integer value between 1 and 255; some of these values have a predefined value; others might have any vendor specific meaning.

The predefined capacity types and supported platforms are shown in Table 2 on page 8:

Vendor Controlled Policies

Table 2. Predefined capacity types and supported platforms

	Configured processors	Online processors	Physical disks	Physical memory (in MB)
AIX	Y	Y	Y	Y
Windows	N	Y	Y	Y

When you use one of the predefined capacity types, the License Use Management library embedded in the license application can calculate the number of capacity units that are used by the application itself. In the other cases the vendor must calculate them before passing the results to the License Use Management library. In either case, the license is granted only if the capacity type of the password matches the capacity type specified in the request, and the capacity units are not exceeded. This applies to nodelock and concurrent network license types, under either vendor-managed or customer-managed use control.

Value Units Policy

With this policy vendors price their products by assigning a value expressed in units to each resource in an environment. All the different metrics (like usage count, system resources or other product-specific indicators) are defined into the same license certificate, as well as the rules and relative weights for their translation into value units. The Value Units policy can only be applied to concurrent licenses. See the table below.

Type of resource	Server Type A 2 processors	Server Type B 1 processor	No. of clients 1 - 10	No. of clients 11 - 50	Single user
No. of value units assigned	50.15	30.20	20.30	45.00	10.00

Value units are multiplied by the number of actual resources in your environment according to the rules defined in the enrollment certificate. The value units are then checked against the limit that is also defined in the enrollment certificate. This policy enables you to change your environment to suit your needs, without exceeding the value units assigned.

Try-and-Buy

The vendor can enable a product with a special simple nodelocked license for customers to use during an evaluation period. The evaluation period (with duration that is set by the vendor) starts either when the product is enrolled or when the product is run for the first time.

Multiuse Rules

Multiuse rules define the conditions under which multiple calls of a product require only a single license. These rules are applicable only to concurrent network and concurrent-offline licenses.

The vendor can enable a product so that after a license has been granted to a particular user, group, node, job ID, or ACID, a second call of the product does not require a second license.

Multiuse rules might be based on any combination of the following tests that the server performs when a concurrent license is requested:

- The request for a license is associated with the same user as a previous request.

- The request for a license is associated with the same group as a previous request.
- The request for a license is associated with the same node as a previous request (applicable to concurrent licenses only).
- The request for a license is associated with the same job ID as a previous request.
- The request for a license is associated with the same ACID as a previous request. An ACID is a generic string that the vendor can use to further identify the caller of the license request. For example, if a user calls a compiler repeatedly, a multiuse rule might specify that the second and subsequent calls do not require additional licenses.

License Annotation

License annotation is data that is defined and included as part of the license information when a license is created. When the license is granted, the data is passed to the enabled application for its own use. Licenses of any type can be annotated.

Custom Configuration

Vendors who want to offer a selected combination of products, tailored more precisely to the needs of users, can define custom configuration by adding functions and products to a base configuration.

You specify the required content of a custom configuration when you order the configuration. You can order a custom configuration for one seat or for a group of any number of identical seats. If you order a configuration for a block of seats, the quantity of each add-on functions or products must equal the number of seats in the block. Each custom configuration, whether for a single seat or for a block of two seats is assigned as a separate custom configuration license.

A custom configuration license is a special case of a concurrent network license, a concurrent-offline network license and a simple nodelock license that contains a unique serial number identifying that custom configuration. The single serial number and license for a block configuration helps you to manage your installed licenses more easily.

After initial installation of a custom configuration, you can better manage the evolution and growth of your configuration by ordering additional add-on functions or products as necessary.

Custom License Attributes

Vendor-specific license attributes can be defined and included as part of the license information when a license is created. When the license is granted, the attribute data is passed to the enabled application.

Three general purpose attributes can be used in License Use Management Runtime. These are specified with the **-A** parameter of the LUMlct - License Creation Tool, (described in *Using License Use Management Application Developer's Toolkit*):

1. Custom attribute 1
2. Custom attribute 2
3. Custom attribute 3

Vendor Controlled Policies

These attributes can be exploited by a vendor to enforce any specific policy. License Use Management Runtime only records the attribute and makes it available to the vendor's application upon request.

Release Dependent Key

The vendor can enable a product so that different product versions can use the same license certificate. In particular older product versions can run if a license for a new product version is enrolled. This policy is applicable only to simple nodelock, concurrent, and concurrent-offline licenses.

Customer Controlled Policies

The customer can use the license policies hard stop/soft stop and user access restriction.

Hard Stop/Soft Stop

The vendor can enable a product so that you can choose the behavior of the product when the end user starts it and no licenses are available.

If no license is available, one of two things can happen:

- The product does not start, and there is no way for the end user to go on (hard stop policy).
- The product starts (soft stop policy).

When you enroll a product enabled for hard stop/soft stop, the default is hard stop. To use soft-stop, you must enable a network license server with the correct option. You can use the basic license tool to change the policy to soft stop and back again. For details, see "Scenario 7: Using the Hard Stop/Soft Stop Policy" on page 78.

When the soft stop policy is set, License Use Management Runtime keeps track of the high-water mark. The *high-water mark* is the maximum number of licenses that are ever granted for a given product beyond the number of licenses that are enrolled for that product. You can see this number through the basic license tool, and you can reset it to zero. Use this number to help you decide the number of additional license keys you need. When the hard stop policy is selected, the number of in-use licenses cannot exceed the number of enrolled licenses, so the high-water mark is not maintained.

While for CMU licenses the vendor can decide to let the user exploit the License Use Management Runtime hard stop/soft stop policy, VMU application vendors can decide to have a soft stop policy that is under the full control of the enabled application itself.

User Access Restriction

The License Administrator can grant or deny usage of a product to specific users or specific groups through the basic license tool graphical user interface or command line. This applies only to concurrent and concurrent-offline products. For concurrent-offline products the authorization can also be based on the end-user machine target ID and optionally secured by a password.

In addition to the authorization method, you can use the user file to control which users have access to licenses for specific products. The user file is a flat American National Standard Code for Information Interchange (ASCII) file that you create using a text editor. For each product in the file, there is a list of users. It lists either those who are allowed to use the product (in which case no one else can use it) or

those who are not allowed to use it (in which case anyone else can use it). Should a certain user be defined with both methods, the user file authorization method overrides the basic license tool method.

For details, see “Scenario 8: Restricting User Access” on page 80.

License-Enabling Models

The product vendor can create license-enabled products that use nodelocked or network licenses.

Nodelocked license-enabled products (non-runtime-based)

If the vendor chose nodelocked non-runtime-based enabling, the product does not make use of License Use Management Runtime on the workstation where the product runs. Following the vendor’s installation instructions, you might be required to store the password for such a product in a vendor-selected nodelock directory. When you start the application, it checks the nodelock directory to ensure that you have a valid license. Information about use of the product is not logged. You cannot use the basic license tool to view information or get reports about the product and its usage.

Network license-enabled products (non-runtime-based)

A non-runtime-based network license-enabled product does not make use of License Use Management Runtime on the workstation where the product runs and requires manual configuration on that workstation. The licenses are stored on one or more network license servers. When the user at a client starts a licensed program, the license server determines whether or not a license is available.

Network license-enabled products (runtime based)

A runtime-based network license-enabled product makes use of License Use Management Runtime on the workstation where the product runs and requires some limited configuration on that workstation. The licenses are stored on one or more network license servers. When the user at a client starts a licensed program, License Use Management Runtime at the license server determines whether or not a license is available.

Table 3 summarizes the license-enabling models, license types, and license policies.

Table 3. License Types and Policies Available for License Use Management Runtime Products

License-Enabling Model	License Types Available	License Policies Available
Nodelocked license-enabled products	Simple nodelocked	<ul style="list-style-type: none"> • Try-and-buy • License annotation • Capacity • Release Dependent Key • Custom Configuration • Performance Monitoring

License-Enabling Models

Table 3. License Types and Policies Available for License Use Management Runtime Products (continued)

License-Enabling Model	License Types Available	License Policies Available
Network license-enabled products (runtime and non-runtime-based enabling)	Concurrent	<ul style="list-style-type: none">• Hard stop/soft stop• Multiuse rules• User access restriction• License annotation• Capacity• Value units• Release Dependent Key• Custom Configuration• Performance Monitoring
	Reservable	<ul style="list-style-type: none">• Hard stop/soft stop (when unreserved)• User access restriction• License annotation• Performance Monitoring
	Use-once	<ul style="list-style-type: none">• User access restriction• License annotation• Performance Monitoring
	Per-seat	<ul style="list-style-type: none">• Hard stop/soft stop• License annotation• Performance Monitoring
	Concurrent-offline	<ul style="list-style-type: none">• Hard Stop/Soft Stop (if used as concurrent)• User access restriction• Multiuse rules (if used as concurrent)• License annotation• Release Dependent Key• Custom Configuration• Performance Monitoring
Note: Custom license attributes are available for any license type.		

Scalable Installation

License Use Management Runtime consists of separate installable features, so that you can install exactly what you need on each workstation. When you install License Use Management Runtime, the command-line interface is always installed. There is an optional graphical user interface which can be installed on all platforms

For example, in AIX 5.3, all required License Use Management Runtime features are automatically installed on every AIX workstation as part of the AIX 5.3 installation. You can install optional features, such as the graphical user interface, either when you install AIX or later.

Creating Licenses

License Use Management provides a tool that creates product licenses for the use of vendors who create license-enabled products. The tool enables vendors to create these kinds of passwords:

- Test passwords, for use in testing while enabling a product

- Production passwords, to deliver to customers

Distribution of production passwords to customers depends on the use control level of the license-enabled products:

For customer-managed use control products, the customer receives the license password together with the product package.

For vendor-managed use control products, for IBM license-enabled products, the customer requests the license password from the IBM country software password distribution center. For non-IBM license-enabled products, the customer requests the license password from the vendor software password distribution center.

Note: The LUM1ct license creation tool is not included in the toolkit or the runtime package or the application developer's toolkit. If you need to create test passwords while enabling a product you should contact LUM Support (LUMSERV@PL.IBM.COM). You can not use LUM1ct with parameters -F and -C in the same time.

For details about how to use this tool, see *Using License Use Management Application Developer's Toolkit*.

Administering Licenses

Use the *basic license tool* to administer licenses.

The basic license tool has a command-line interface and a graphical user interface on all platforms.

The tool enables you to do the following:

- Manage network licenses.
- Add licenses to or delete licenses from the network license server database; update information about existing customer-managed use licenses.
- Display a notebook of information about the licenses installed for each product.
- Manage authorizations for the usage of concurrent and concurrent-offline licenses.
- Extract licenses from a compound password and distribute them among the network license servers available on the network.
- Manage the reservation of reservable licenses for the exclusive use of certain users.
- Manage multiple network license servers. From any properly configured workstation, you can view and manage licenses that are installed on any network license server in the network.
- Monitor license server's workload, set load thresholds and enable trace mode for debugging reasons.
- Generate the following reports:

Standard Event Report. Displays detailed information about significant events that occur on the license servers that you specify.

License Request by Product Report. Displays statistical information about the use of the licenses of a product in the time interval that you specify. For each product, it reports the licenses that were requested, the licenses that were granted, and the percentage of rejections.

Administering Licenses

License Request by User Report. Displays statistical information about the use of products by users in the time interval that you specify. For each user, it reports the licenses that were requested, the licenses that were granted, and the percentage of rejections.

License Use by Product Report. Displays statistical information about the use of the licenses of a product in a specified time interval. For each product, it reports:

- The maximum number of nodes that used licenses for the product at the same time
- The maximum number of users that used licenses for the product at the same time
- The average time the licenses were in use

License Use by User Report. Displays statistical information about the use of the licenses by each user in a specified time interval. For each user, it reports the times the user requested licenses and the length of time the user kept the licenses in use.

Customer-Managed Use Audit. Reports the following information for customer-managed use product transactions:

- Vendor name
 - Product name
 - Product version
 - Product features
 - Administrator information
 - Time stamp
 - Number of licenses
 - Transaction type (for example, product enrolled, license distributed, license deleted, license updated, and high-water mark changes)
 - Signature stamp (user, group, and node)
 - Signature information
 - Licenses attached to sites
- Use the high-water mark. When the soft-stop policy is in effect, the high-water mark is recorded in the licensing database. The high-water mark is the maximum number of licenses that are ever granted for a given product beyond the number of licenses that are enrolled for that product. You can see this number through the basic license tool and can reset it to 0. This number assists you in deciding how many additional licenses you need. When the hard stop policy is selected, the number of in-use licenses cannot exceed the number of enrolled licenses, so the high-water mark is not maintained.
 - Set a threshold percentage of licenses. If more than the threshold percentage of licenses for a product are in use, messages about the level of usage are logged. There is a single threshold that applies to all vendor-managed products. You can change that threshold, and you can also set a separate threshold for each product.
 - Exercise customer-controlled policies. You can switch between hard stop and soft stop and manage the identifiers of application clients using per-seat licenses.
 - Administer high-availability licensing (see “High-Availability Licensing” on page 15). That is, create clusters, activate and deactivate members of clusters, and show cluster status.

For help on using the basic license tool, see “Performing Basic Administration” on page 68.

High-Availability Licensing

High-availability licensing enables you to set up an environment in which there is a very high degree of certainty that concurrent licenses will be available, even if a network license server goes down.

When you use this option, you create a cluster of network license servers. A cluster is a group of from 3 to 12 network license servers that jointly serve vendor-managed concurrent licenses that are enrolled on the cluster rather than on an individual server.

You can create and administer a cluster, and administer high-availability licenses, from any workstation.

While some servers in the cluster are serving licenses, one or more servers remain in reserve, ready to take over should an active server fail.

Each active server serves an equal share of the licenses enrolled on the cluster. When a server becomes unavailable and another server takes its place, responsibility for the licenses is automatically redistributed among active servers.

For high-availability licensing to work for a particular product, the product vendor must supply a password tied to a cluster rather than to an individual target server.

High-availability licensing works only with the Internet Protocol (IP). Before you decide to use high-availability licensing for a product, make sure that such a password is available from the product's vendor.

High-availability licensing is recommended only for users who are already experienced with managing individual license servers and who already have a stable licensing environment working.

For planning information, see "Planning Clusters for High-Availability Licensing" on page 26.

For an example, see "Creating a Cluster" on page 87.

Backing Up Databases and Files

On license servers, there is an automatic backup procedure for License Use Management Runtime databases and files. See "Using the Built-In Backup and Recovery Procedure" on page 149.

Working with Licensed Products

This section explains what happens when a user starts a licensed product, depending on how the product is enabled.

Only C, C++, and Java programs can be license-enabled.

In the figures and text in this section, references to the *enabled application* refer to the application plus the embedded code that services the API calls (which carries out the described steps).

This section assumes that, if required:

Working with Licensed Products

- License Use Management Runtime is installed properly.
- License Use Management Runtime is configured properly.
- The network is running properly.

If not, what happens depends on how the vendor enabled the product. See the additional product documentation on the IBM License Use Management Web site.

Central Registry License Server

Some of the scenarios in this section show the use of a *central registry license server*. The central registry is a repository of information that all the other network license servers can use. If you plan to install customer-managed use products with network licenses, or products with reservable licenses, you must identify one (and only one) central registry. Otherwise, the central registry license server is not required.

The central registry can contain:

- A record of all per-seat licenses
- The list of application clients to which per-seat licenses have been granted
- A record of soft stop license use
- The high-water mark
- Reserved licenses

Working with Nodelocked Licenses (Non-Runtime-Based Enabling)

Figure 1 shows what happens when an end user calls an application with nodelocked licenses for which the vendor chose non-runtime-based enabling. The licenses must be simple nodelocked licenses.



Figure 1. Using a Nodelocked License (Non-Runtime-Based Enabling)

1. The end user calls the application.
2. The application checks the nodelock directory to ensure that a license is stored on the local system.
3. If there is a valid license in the nodelock directory, the application runs. If not, depending on how the vendor enabled the application, it might return information to the end user, or it might run even with no license available.

Working with Use-Once Licenses

Figure 2 on page 17 shows what happens when an end user calls an application with use-once licenses.

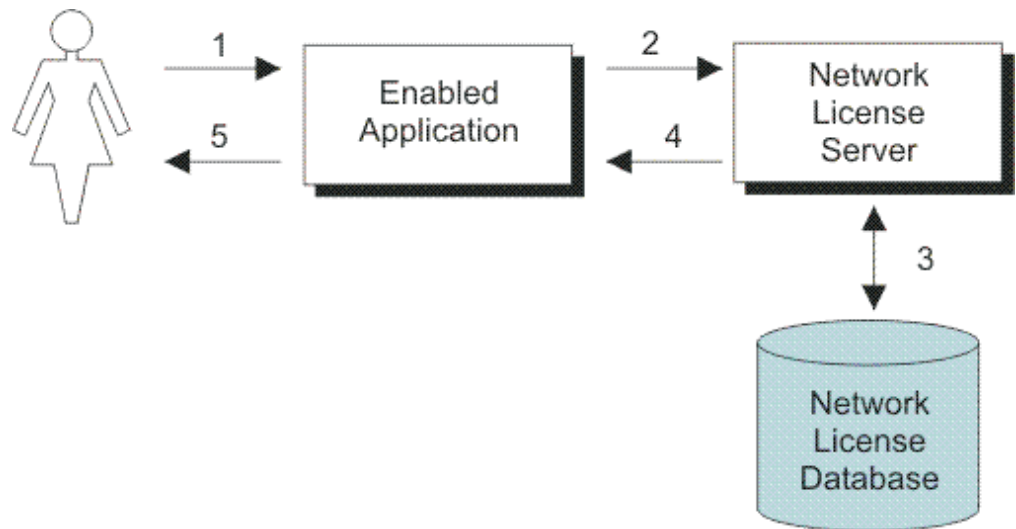


Figure 2. Using a Use-Once License

1. The user calls the application.
2. The application requests a license from the network license server.
3. The network license server checks its license database for an available license and the proper authorization.
4. The network license server returns the status of the request to the application. If a license is found and granted, the application runs, and one license is subtracted from the number of available use-once licenses.
5. If no license can be granted, depending on how the vendor enabled the product, the application might return information to the end user, or it might run even with no license available.

Working with Concurrent Licenses

Figure 3 on page 18 shows what happens when an end user calls an application with concurrent licenses.

Working with Concurrent Licenses

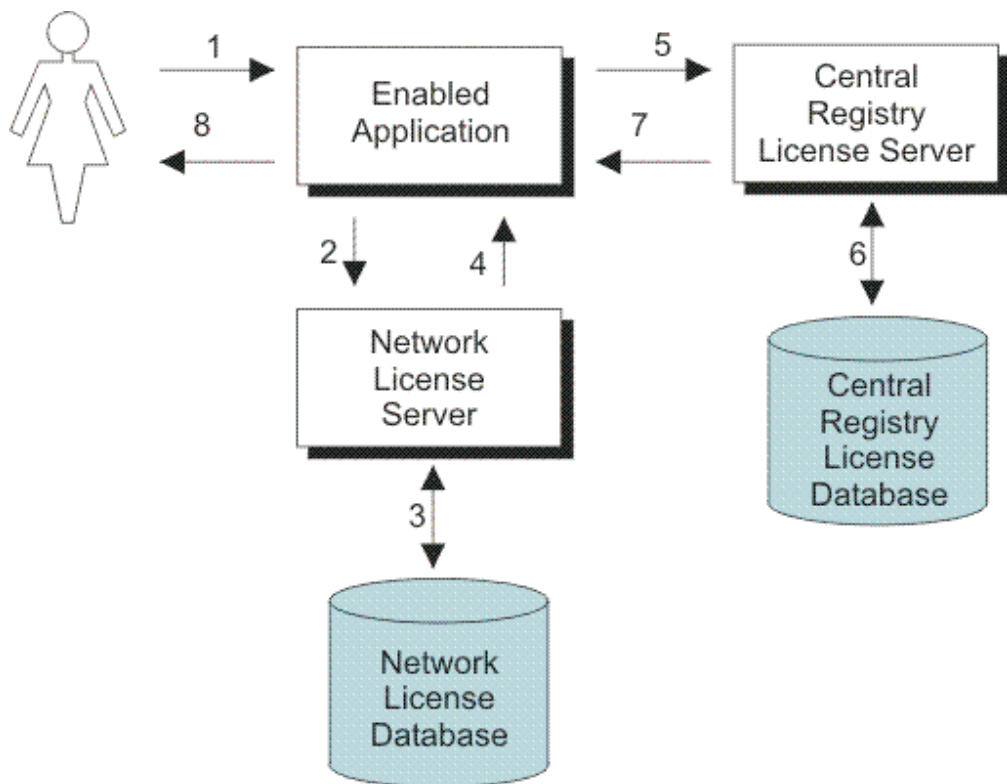


Figure 3. Using a Concurrent License

1. The user calls the application.
2. The application requests a license from the network license server.
3. The network license server checks the following:
 - The license server for an available license.
 - Its license database for an authorization record that allows a request for that license for the user and group specified in the client request.
4. The network license server returns the status of the request to the application. If a license is found and granted, the application runs.
5. If a network license is not available and the application implements the soft stop policy, the application requests a soft stop license.
6. The central registry license server checks its database for a soft stop license and the user file for authorization.
7. The central registry license server returns the status of the request to the application. If a soft stop license is granted, the application runs.
8. If no license can be granted, depending on how the vendor enabled the product, the application might return information to the end user, or it might run even with no license available.

Working with Concurrent-Offline Licenses

Figure 4 on page 19 shows what happens when an end user calls an application with offline licenses.

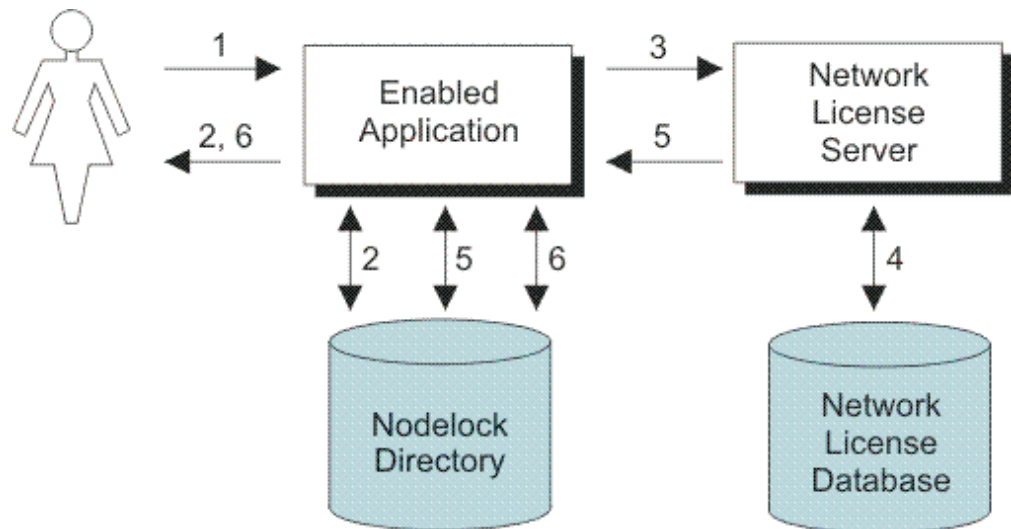


Figure 4. Using a Concurrent-Offline License

1. The user calls the application.
2. The application looks for an offline-nodelocked license in its nodelock directory. If a license is found and is valid, the application runs.
3. If the application does not find a license in the nodelock directory and the portable computer can reach a License Use Management network license server, the application requests a concurrent-offline license from it.
4. The network license server checks if the license has an authorization for the user, group, or for the target ID of the machine, and validates the password provided by the user.
5. If the authorization is for a concurrent-offline license, the server creates an offline-nodelocked license and copies it to the nodelock directory of the portable computer. The license is marked as in use on the server.
6. The application checks that the nodelock directory contains a valid license and the application starts. The application can now run without a connection to the License Use Management network license server (that is, the application can run on a portable computer).

Note: At the end of the reservation period, the copy of the license stored in the nodelock directory of the portable computer expires (the license can also be returned by the user before the reservation period expires). The license can be used by another user both as a normal concurrent license and as a new offline-nodelocked license.

Working with Reservable Licenses

Figure 5 on page 20 shows what happens when an end user calls an application with reservable licenses.

Working with Concurrent-Offline Licenses

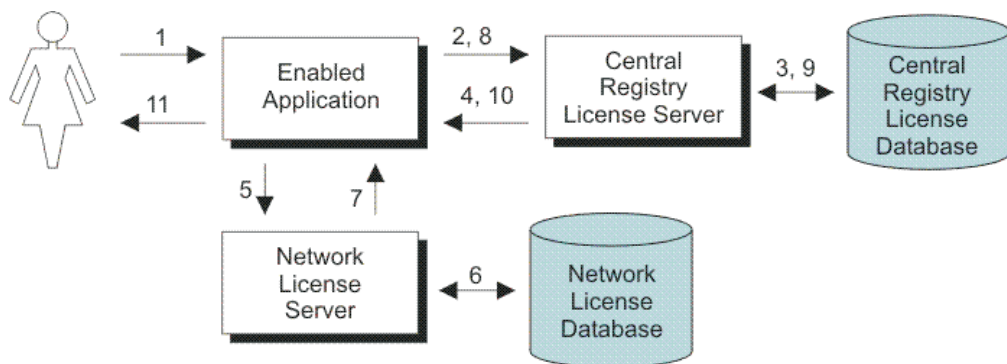


Figure 5. Using a Reservable License

1. The user calls the application.
2. The application requests a reserved license from the central registry license server.
3. The central registry license server checks its database for a reserved license and the user file for authorization. This is a license that you reserved for the user, group, and node.
4. The central registry license server returns the status of the request to the application. If a reserved license is found and granted, the application runs.
5. If a reserved license is not found, the application requests a reservable license from the network license server. This is a reservable license that you have not reserved for anyone.
6. The network license server checks its license database for a reservable license and the user file for authorization.
7. The network license server returns the status of the request to the application. If a reservable license is found and granted, the application runs.
8. If a reservable license is not found, and the application implements the soft stop policy, it requests a soft stop reservable license from the central registry license server.
9. The central registry license server checks its database for a soft-stop reservable license and the user file for authorization.
10. The central registry license server returns the status of the request to the application. If a soft stop license is granted, the application runs.
11. If no license can be granted, depending on how the vendor enabled the product, the application might return information to the end user, or it might run even with no license available.

Working with Per-Seat Licenses

Figure 6 on page 21 shows what happens when an end user calls an application with per-seat licenses when per-seat has been enabled. In the figure, the application server is license-enabled.

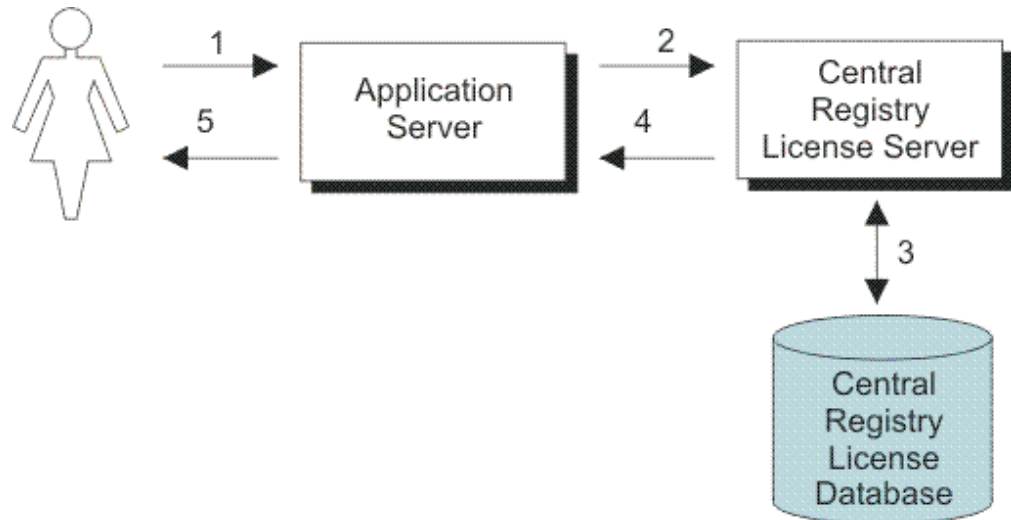


Figure 6. Using a Per-Seat License

1. The application client user calls the application.
2. The application server requests a per-seat license from the central registry license server on behalf of its application client.
3. The central registry license server checks whether a license is already being used by the requesting application client, possibly granted through another application server. In such a case the application can start without having a new license granted. Otherwise, the central registry license server checks whether a per-seat license is available. If so, it grants the license and records the application client identifier. If no per-seat license is available, but the application implements the soft stop policy, the central registry license server checks for a soft stop license.
4. The central registry license server returns the status of the request to the application server, and the application runs.
5. If no license can be granted, depending on how the vendor enabled the product, the application might return information to the end user, or it might run even with no license available.

Working with Per-Seat Licenses

Chapter 2. Planning Network Licensing

This chapter is for the administrator who is setting up an environment to allow multiple client workstations to share licenses stored on one or more network license servers. Skip this chapter if both of the following are true:

- You are using applications with nodelocked licenses only
- You do not intend to use the basic license tool from one workstation to administer licenses on other workstations

Designing the network licensing environment that provides the best solution for your business requires careful and thoughtful planning. This chapter will assist you, as the system administrator, to plan the environment for network-licensed products and to decide on the configuration options you need.

It is important that you allow enough time for planning, especially when using License Use Management Runtime in large networks or across subnetworks.

The decisions you need to make include the following:

- How many network license servers you will set up
- Which workstations, if any, will be the network license servers
- How you will distribute product licenses among the network license servers
- Which clients will have access to which servers
- How clients will locate the servers
- Whether all servers will serve all clients, or whether you will set up independent groups of servers and clients
- Which workstation will be the central registry (if required)
- Whether you will make use of License Use Management Runtime high-availability licensing; and, if so, which network license servers will be part of a cluster
- Whether and how you will make use of remote administration to administer from one workstation the network licenses on other workstations
- Whether your network will be configured with firewalls.

Selecting Your Servers

The license server system depends on a stable network. If name resolution and routing in a network are not running properly, then the network license servers, network license clients, and central registry license server might be unable to communicate properly.

In designating workstations to be network license servers or the central registry license server, keep the following criteria in mind:

- A license server should be a computer that stays on at all times. Workstations that are frequently unavailable or unreliable, such as those that are brought down often for testing or maintenance, are not good candidates.
- It is important to keep license servers for production environments separate from those for test environments.

- If you have multiple subnetworks, then ideally, the servers should be on the same subnetwork as the majority of clients that will run the licensed products. Accessing in another subnetwork, across a bridge or router, might not be quite as fast.

If the network spans subnetworks, you need to spread the licenses out among network license servers. Also, inside the same network, each client request for a license generates network traffic. Therefore, it can be useful to spread the application licenses across more than one network license server, and across multiple platforms. When a computer is down, the licenses assigned to the network license server on that system are unavailable, but licenses assigned to other network license servers remain available. Having several license servers on the network will help to prevent bottlenecks that result when many clients communicate with a single network license server.

The number of network license servers in the network should be proportional to the frequency of license requests rather than to the number of users. For example, suppose that a compiler and a word processor are both license-enabled. A single user running many short compilations will place a heavier load on the license server than many users each starting the word processor once.

Computers that function as network license servers or as the central registry can also run the license-enabled products. The license server software does not have a noticeable effect on the performance of products.

When you have identified the network license servers, and before you configure them, you must organize the servers into one or more groups. The servers in a group form an independent licensing environment and serve a common set of clients. You must also identify a central registry license server for the group, if it requires one. “Using Direct Binding” will help you to group your servers.

Using Direct Binding



License Use Management Runtime provides the direct binding network configuration to enable clients to locate (or *bind to*) the network license servers and the central registry.

Make a list of your network license servers and the central registry. The list is called the *direct binding servers list* in this chapter and in the configuration scenarios in “Setting Up Your Servers and Clients” on page 51.

During configuration of servers and clients, you specify the network addresses of all the servers on the list. The network addresses are stored on every server and every client in a configuration file.

All network license servers, and the central registry license server, listen for incoming communications on ports:

Table 4. Communication Ports Used

Protocol	Ports	Operating Environments and Systems
UDP/IP	2215, 10998	AIX, Windows XP, Windows Server 2003, and Windows Vista

The network license client uses these port numbers, together with the network addresses of the server systems that are specified in the configuration file, to locate and connect to the servers.

In addition to enabling clients to locate license servers, the direct binding mechanism makes it possible, from any license server, to use the basic license tool remotely to administer licenses on all the servers in the direct binding list.

Performance Considerations

Assuming that licenses are equally spread over all the license servers and that all servers belong to the same licensing environment, keep in mind that workload balance is not automatic. The license system administrator must simulate it arranging the clients' Direct Binding list so that each license server occupies different positions on the same number of clients.

In all cases in which there is discretion in deciding the order of the servers, consider the following:

- What has to be balanced is not the number of client workstations, but the number of application clients; if more than one enabled application runs on a workstation this must be taken into account.
- The frequency of license requests and license checks is relevant. That is, applications that frequently request and check licenses impact server performance more than applications that request and check licenses in longer time intervals. Fast applications that are frequently run belong to this category.
- In a normal environment, clients reach servers on the same subnetwork more quickly.

On the client side, clients are configured in direct binding only. Workload balancing over multiple servers is not automatic, you must simulate it. This can be done by varying the order of the servers in the clients' direct binding list so that the servers occupy different positions on the same number of clients. This scenario makes sense if some clients need to contact only a subset of the license servers in the licensing system. These clients might be configured to contact only the servers they actually need to reach.

Planning Direct Binding



Before you begin configuring workstations, be sure you have identified all the servers in your direct binding servers list and refer to the configuration scenarios in "Setting Up Your Servers and Clients" on page 51. As you configure direct binding at each server and at each client, be sure you enter exactly the same list of servers.

It is important that the direct binding servers list include all the servers, and that it excludes workstations that will not function as servers. If there are any workstations that are not servers in the list, there will be a noticeable effect on performance.

When a network license client requests a license, and multiple servers have licenses for the product, the servers are checked for an available license in the sequence in which they were entered into the direct binding servers list during configuration of the client. Therefore, if you know how frequently specific network

license clients will request licenses for specific products, you might be able to balance the workload of the servers by varying the sequence in which servers are defined at different clients.

If all the licenses requested by a particular network license client are to be supplied by a subset of the servers, when you configure the client you might configure direct binding with just those servers, rather than all servers in the direct binding servers list. This will improve performance. If you configure the client in this way, make sure that it is configured to communicate with the necessary servers; otherwise, it will not obtain licenses.

Planning the Central Registry

ALL

The central registry license server subsystem provides a mechanism for storing licensing information in a database common to all the servers. It is used for the administration of customer-managed use products and products with reservable licenses. Only one central registry subsystem must be running in a direct binding servers list. This ensures that the data is accurate and complete.

Notes:

1. Use the configuration tool to specify where to start the central registry.
2. Select the node where you will run the central registry carefully. After you place the central registry on a node, it cannot be moved.
3. The workstation running the central registry must be up and running in order to perform administration tasks on network customer-managed products or on products using reservable licenses.

Planning Clusters for High-Availability Licensing

High-availability licensing is recommended only for users who are already experienced with managing individual license servers and who already have a stable licensing environment working.

For high-availability licensing, you set up clusters of network license servers connected through TCP/IP. For concurrent licenses with vendor-managed use control only, the independent software vendor generates passwords that are bound to the cluster rather than to a single server. Some of the servers in a cluster serve licenses, while others wait in reserve to take over in case a serving server goes down. The servers that are serving at any time share equally the responsibility for the licenses that are bound to the cluster, and keep one another informed about the status of the licenses.

You can create and administer a cluster, and administer high-availability licenses, from any workstation.

A network license server that is a member of a cluster can serve licenses that are bound to the server, and participate as a member of a cluster at the same time.

Restrictions on Cluster Size and Composition

For security reasons, it is necessary to impose strict rules on the size and composition of clusters.

Attention: Be very careful when you decide how many and which servers to put in a cluster. You will not be able to change your decisions after the fact and they will affect the size and composition of the cluster as long as it exists.

When you create a cluster, you specify the initial number of servers in the cluster, and which servers they are. The initial number must be in the range 3 through 10. The first server assigned to the cluster is automatically activated; that is, it is available to participate in serving licenses as part of the cluster. You must explicitly activate the other members.

The initial number of servers dictates two important attributes of the cluster:

- The minimum number of servers that must be activated in the cluster for the cluster to work
- The maximum number of servers that can be added to the cluster in addition to the initial number

If you want to replace a server workstation that is one of the initial minimum number, to upgrade the hardware or to replace failing hardware, add a new server to the cluster. The number of new servers you can add, even to replace other servers, is limited.

Attention: The initial minimum number of servers must always be in the cluster; they must not be deactivated. If any is deactivated, the cluster ceases to serve licenses.

Passwords that are bound to a cluster are usable on only that cluster. If you find it necessary to delete a cluster and create a new one, or to create additional clusters, you will not be able to use existing passwords on the new cluster.

Note: To delete a cluster, deactivate all its members. When you deactivate a server, it must be up and running.

After a cluster has been created and its members have been activated, the number of activated members determines how many servers must be up and running for the cluster to function.

The relationships between these cluster attributes is shown in Table 5 on page 28.

The minimum number of servers up and running, as shown in the table, is the number of servers that serve licenses. All servers beyond that number are in reserve, waiting to take over if a serving server goes down.

Table 5. Number of Servers in a Cluster

Initial Number	Minimum Activated for Cluster to Work	Maximum Added after Cluster Creation	Actual Activated	Minimum Up and Running for Cluster to Work
3	2	1	2 3 4	2 2 3
4	4	2	4 5 6	3 3 4
5	4	1	4 5 6	3 3 4
6	6	2	6 7 8	4 4 5
7	6	1	6 7 8	4 4 5
8	8	2	8 9 10	5 5 6
9	8	1	8 9 10	5 5 6
10	10	2	10 11 12	6 6 7

Examples of Cluster Size Rules

Example 1: Initial number of servers is 3

The following rules apply:

- During the life of the cluster, you can add only one server to the cluster, but the first two servers declared in the cluster cannot be replaced (due to security exposure). This means you can add a new server with upgraded hardware, and deactivate the original third declared server, only once during the life of the cluster. This scenario has the effect of replacing a server with an upgraded workstation. Alternatively, you can add a fourth server to the cluster without deactivating any of the original three, thus increasing the cluster size to four servers. Again, you can add a server only once.

The relationships between these cluster attributes is shown in Table 5.

- More than half of the activated servers must be up and running for the cluster to work.

Table 6 on page 29 shows how the servers are deployed, depending on how many are activated, and how many are up and running.

Table 6. Example - Cluster with Three Initial Members

Number of Activated Members	Number of Members Up and Running	Number of Members Serving Licenses	Number of Servers In Reserve
2	2	2	0*
3	2 3	2 2	0* 1
4	3 4	3 3	0* 1

* When the number of servers in reserve is 0, there is no high-availability advantage.

Example 2: Initial number of servers is 6.

The following rules apply:

- During the life of the cluster, you can add two servers to the cluster, but the first six servers declared in the cluster cannot be replaced (due to security exposure). The relationships between these cluster attributes is shown in Table 5 on page 28.
- Whether the cluster has six, seven, or eight members, at least six members must be activated for the cluster to work.
- More than half of the activated servers must be up and running for the cluster to work.

Table 7 shows how the servers are deployed, depending on how many are activated, and how many are up and running.

Table 7. Example - Cluster with Six Initial Members

Number of Activated Members	Number of Members Up and Running	Number of Members Serving Licenses	Number of Servers In Reserve
6	4 5 6	4 4 4	0* 1 2
7	4 5 6 7	4 4 4 4	0* 1 2 3
8	5 6 7 8	5 5 5 5	0* 1 2 3

* When the number of servers in reserve is 0, there is no high-availability advantage.

Cluster Membership Considerations

If you want to take full advantage of the high availability of licenses, make sure the following have the cluster servers in their direct server binding lists:

1. The network clients that will use licenses bound to the cluster
2. All the servers of the cluster

If you use HAL with remote administration disabled, there are some important points to take into consideration:

- All cluster members must adhere to the same remote administration policy (that is, either all disabled, or all enabled).
- From a remote administration point of view, the cluster behaves as a single server.
- If remote administration is disabled, it is not possible to enroll or delete licenses from a machine that is not a cluster member.
- A cluster can be created only if the request comes from the local node. Cluster members can be deactivated only from another cluster member.

A server can be activated in only one cluster at any time. If you assign a server to a cluster and never activate it, or explicitly deactivate it, it can join a second cluster and be activated there. But in this case, the server cannot be activated in its original cluster, and no other server can be substituted in the original cluster. To reactivate the server in its original cluster, you must first deactivate it in the second cluster.

Firewall Support

If a server runs behind a firewall with respect to the client side, the client-server communications are prevented. This method increases the level of security on those special company assets which are represented by the LUM License Electronic Certificates. In this way nobody outside the Local Area Network of the company that purchased the certificates can have a license granted from the company server.

Figure 7 on page 31 shows an example of a network configuration that uses a firewall. The example shows a network consisting of a network license server and three network license clients on the protected side of a firewall, and two network license clients on the unprotected side of a firewall.

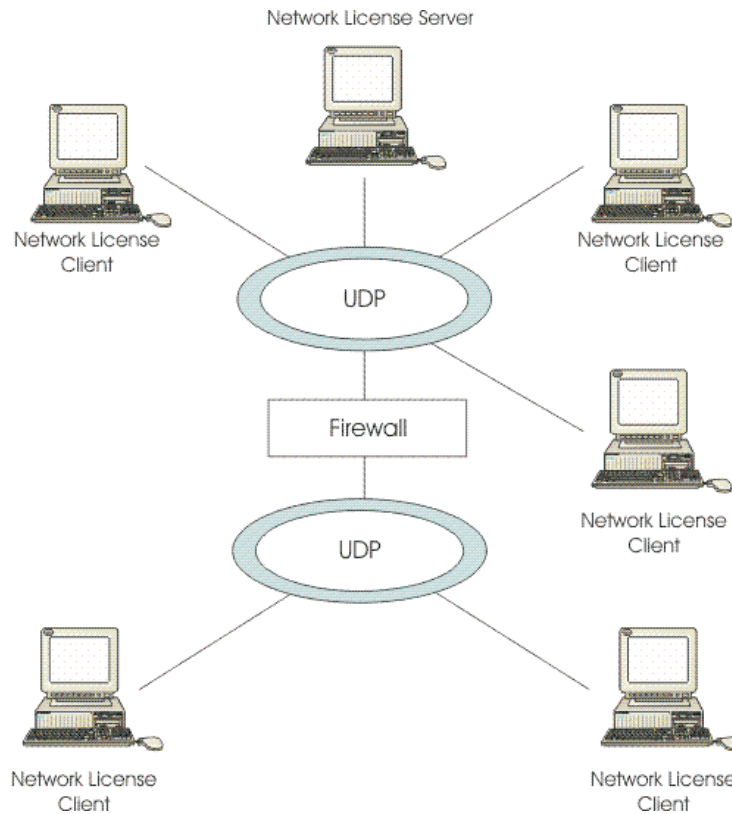


Figure 7. Direct Binding with Network License Servers, Firewall, and Network License Clients

License server communications take place on two ports. The main server port is defined (*ipPort* in the configuration file), however, server responses to client requests for authentication take place on a secondary, randomly chosen, port. This is why client/server communications cannot take place through a firewall. If the port number is defined, communications can take place through a firewall, once the firewall administrator has applied proper rules to UDP packets flowing to/from the license server on that port number.

Firewall support has been introduced, based on the customization of the server authentication port. This is represented by a new **ipAuthPort=** tag in the configuration file. By default the port number is randomly chosen, but if a specific value is set then the authentication server port will be fixed to that value, for example:

```
ipAuthPort=2216
```

Using this method, it is possible to install the LUM license server inside the company LAN, protected by the firewall, and to enable the incoming connections of LUM clients from, for example, a DeMilitarized Zone (DMZ), by opening the firewall on the two ports used by the server. Packets directed the opposite way, from the LAN to the DMZ, must not be filtered by the firewall.

When configured to support clients through a firewall License administration is permitted only when the basic license tool is run on the same machine as the license server. When multiple servers are connected to set up a High Availability Licensing cluster environment, all the server members of the cluster must be placed in the same side of the firewall.

The main server port number can be changed through the panels of the LUM Configuration tool or its command line interface. However, the authentication port number can be changed only by editing the lum_ini.txt configuration file.

Only the network license server can use firewall support, the central registry license server is excluded from using a firewall.

Note: Support is not included for configurations where the firewall includes dynamic network address translation (NAT) or dynamic port address translation (PAT).

Verifying Network Connections

License Use Management Runtime provides the LUMtv tool to verify that network license servers, and the central registry, are running properly. For information on how to use the tool, see “LUMtv - Test Verification Tool” on page 142.

Chapter 3. Installing License Use Management Runtime

This chapter is intended for administrators that are using license-enabled products and for software programmers who are developing license-enabled products. The following sections show you how to install License Use Management Runtime on AIX and Windows.

Attention: If any other license management product is installed on the machines in your environment, you must be aware of certain requirements before you install. Be sure you read Chapter 2, “Planning Network Licensing” carefully. Considerations for coexistence with other license management products are in the section Selecting Your Servers.

Installing License Use Management Runtime on AIX 5

The License Use Management Runtime base code is delivered with the basic operating system components for every machine that runs AIX 5.2.0.30 or higher. This section shows you how to install the latest version of License Use Management Runtime on AIX 5.

Note: If the License Use Management Runtime code is incorporated in the license-enabled product, you can install License Use Management Runtime packages as part of the installation of the licensed product, rather than by using the procedures in this section.

Before Installing License Use Management Runtime Packages

This section identifies the components of License Use Management Runtime and gives their disk space requirements. It also gives the hardware and software requirements for License Use Management Runtime. This section explains how to determine the level of License Use Management Runtime installed on a system. It explains how to determine whether you need to install License Use Management Runtime.

License Use Management Runtime Packages, Components, Disk Space Requirements

Before installing License Use Management Runtime, allocate sufficient disk space in the /opt file system. Table 8 identifies the components of License Use Management Runtime and gives their disk space requirements.

Table 8. License Use Management Runtime Packages, their Components, and their Disk Space Requirements on AIX 5

Package	License Use Management Runtime Component	Disk Space
lum.base.cli	Base code and command-line interface	50 MB
lum.base.gui	Base GUI	15 MB
lum.html.en_US	LUM documentation	10 MB

Note: The default directory for these packages is /usr/sys/inst.images.

License Use Management Runtime also requires space in the /var file system for databases, log files, and trace output. If you are using several licensed products

and there is extensive activity on your system, License Use Management Runtime might need 10 MB up to 100 MB or more in /var.

For an overview of the packages, see “Installing License Use Management Runtime Components.”

Hardware and Software Requirements

License Use Management Runtime requires a system that can run AIX 5.2.0.30 or higher.

GUI Requirements: Java Runtime Environment, as follows:

- Java Runtime Environment 1.4.1, or later.

The License Use Management Runtime Java GUI requires a minimum of 192 MB of RAM.

Determining the Level of License Use Management Runtime Installed

If you need to determine the level of License Use Management Runtime Version 5 already installed on your workstation, check the file:

/var/LicenseUseManagement/VERSION

Use the smitty List Installed Software panel. Next to each License Use Management Runtime fileset:

- 5.1.0.0 indicates License Use Management Runtime Version 5.1.0
- 5.1.1.0 indicates License Use Management Runtime Version 5.1.1
- 5.1.2.0 indicates License Use Management Runtime version 5.1.2

Installing License Use Management Runtime Components

This section outlines the content of the License Use Management Runtime packages, summarizes the installation procedure, and provides instructions on what to install from which package.

You can install License Use Management Runtime from the AIX installation media. Before you install License Use Management Runtime packages, make a backup copy of the originals.

Log in with root authority, and use the smit command to install License Use Management Runtime from the following packages:

- **lum.base.cli.** This is the runtime code and the command line interface for the basic license tool and the configuration tool.
- **lum.base.gui.** The Java graphical user interface for the basic license tool and the configuration tool.

The sequence of smit panels to follow is:

1. Software Installation and Maintenance.
2. Install and Update Software.
3. Install Software.

If you do not have a graphical terminal, use the smitty command.

Setting Up the .profile File

After installation, and before starting License Use Management Runtime, log in with root authority and check that there is a .profile file. If there is not, create it and add the following path to the .profile:

```
PATH=/opt/LicenseUseManagement/bin:$PATH
```

The default directory for the .profile file of the user **root** is /. License Use Management Runtime looks for this file and automatically updates it, if it is found. However the user **root** can choose to change the location of its .profile file. In this case License Use Management Runtime cannot perform the automatic update and it must be done manually by the user **root**. A typical path for the root .profile file is /home/root.

You might also need to add a path for the man pages. For details, see “MAN Pages for Command Syntax” on page xii.

Exit and log in again for the changes to take effect.

Uninstalling License Use Management Runtime Packages

This section describes how to remove the License Use Management Runtime packages from your workstations:

The GUI file sets can be removed without removing the base file sets. Removal of the base file sets requires the removal of the GUI file sets.

Uninstall the packages and file sets in the following sequence:

1. The License Use Management Runtime GUI, lum.base.gui.
2. The License Use Management Runtime CLI, lum.base.cli.

The uninstallation procedure does not delete the License Use Management Runtime databases, which are in the /var/LicenseUseManagement/ directory.

Use the smit command to uninstall License Use Management Runtime. If you do not have a graphical terminal, use the smitty command.

Installing License Use Management Runtime on Windows



This section is intended for:

- The independent software vendor who needs to install License Use Management Runtime on Windows Server 2003, Windows XP or Windows Vista for use in license-enabling a product.
- The customer of a license-enabled product if the vendor did not incorporate the License Use Management Runtime features into the product.

Before You Install

Read this section to be sure you have everything you need and that you have made the necessary decisions before installing.

Note: To install License Use Management Runtime, you must log in as a user with administrator privileges. This ensures that the path and registry information is updated during the installation. If you try to install License Use Management Runtime from another user ID, the installation program issues the message:

Installation stopped. Only the user administrator can install License Use Management Runtime.

Note: To use License Use Management tools on Windows Vista, you must increase the rights to the Administrator level, switching to the elevated mode. This behavior is introduced in the Windows Vista operating system only as a brand new concept of *User Account Control (UAC)*. For more information see the Windows Vista site.

To determine whether License Use Management Runtime is already installed on your workstation, refer to the following file:

c:\Documents and Settings\All Users\Application Data\IBM\License Use Management\version

Selecting License Use Management Runtime Features

License Use Management Runtime consists of these features:

- License Use Management Runtime. This contains a sub feature named Java GUI.
- Documentation

Install the Documentation feature on any workstation to give you access to the online *Using License Use Management Runtime* and *Message Reference* books, in .HTML format for viewing with a Web browser.

Hardware Requirements

The hardware requirements for the various Windows platforms are shown in Table 9.

Table 9. Hardware Requirements

Minimum		Suggested	
Processor	RAM	Processor	RAM
1.5 GHz Pentium® IV	512 MB	2.0 GHz Pentium IV or higher	1 GB

Before installing, make sure that there is enough disk space for the features, as shown in Table 10.

Table 10. Disk Space Requirements

Feature	Requirement
Java GUI	60 MB
License Use Management Runtime	15 MB
Documentation	10 MB

Software Requirements

- One of the following operating systems:
 - Windows XP with Service Pack 1
 - Windows Server 2003
 - Windows Vista

- For all supported Windows platforms:
 - A device driver that complies with network driver interface specification (NDIS) 4
 - The latest level of the device driver. To determine the latest level of IBM device drivers, see:
<http://www.networking.ibm.com>
 - The LUMtarget executable. If License Use Management Runtime is not yet installed on the workstation, you can download it from the License Use Management Web site:
<http://www-306.ibm.com/software/awdtools/lum/support.html>
 or the vendor of a license-enabled product can supply it to you.
- The TCP/IP transport protocol.

If the prerequisites are not met, the hardware-based target ID is not generated.

Obtaining the License Use Management Runtime Code

1. Download the self-extracting EXE or the compressed equivalent TAR/ZIP file from: <http://www-306.ibm.com/software/awdtools/lum/support.html>
2. Run the self-extracting EXE or uncompress the equivalent TAR/ZIP file.

Deciding How to Install

Before you install, you need to decide:

- Whether to install interactively, using the installation GUI (see “Installing License Use Management Runtime Interactively”)
- Whether to install noninteractively, using the setup command (see “Installing License Use Management Runtime Noninteractively” on page 47)

Installation Considerations

Windows Installer is used for installing License Use Management Runtime.

If License Use Management Runtime program files are damaged and need to be replaced, run the setup program again, and select the **Repair** option.

Installing License Use Management Runtime Interactively

To install License Use Management Runtime interactively, follow these steps:

1. Log on as Administrator.
2. Shut down any currently running programs, including virus scanning programs.
3. Start the installation program:
 - Switch to the directory to which you have downloaded the code, and run setup or the self-extracting EXE file.
 The Welcome window is displayed (see Figure 8 on page 38).

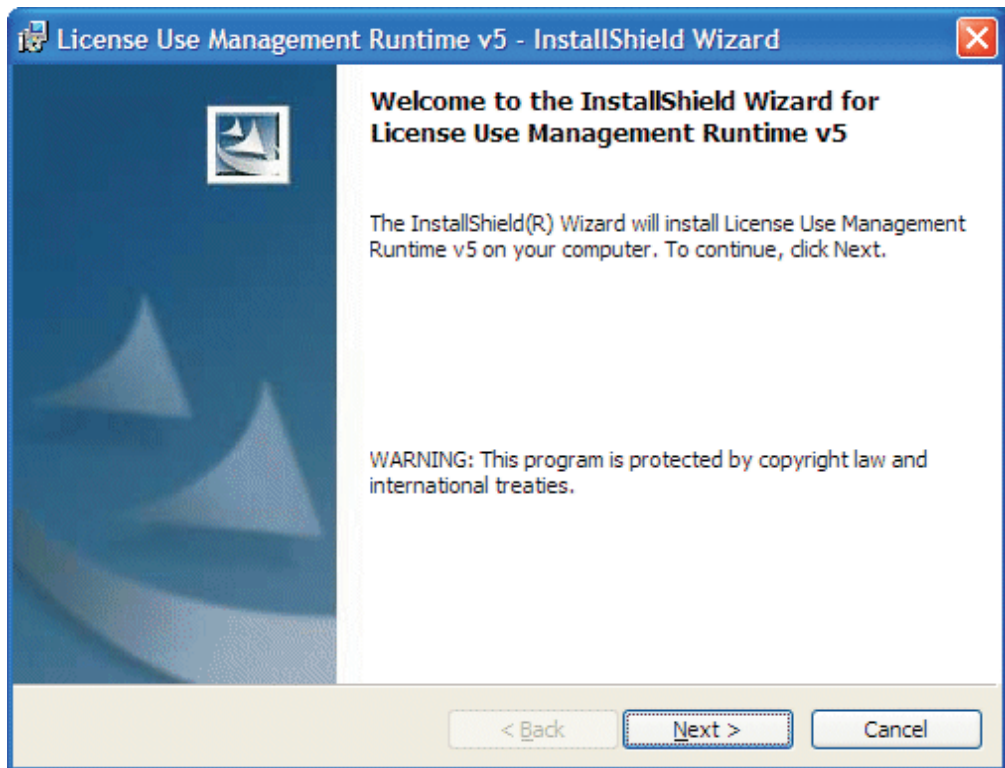


Figure 8. Welcome Window

4. In the Welcome window, select **Next >**.
The License Agreement Window is displayed (see Figure 9 on page 39).

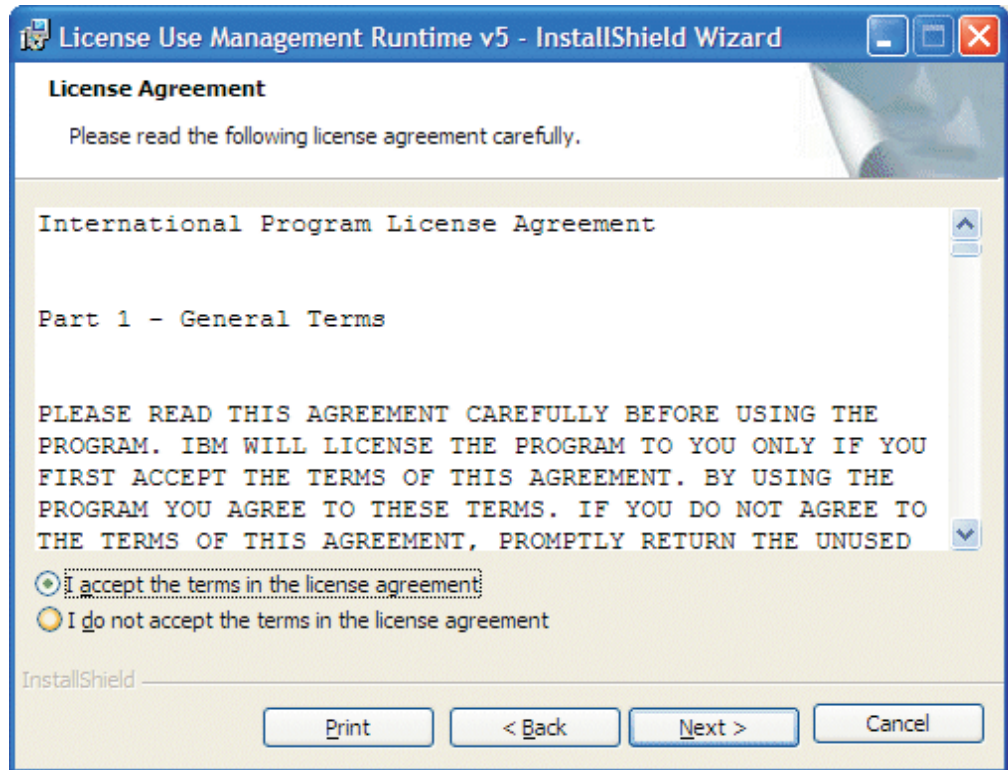


Figure 9. The License Agreement Window

5. In the License Agreement window, choose **I accept the terms in the license agreement** and select **Next >**.

The READ.ME file for License Use Management Runtime is displayed (see Figure 10 on page 40).

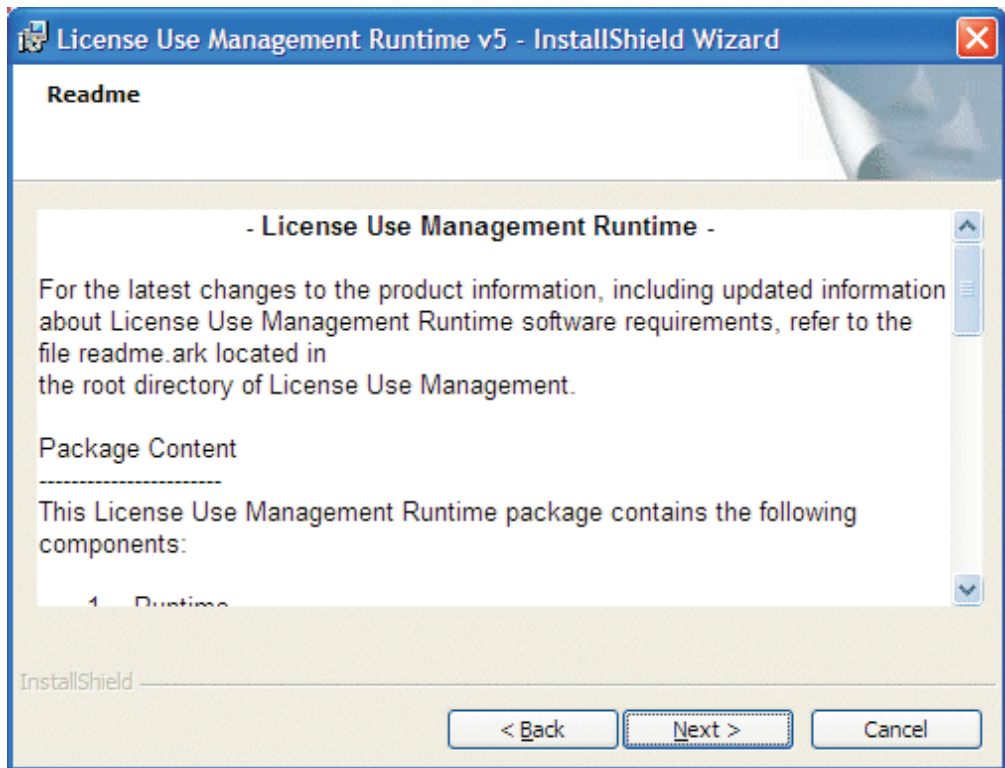


Figure 10. READ.ME Window. The text displayed on your monitor might be different from that shown here.

This file contains an overview of the installation procedure.

6. When you have read the document, select **Next >**.

The Customer Information window is displayed (see Figure 11 on page 41).

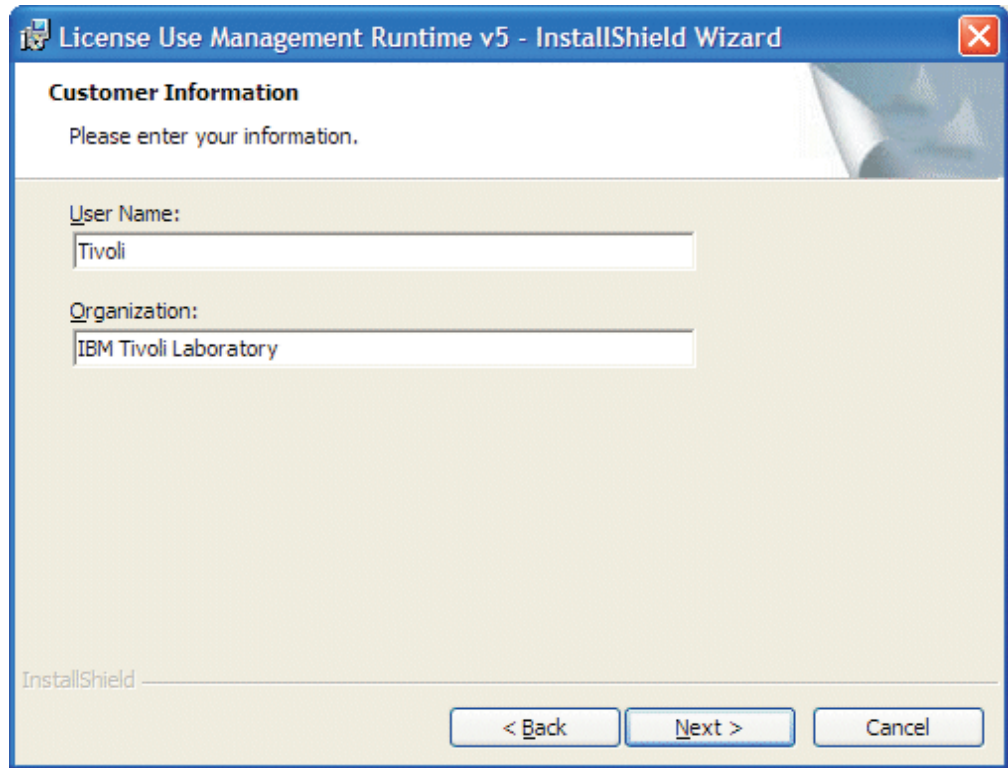


Figure 11. Customer Information Window

7. Enter your customer details, then click **Next >**. The Setup Type window is displayed (see Figure 12 on page 42).

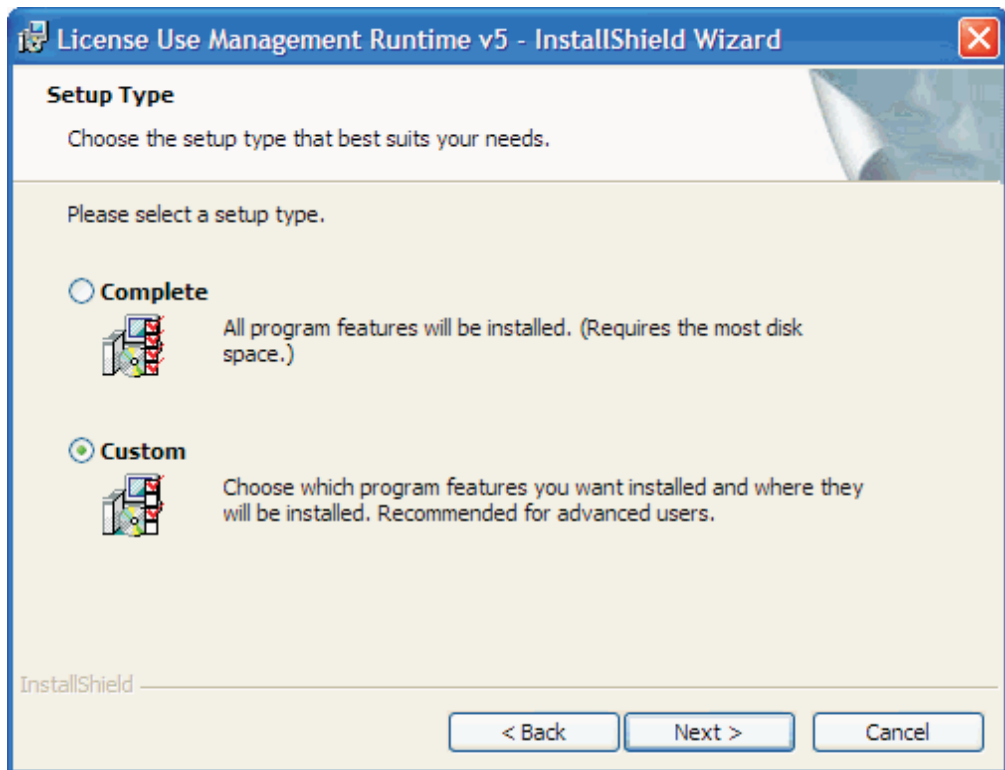


Figure 12. Setup Type Window

8. Choose **Complete** or **Custom** setup. If you choose Custom setup, you will be able to specify the disk drive on which to install License Use Management Runtime and the features to install.
9. Click **Next >**.
The Custom Setup window is displayed (see Figure 13 on page 43).

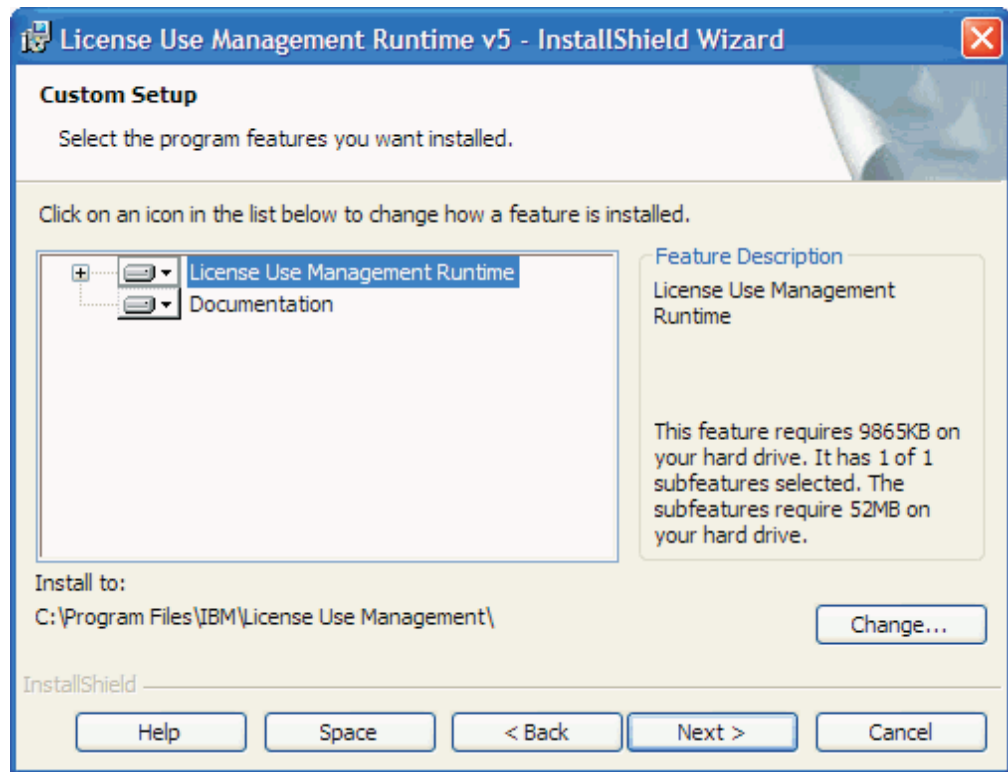


Figure 13. Custom Configuration Window

By default, all the features will be installed on the drive on which the operating system is installed. If you want to install all the features on that drive, go to step 15 on page 45.

If you want to install the features on a different drive, go to step 10.

If you want to install only one or two features, go to step 13 on page 44.

10. To change the drive on which to install the features, click **Change...**

The Change Current Destination Drive window is displayed (see Figure 14 on page 44).

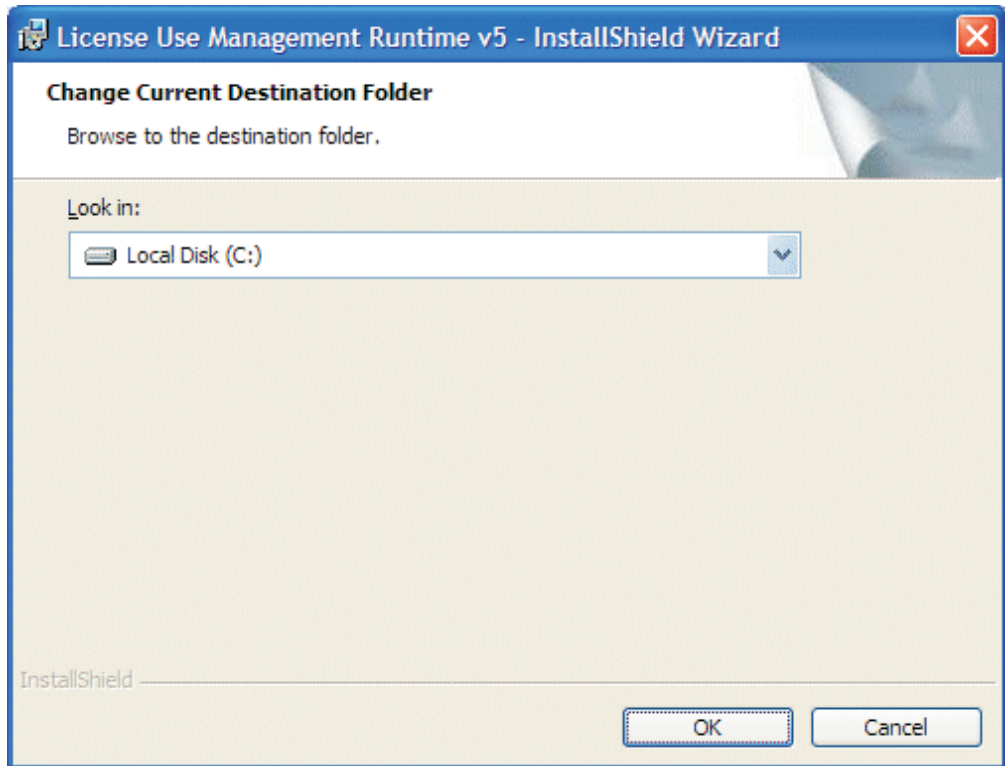


Figure 14. Change Current Destination Drive Window

11. Select the drive from the **Look in** drop-down list.

Notes:

- a. Specify the drive only. The product is always installed in the Program Files\IBM\License Use Management directory. Do not specify a folder name in the **Drive letter** field.
- b. If the Application Developer's Toolkit is installed on the workstation, License Use Management Runtime is always installed on the same drive.

12. Click **OK**.

The Custom Setup window is displayed again, showing the changed drive information.

If you want to install all the features, continue at step 15 on page 45

13. To not install a feature, click the icon:



beside its name.

The feature selection menu is displayed (see Figure 15).

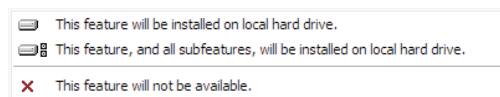


Figure 15. Feature Selection Menu

14. Select the choice **This feature will not be available**. The icon changes to:



to indicate that the feature will not be installed.

15. Click **Next >**. The Ready to Install the Program window is displayed (see Figure 16).

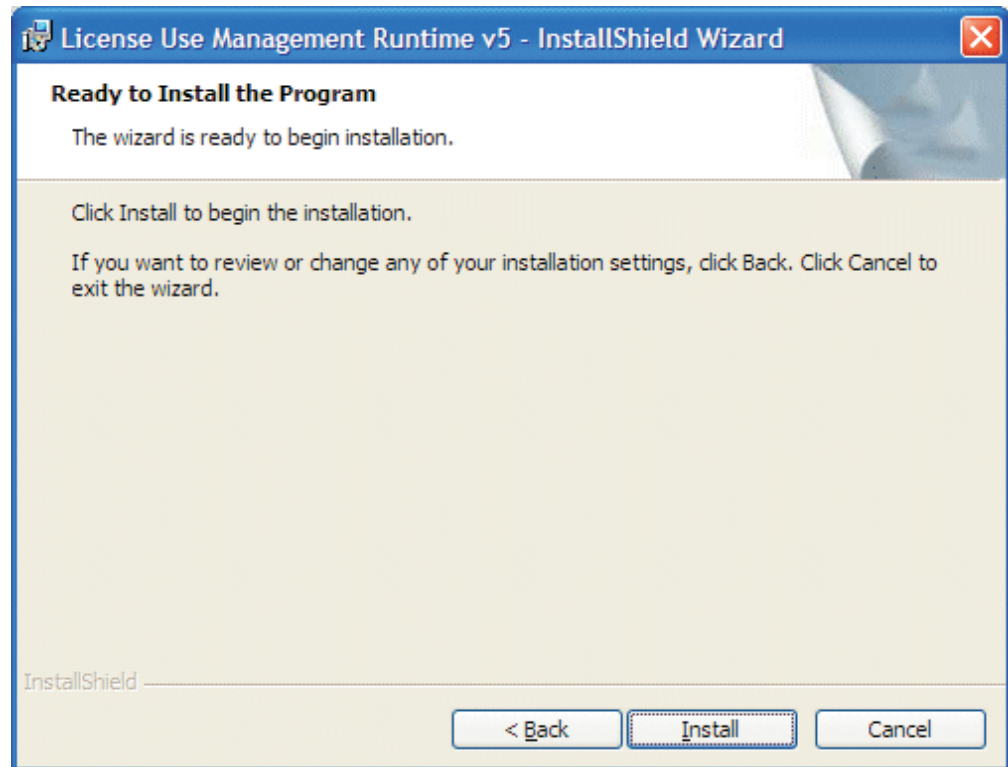


Figure 16. Ready to Install Program Window

16. Click **Next >**.
The Installing License Use Management Runtime window is displayed (see Figure 17 on page 46), and License Use Management Runtime starts to copy files.

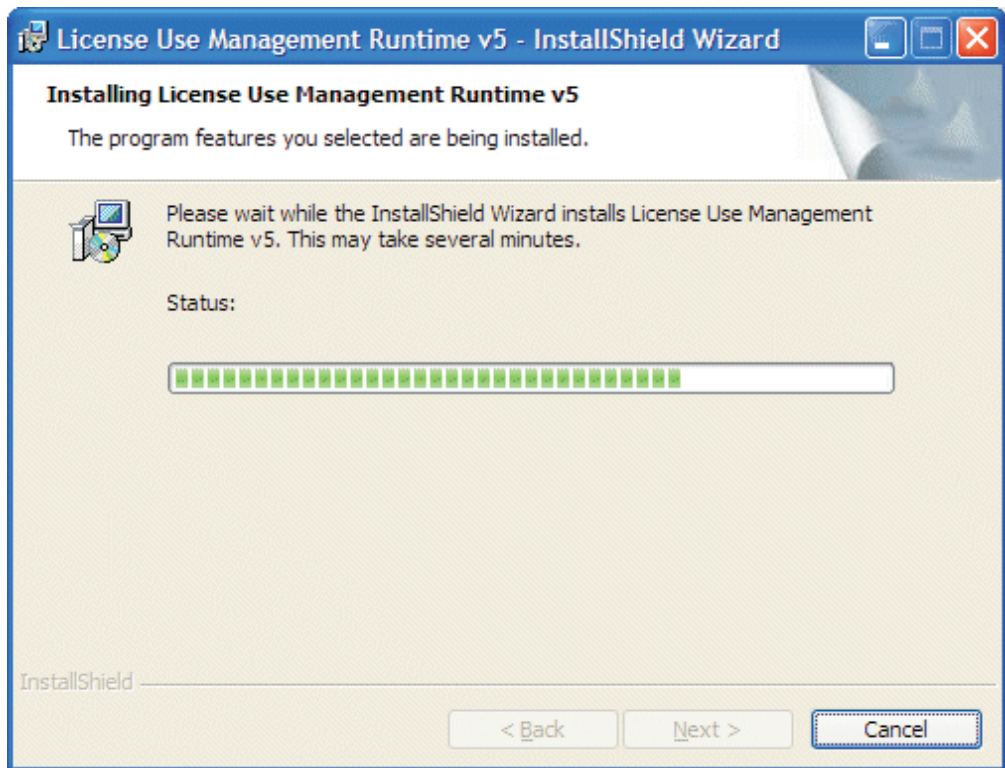


Figure 17. Installing License Use Management Runtime Window

If you get the message:
Unable to update PATH system variable.

Add the following path manually:

```
c:\Program Files\IBM\License Use Management\bin;
c:\Program Files\IBM\License Use Management\bin\en_US
```

Windows has not updated the PATH environment variable, because the sum of the length of the current environment variable plus the length of the environment variable would exceed 1024 bytes. See “Verifying and Updating the PATH Environment Variable” on page 48 for information about how to manually add the License Use Management Runtime path information.

When installation is complete, the InstallShield Wizard Completed window is displayed.

17. Click **Finish**.

You can start using License Use Management Runtime immediately.

18. If you are planning to use the machine in a Windows Terminal Server environment, run the **LUMregister.cmd** script (located in the Windows/Application Compatibility Scripts/Install directory) to register the DLLs.

License Use Management Runtime is installed on your workstation, and a folder called License Use Runtime v5 is added to the Programs menu.

After installation you must configure License Use Management Runtime as explained in Chapter 4, “Configuring License Use Management Runtime,” on page 51.

Installing after a Version 5.1.2 Uninstallation

If you uninstall Version 5.1.2, your existing license databases are not deleted. They remain in the directory `c:\Documents and Settings\All Users\Application Data\IBM\License Use Management\`. If you then re-install License Use Management Runtime Version 5.1.2, the installation process renames the databases to have an extension of `.old`. If you want to use the old databases, follow these steps:

1. Enter the following sequence of commands:

```
LUMcfg -stop
cd c:\Documents and Settings\All Users\Application Data\IBM\
License Use Management
dir
```

2. Look for the following files in the `Documents and Settings\All Users\Application Data\IBM\License Use Management\` directory list, and if present, perform the appropriate actions, in the order shown:

Step	If these files are present:	Enter the following commands:
1	crpdb.dat.old crpdb.idx.old	copy crpdb.dat.old crpdb.dat copy crpdb.idx.old crpdb.idx
2	licdb.dat.old licdb.idx.old	copy licdb.dat.old licdb.dat copy licdb.idx.old licdb.idx

crpdb file migration

- To migrate the `crpdb.*` file, type the following command:

```
LUMmig -c
```

licdb file migration

- To migrate the `licdb.*` file, type the following command:

```
LUMmig
```

Installing License Use Management Runtime Noninteractively

You can use the `setup` command to install License Use Management Runtime without being prompted.

You need to be present only to initiate the installation and to restart your workstation, if necessary, when the installation is complete. No questions are asked while the installation is running. To install License Use Management Runtime noninteractively, follow these steps:

1. Make sure that the environment variable `LUM_INSTALL_DRIVE` is set. To do this, look in the windows registry at the entry: **HKEY_LOCAL_MACHINE --> SYSTEM --> CurrentControlSet --> Control --> Session Manager --> Environment**.
2. To set the `LUM_INSTALL_DRIVE` variable, follow these steps:
 - a. Open the directory:
 - **Start --> Settings --> Control Panel --> System --> Advanced --> Environment Variables** for Windows Server 2003 and XP.
The Environment Variables dialog is displayed.
 - **Control Panel --> System -->Advanced system settings --> Environment Variables** for Windows Vista.
 - b. In the System Variables box, click **New**. In the New System Variable dialog, add the following information:

- In the **Variable Name** field, type:
LUM_INSTALL_DRIVE
 - In the **Variable Value** field, type the installation drive letter; for example, **c:**.
- c. Click **OK**.
3. Check, in the file lum.bat, whether the value of the ADDLOCAL parameter is suitable. If it is not, change it. This parameter identifies the features to be installed.
 4. In a new command prompt window, run lum.bat.
 5. When installation is complete, follow the instructions in Chapter 4, "Configuring License Use Management Runtime," on page 51.

Using the Installation Command

The following syntax shows the parameters accepted by the **setup** installation command:

```
setup /s /v"ADDLOCAL=Runtime,GUI_Runtime,Documentation LUM_SILENT=1 /qn /l log_file"
```

where:

- s** Specifies silent installation
- v** Indicates that what follows is a command line parameter

ADDLOCAL

Specifies the features to be installed

LUM_SILENT=1

Specifies that installation is to run silently

- qn** Specifies that the user interfaces not to be displayed during installation

/l log_file

Specifies the log file in which installation information is to be logged

When the installation completes successfully, the message Installation operation completed successfully is written to the log file.

Verifying and Updating the PATH Environment Variable

Check whether the PATH environment variable contains the following information:

```
c:\Program Files\IBM\License Use Management\bin;  
c:\Program Files\IBM\License Use Management\bin\en_US
```

If the License Use Management Runtime path information has not been added, update the PATH environment variable manually, as follows:

1. Click **Start --> Settings --> Control Panel --> System --> Advanced --> Environment Variables** for Windows Server 2003 and XP or **Control Panel --> System --> Advanced system settings --> Environment Variables** for Windows Vista.
2. If necessary, delete unused path information. Remember to add any necessary delimiting semicolon to the end of the original PATH statement.
3. Highlight the system variable PATH. Click **Edit**. In the Edit System Variable dialog, add the following information to the end of the PATH variable:
c:\Program Files\IBM\License Use Management\bin;
c:\Program Files\IBM\License Use Management\bin\en_US
4. Click **OK**.

The maximum length of the PATH environment variable is 1024 bytes. Therefore, if the sum of the length of the current path plus the length of the License Use Management Runtime PATH information would exceed 1024 bytes, Windows will not update the current PATH environment variable. You will then not be able to run License Use Management Runtime, until you manually update the PATH statement.

If License Use Management Runtime Fails to Start:

In certain unusual circumstances, the License Use Management Runtime environment variables are set during installation, but are not propagated to the system. The product therefore fails to start.

If you experience this situation, select as follows:

- **Start --> Settings --> Control panel --> System --> Advanced --> Environment Variables --> OK** for Windows Server 2003 and XP or
- **Control Panel --> System -->Advanced system settings --> Environment Variables** for Windows Vista.

License Use Management Runtime should then start correctly.

Uninstalling License Use Management Runtime

You can remove features of License Use Management Runtime, or the whole product, from your computer.

Remove License Use Management Runtime features from your workstation, as follows:

1. Click **Start --> Settings --> Control Panel --> Add/Remove Programs**. The Add/Remove Programs window is displayed.
2. Select **License Use Management Runtime v5**.
3. Click **Change**.
4. The License Use Management Runtime installer's Welcome window is displayed.
5. Click **Next**. The Program Maintenance window is displayed.
6. Click **Modify**.
7. Click **Next**. The Custom Setup window is displayed.
8. Select the features you want to delete. The feature selection menu is displayed.
9. Click **This feature will not be available** for each feature to be deleted.
10. Click **Next**. The Ready to Modify the Program window is displayed.
11. Click **Install**. When uninstallation is complete, the **InstallShield Wizard Completed** window is displayed.
12. Click **Finish**.

The selected features have been removed from your computer.

Remove the whole License Use Management Runtime product from your workstation, as follows:

1. Click **Start --> Settings --> Control Panel --> Add/Remove Programs**. The Add/Remove Programs window is displayed.
2. Select **License Use Management Runtime v5**.

3. Click **Remove**. A window is displayed asking you if you are sure that you want to remove License Use Management Runtime. Click **Yes** to confirm. The Windows InstallShield Wizard deletes License Use Management Runtime from your computer.

Note: The uninstallation process does not remove configuration files or other files created after installation. To remove such files, after the uninstallation process has finished, delete the Program Files\IBM\License Use Management directory and all its contents.

Chapter 4. Configuring License Use Management Runtime

ALL

The scenarios in this chapter describe how to set up your License Use Management Runtime environment.

License Use Management Runtime is not required for non-runtime nodelocked workstations (see “License Use Management at a Glance” on page 1).

Setting Up Your Servers and Clients

After you install License Use Management Runtime, you must configure the program on each workstation.

The configuration tool has a GUI, and a command line interface. The information you provide is saved in a configuration file. When you start License Use Management Runtime, it uses the information in this file to direct the behavior of the local system in the licensing environment. See Appendix A, “License Use Management Runtime Configuration File,” on page 179 for reference information on the configuration file.

Configuring to Handle Network Licenses

To handle products with network licenses, you must configure at least one network license server (“Scenario 1: Configuring a Network License Server” on page 55) and configure each client as a network license client (“Scenario 3: Configuring a Network License Client” on page 61). If you use products with customer-managed or reservable licenses, you must also configure one server as the central registry server (“Scenario 2: Configuring the Central Registry License Server” on page 60).

The maximum length of the full host name that LUM can handle is currently 127 characters. Use host names shorter than 128 characters for LUM servers and clients. If the LUM server is already configured with longer host names, you must edit the configuration file (`lum_ini.txt`) manually.

Determining the Required Configuration

You can configure a workstation to play more than one role in your licensing environment. For example, if you configure the same workstation as a network license server, and the central registry license server, that workstation can handle all types of licensed products.

If you know the types of licenses that are used by the license-enabled products in your environment, Table 11 on page 52 will help you to determine how to configure:

- The license servers for the application
- The workstations that will request licenses for the application

See the application documentation for information that might affect your configuration. The *enrollment certificate file* that you receive from the vendor shows the type of license.

Table 11. Configuration Required to Support All Types of Licenses

License Type	License Requester	License Server
Simple Nodelocked (Non-Runtime-Based Enabling) (note 1)	License-Enabled Application	None
Use-Once	Network License Client	Network License Server (note 2), and Central Registry License Server (note 3)
Concurrent	Network License Client	Network License Server (note 2) and Central Registry License Server (note 3)
Concurrent-Offline	Network License Client	Network License Server (note 4) and Central Registry License Server (note 3)
Per-Seat	Network License Client	Central Registry License Server (note 3)
Reservable	Network License Client (note 4)	Network License Server (note 2) and Central Registry License Server (note 3)
<p>Notes:</p> <ol style="list-style-type: none"> If the vendor enabled the product with simple nodelocked licenses and delivered the licenses to you in a compound network password, you must also: <ul style="list-style-type: none"> Configure a network license server, where you will install the compound password, and Configure the local workstation (where the nodelocked license is to be installed) as a network license client of that server You can configure one or more network license servers. You can configure only one central registry license server. For customer-managed use products, the central registry is required. It enables you to update the count of product licenses, implement the hard stop or soft stop policy, or track the high-water mark. Note that because per-seat licenses are always customer-managed, they require the central registry. For reservable licenses, the central registry is required if you want to be able to reserve licenses for specific users. No server is required once the reservation has been made. 		

Before You Configure

Before you begin the configuration process, for every workstation you are going to configure, you need to decide which roles it will play and how you plan to set up direct binding. You might also decide to override some of the configuration defaults. The actions you can take during configuration are summarized in Table 12. Check the table for all the roles your workstation will play, and make all the indicated decisions before you start configuration.

Table 12. Configuration Options

Configuration Options	Network License Client	Network License Server	Central Registry License Server
Customize selection of information logged or accept default? (“Customizing Log Information” on page 53)		Yes	Yes
Start license servers at system startup (default is no)? (“Automatically Starting License Servers” on page 54)		Yes	Yes

Table 12. Configuration Options (continued)

Configuration Options	Network License Client	Network License Server	Central Registry License Server
Disable remote administration of network license servers (default is no)? (“Disabling Remote Administration” on page 54)		Yes	Yes
Set up direct binding? (“Configuring Direct Binding” on page 54)			
Have your direct binding servers list ready?	Yes	Yes	Yes
Know which workstation is the central registry?	Yes	Yes	Yes
Change default direct binding ports?	Yes	Yes	Yes

Customizing Log Information

For any license server, you can customize the selection of events that are logged, and the location of the log file. Note that if you want to change the location of the log from the default to a path you choose, the directory you specify must already exist.

The following events can be logged:

All events Includes all the events in the list.

Errors Describes server errors that do not stop the server, but return a status code and a message. This is logged by default.

License timeout Tells you that the server has canceled the request for a license because the check period expired. This is not logged by default.

License checkin Tells you when a licensed product has sent a check-in call to the server to notify that the product is running. This is not logged by default.

License grant/release Tells you when a license was granted or released. This is not logged by default.

Vendor added/deleted Tells you when a product of a new vendor was registered or deleted. This is logged by default.

Vendor messages Provides the log messages the vendor inserted in the enabled product. This is logged by default.

Product added/deleted Tells you when a new product was registered or deleted. This is logged by default.

Server start/stop and load messages Logs the successful start or stop of the license server, and when the threshold on the workload is exceeded or regained. This is not logged by default.

Automatically Starting License Servers

During configuration of any license server, you can specify that license servers should start automatically when you start the workstation. Otherwise, you must remember to start the services manually after you configure and before you use the basic license tool or any enabled applications.

Disabling Remote Administration

When you configure a network license server, you can specify that licenses stored on that server can be administered by running the basic license tool on that machine only.

Configuring Direct Binding

When you configure a network license server, network license client, or central registry license server, you must have your direct binding servers list ready.

When you configure a network license server, or central registry license server, you must also have ready a list of license servers whose licenses you want to administer remotely from this workstation.

You will enter the hostnames or network addresses of all the servers in the list on the local workstation. You will also designate which server, if any, is the central registry.

When you configure the servers in the direct binding servers list, and the clients that will use them, be sure you define exactly the same set of servers on each.

You can change the default port numbers for network license servers and the central registry license server. Do not change the defaults unless they are already in use by other applications.

Using the Configuration Tools



To configure License Use Management Runtime, you can use one of the following tools:

- Configuration Tool graphical user interface
- Configuration Tool command line interface

Using the Configuration Tool GUI

If the License Use Management Runtime graphical user interface is installed on your workstation, you can use it to configure your workstation.



Login with root authority and issue the command:

```
LUMcfg
```



Login with administrator authority and start the configuration tool by one of the following means:

- Click **Start** --> **Programs** --> **License Use Runtime v5** --> **Configuration Tool**.
- In the **License Use Runtime v5** folder, click the **Configuration Tool** icon.
- Enter the LUMcfg command with no parameters.



The configuration tool notebook appears. Follow the steps in one or more of the configuration scenarios in this section, depending on the role of your workstation in your licensing environment.

Each of the configuration scenarios in this chapter shows how to configure a workstation to play only one role in the licensing environment. If the workstation is to play two or more roles, check all the applicable roles on the **Configure As** page of the configuration tool notebook.

If you configure a specific page of the notebook more than once, the most recent configuration takes effect.

Using the Configuration Tool Command-Line Interface

You can use the LUMcfg command to accomplish the same configuration tasks explained in the scenarios in this chapter. At the end of each scenario, a section named "Command-Line Equivalent" shows the LUMcfg commands that correspond to the GUI scenario.

For details of the LUMcfg command, see "LUMcfg - Configuration Tool" on page 138.

Manually Configuring License Use Management Runtime

In addition to the basic configuration tasks described in this chapter, you can also manually configure License Use Management Runtime by editing the `lum_ini.txt` configuration file. The contents of the file are described in Appendix A, "License Use Management Runtime Configuration File," on page 179. Editing this file lets you take advantage of the advanced options for fine tuning the server.

Scenario 1: Configuring a Network License Server

This scenario shows how the administrator configures License Use Management Runtime as a network license server.

When you configure a workstation as a network license server, you can use licenses of the types shown in Table 11 on page 52. You can also use the basic license tool to administer licenses on remote license servers in the network.

To configure the network license server, after installation of License Use Management Runtime:

1. Start the **Configuration Tool**. See "Using the Configuration Tool GUI" on page 54.
2. On the **Configure As** page, select **Network License Server**. Note that **Network License Client** is then automatically checked. Leave **Disable Remote Administration** unchecked. The **Configure As** page is shown in Figure 18 on page 56.

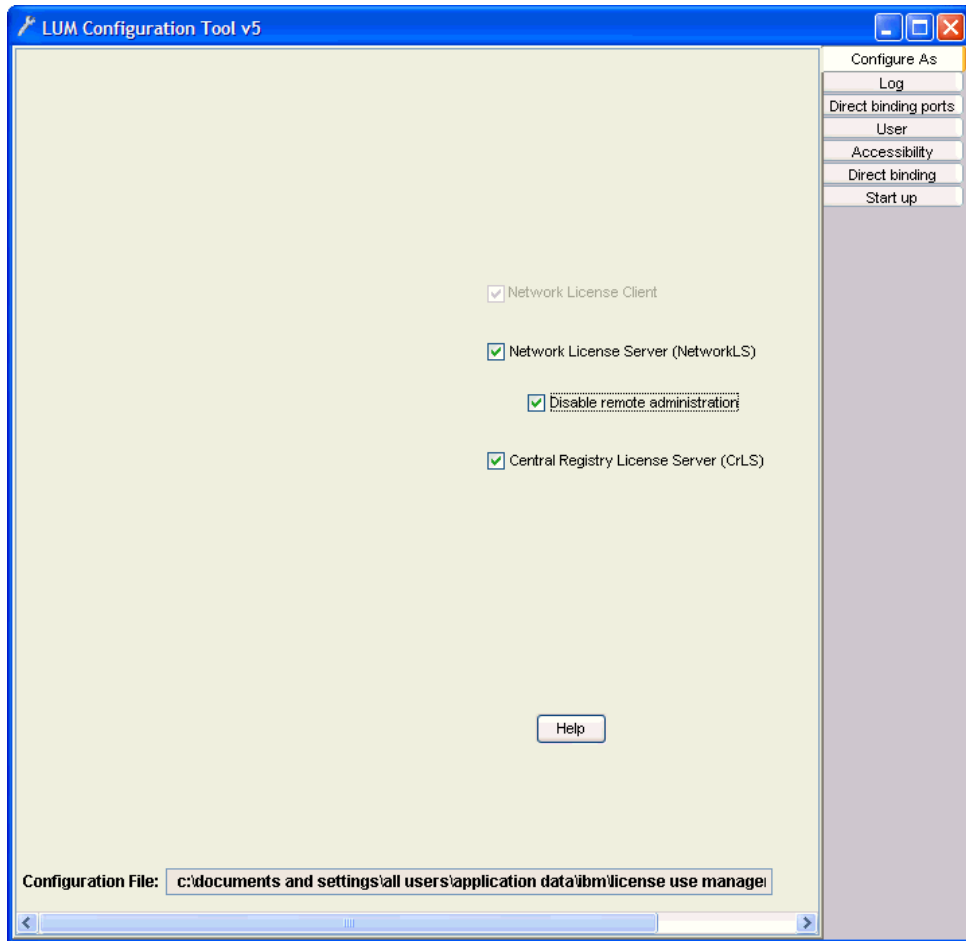


Figure 18. Configuration Tool Notebook - Network License Server

3. On the **Start up** page, select **Start services at system startup** to start the network license server when you power on the workstation.
4. On the **Log** page, select the events you want to be logged and specify where you want the log to be kept, as shown in Figure 19 on page 57.

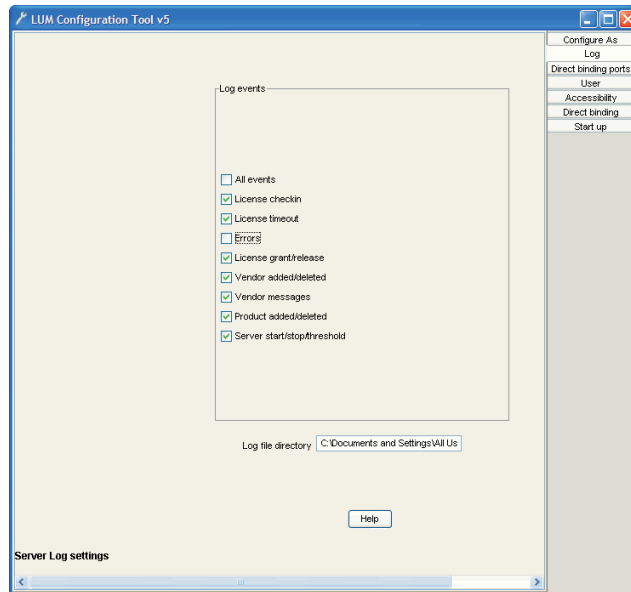


Figure 19. Configuration Tool Notebook - Log Page

The logged events are stored in the files `logdbnn_`, where `nn` assumes the default values from 00 to 01, but can use other values up to a maximum of 99. When a file is full, according to a maximum size that is defined in the configuration file, a new one is started.

5. Select the **Direct binding** tab. The **Direct binding** section is displayed, as shown in Figure 20 on page 58

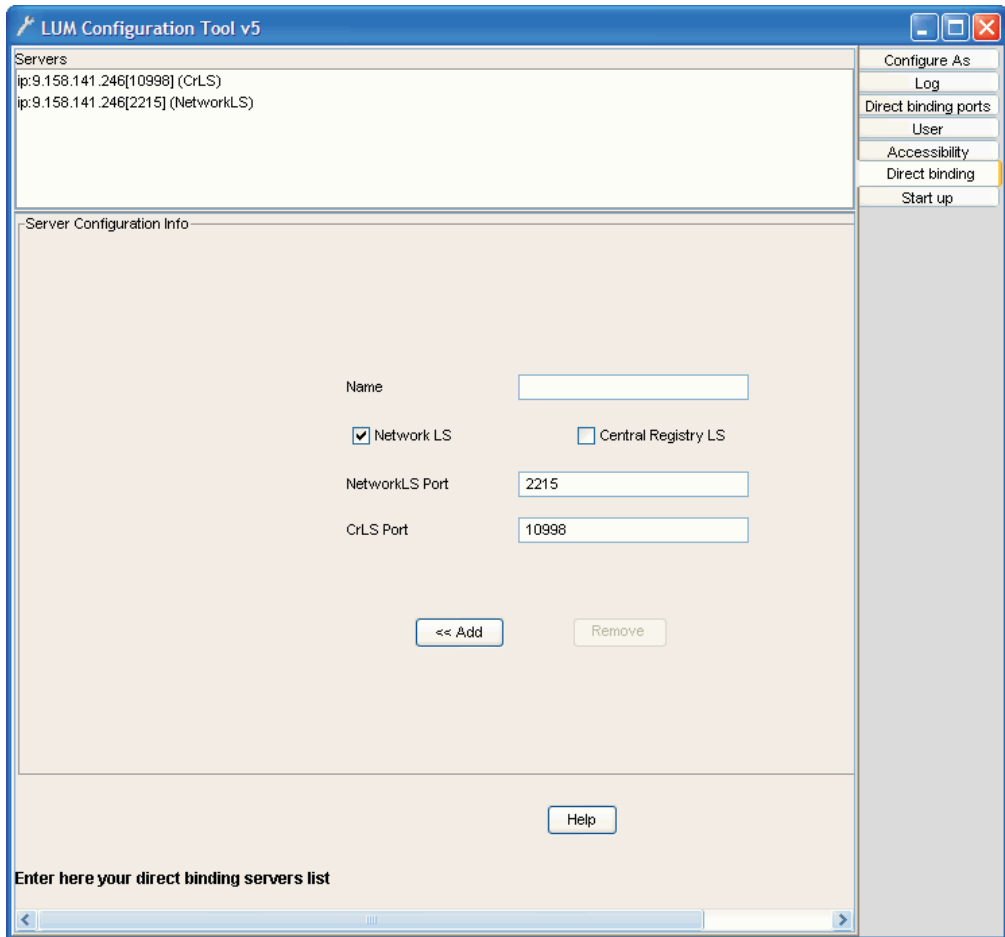


Figure 20. Configuration Tool Notebook - Direct Binding Section

On this page you specify all the network license servers in the direct binding servers list. You must include this network license server that you are configuring, and the central registry license server, if any. If the central registry license server and a network license server run on the same workstation, be sure you include both servers in the list.

As you configure the servers in the direct binding servers list, be sure you define exactly the same set of servers on each.

In this example, the administrator performs the following steps for each server:

- a. In the **Name** field, enter the TCP/IP host name of the workstation you are adding to the Servers list. Note that the server name is case-sensitive.
 - b. If the server being added is a network license server, leave only the **NetworkLS** check box selected.
 - c. Check **NetworkLS**, or **Central Registry LS**, or both, depending on the roles the workstation plays in the network.
 - d. Leave the default values in the **NetworkLS Port** and **CrLS Port** fields.
 - e. Select the **<<Add** push button to add the server to the **Servers** list.
6. On Windows, select the **User** tab. The User section is displayed, as shown in Figure 21 on page 59.

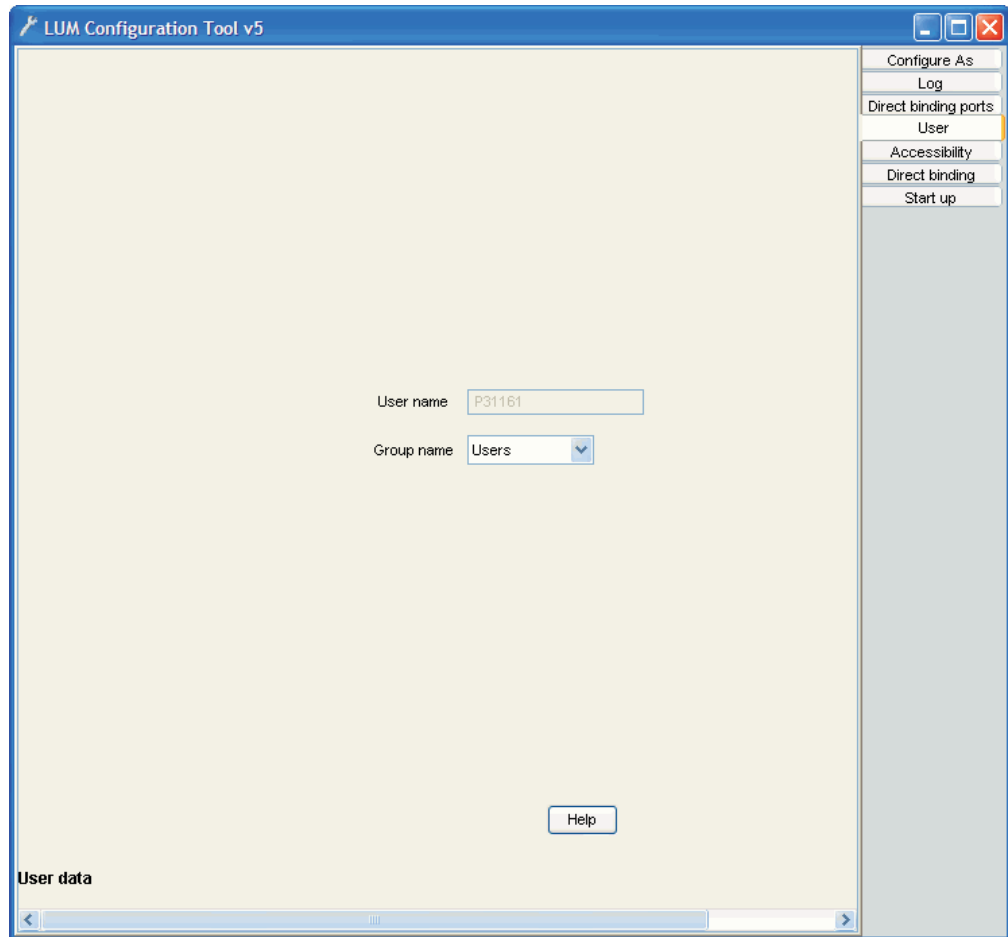


Figure 21. Configuration Tool Notebook - User Section

The user name is the logon user ID in effect when you do the configuration. Select a group name if you want to change the default.

License Use Management Runtime treats the user name as the name of the user who requests and uses licenses on this workstation. The user name is displayed as part of various reports about license usage. It is also used to reserve reservable licenses for a specific user. The group name is used to reserve reservable licenses for a specific group and is also used when assigning authorizations for concurrent-offline licenses.

7. Select **Close** from the system menu in the upper left corner of the notebook. A message is displayed to confirm that you are ready to save your choices.
8. To run the configured servers, see “Starting and Listing Your Servers” on page 63.

Now the workstation can be used as a network license server, to install and grant product licenses and monitor their usage.

Command-Line Equivalent

To configure the network license server

```
LUMcfg -a s -S a -e cegvmp -b "'network ip:goldasz'
'registry ip:goldasz'"
```

ALL

Scenario 2: Configuring the Central Registry License Server

This scenario shows how the administrator configures the central registry license server, making it part of a direct binding servers list.

Be sure you configure only one central registry license server. Carefully plan where to configure it; after you start it, you cannot move it. (See “Planning the Central Registry” on page 26.)

Configuring a workstation as the central registry license server makes it possible to use licenses of the types shown in Table 11 on page 52. It also makes it possible to use the basic license tool to administer licenses on remote license servers in the network.

To configure the central registry license server after installation of License Use Management Runtime:

1. Start the **Configuration Tool**. See “Using the Configuration Tool GUI” on page 54.
2. On the **Configure As** page, select **Central Registry License Server**. **Network License Client** is then automatically checked. The **Configure As** page is shown in Figure 22.

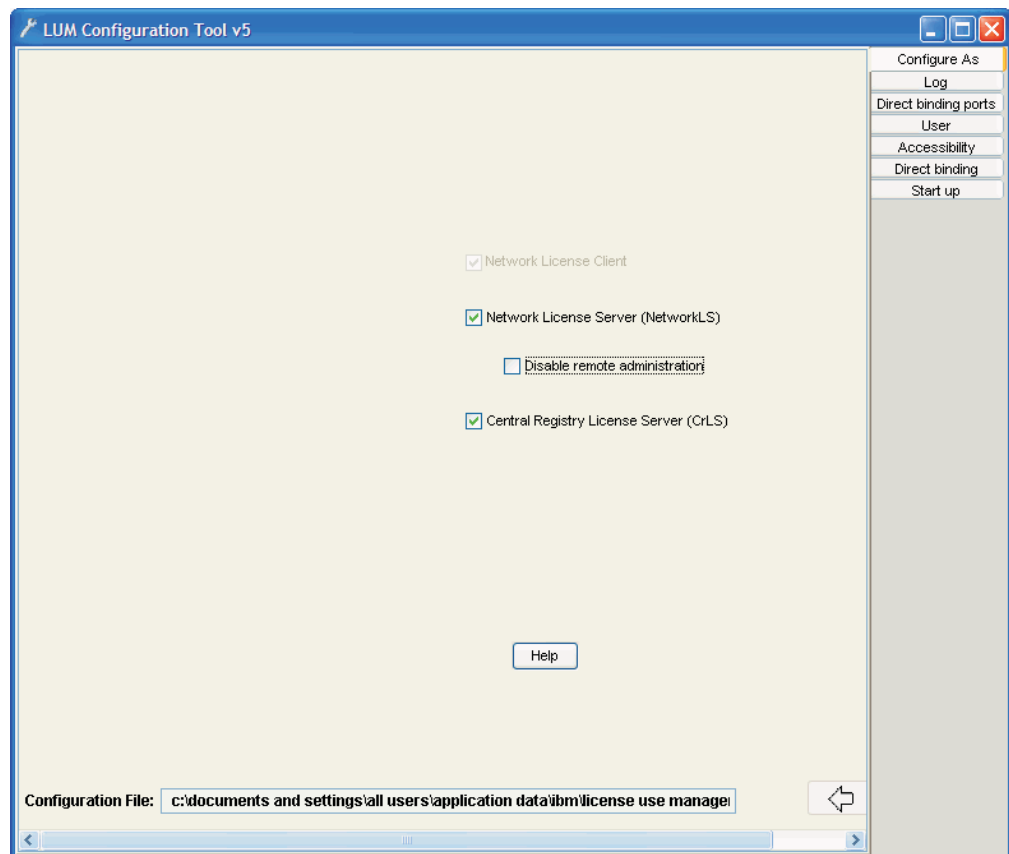


Figure 22. Configuration Tool Notebook - Central Registry License Server

3. On the **Start up** page, select **Start services at system startup** to start the central registry license server when you power on the workstation.
4. Select the **Direct binding** tab. The **Direct binding** section is displayed, as shown in Figure 20 on page 58.

On this page you specify all the license servers in the direct binding servers list. You must include the central registry license server that you are configuring. If the central registry license server and the a network license server run on the same workstation, include all servers in the list.

As you configure the servers in the direct binding servers list, be sure you define exactly the same set of servers on each.

In this example, the administrator performs the following steps for each server with which this server will communicate: Make sure that the following are set:

- a. Check **NetworkLS**, or **Central Registry LS**, or both, depending on the roles the workstation plays in the network.
 - b. Leave the default values in the **NetworkLS Port** and **CrLS Port** fields.
 - c. Select the <<**Add** push button to add the server to the Servers list.
5. On Windows, select the **User** tab. The User section is displayed.

The user name is the logon user ID in effect when you do the configuration. Select a group name if you want to change the default.

License Use Management Runtime treats the user name as the name of the user who requests and uses licenses on this workstation. The user name is displayed as part of various reports about license usage. It is also used to reserve reservable licenses for a specific user. The group name is used to reserve reservable licenses for a specific group, and is also used when assigning authorizations for concurrent-offline licenses.

6. Select **Close** from the system menu in the upper left corner of the notebook. A message is displayed to confirm that you are ready to save your choices.
7. To run the configured server, see “Starting and Listing Your Servers” on page 63.

Now the workstation can be used as the central registry license server.

Command-Line Equivalent

To configure the central registry license server:

```
LUMcfg -a r -S a -e cegvmp -b "'network ip:lab15099 ip:rocky ip:coyote ip:sprint'  
'registry ip:lab15099'"
```

Scenario 3: Configuring a Network License Client

This scenario shows how the administrator or the end user configures License Use Management Runtime as a client of the network license servers configured in “Scenario 1: Configuring a Network License Server” on page 55, and of the central registry license server configured in “Scenario 2: Configuring the Central Registry License Server” on page 60. Configuring a workstation as a network license client makes it possible to use licenses of the types shown in Table 11 on page 52.

This scenario shows the steps the end user follows to configure the network license client after installation of License Use Management Runtime.

1. Start the **Configuration Tool**. See “Using the Configuration Tool GUI” on page 54. The **Configuration Tool** notebook is displayed, as shown in Figure 23 on page 62.

ALL

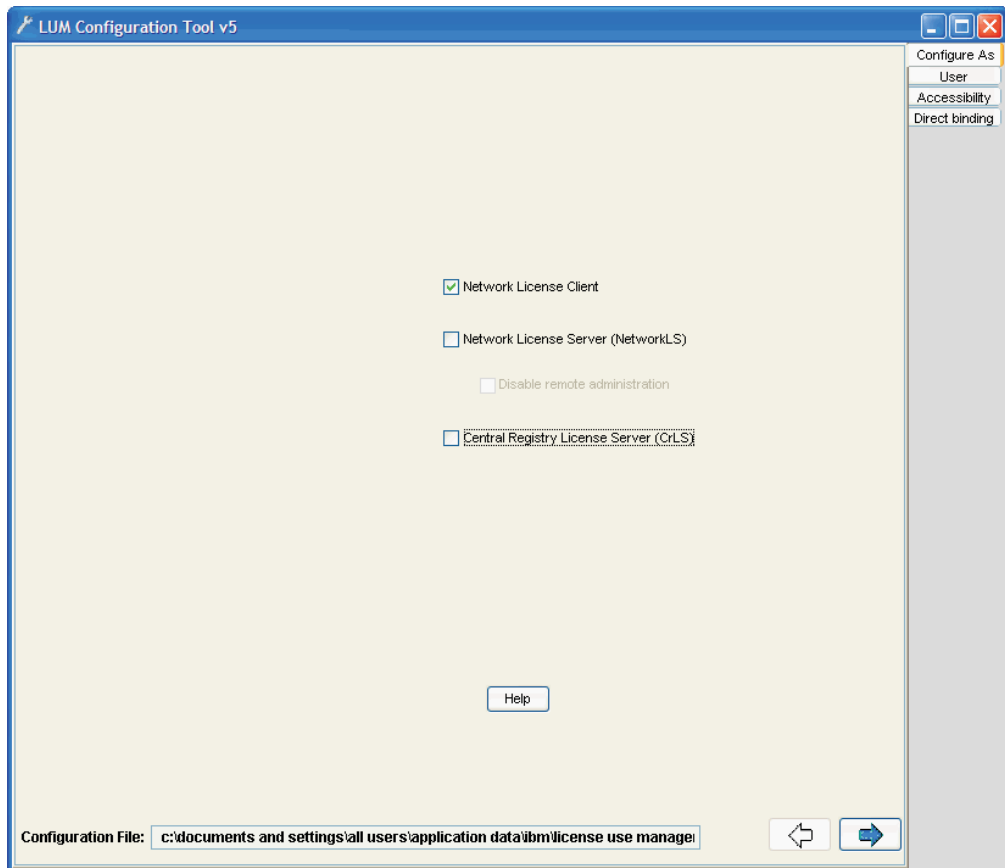


Figure 23. Configuration Tool Notebook - Network License Client

2. Select the **Direct binding** tab. The **Direct binding** section is displayed, as shown in Figure 20 on page 58

On this page you specify all the license servers with which this client will communicate. Before you begin specifying the servers, be sure you have read the performance notes under “Planning Direct Binding” on page 25.

In this example, for each license server, the administrator does the following:

- a. Enter the TCP/IP host name of the license server in the **Name** field. (Note that the server name is case-sensitive.)
 - b. Check **NetworkLS**, **Central Registry LS**, or both, depending on the roles the server plays in the network.
 - c. Leave the default values in the **NetworkLS Port** and **CrLS Port**, fields.
 - d. Select the <<**Add** push button to add the server to the Servers list.
3. On Windows, select the **User** tab. The User section is displayed.
The user name is the logon user ID in effect when you do the configuration. Select a group name if you want to change the default.
License Use Management Runtime treats the user name as the name of the user who requests and uses licenses on this workstation. The user name is displayed as part of various reports about license usage. It is also used to reserve reservable licenses for a specific user. The group name is used to reserve reservable licenses for a specific group and is also used when assigning authorizations for concurrent-offline licenses.
 4. Select the **Close** window icon from the system menu at the top of the notebook. A message is displayed to confirm that you are ready to save your choices.

The end user can now use products that have network licenses.

Command-Line Equivalent

To configure the network license client:

```
LUMcfg -a c -b "'network ip:thelma ip:louise'  
'registry ip:thelma'"
```

Starting and Listing Your Servers



When you finish your configuration, issue the command:

```
LUMcfg -start
```

to start the server you have configured on your workstation.

To verify that they are up and running, issue the command:

```
LUMcfg -list
```

License Use Management Runtime Processes Defined as Windows Services



In Windows XP and Windows Server 2003, you can start and list your processes either by treating them as Windows services or by using the service manager tool (see “Managing License Use Management Runtime with Service Manager Tool”).

During installation, your License Use Management Runtime processes are defined as services on Windows XP, Windows Server 2003 or Windows Vista. You can view them in the following ways:

1. **Start --> Settings --> Control Panel --> Administrative Tools --> Services** window for Windows Server 2003 and XP.
2. **Control Panel --> Administrative Tools--> Services Window** for Windows Vista.

If you are logged on with administrator authority, you can also start and stop the services in the same window.

During configuration, the processes you configure are defined as manual services, which means they are not started when you start the workstation. You can change them to automatic services in the Services window, or by checking the **Start services at system startup** box on the **Start up** page of the configuration tool. Services you do not configure are defined as disabled services.

Note that errors during start or stop of the License Use Management Runtime processes are logged in the Windows XP and Windows Server 2003 log.

To view them, go to the **Start --> Settings --> Control Panel --> Administrative Tools --> Event Viewer** window, and select **Application Log** and for Windows Vista see point 1 above.

Managing License Use Management Runtime with Service Manager Tool

When you finish your configuration, double-click the Service Manager Tool icon in the License Use Runtime folder to start the processes. The **Service Manager Tool** window is displayed, as shown in Figure 24 on page 64.

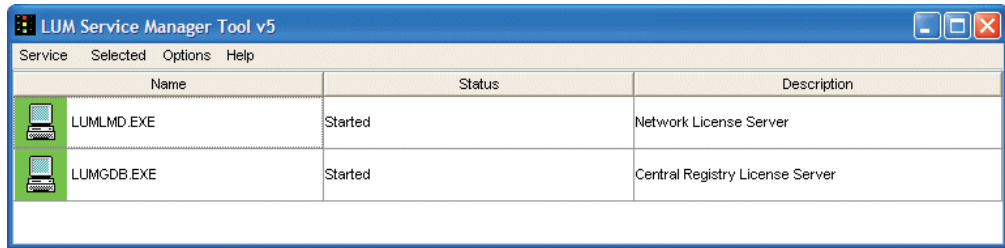


Figure 24. Service Manager Tool Window

In the Service Manager Tool window select **Service** from the menu bar and **Start** from the pull-down menu.

Verifying Connections to Servers

To verify that license servers are running properly, use the LUMtv (test verification) tool, or use the LUMblt -ln command to get a list of active servers (network license servers and the central registry license server). For more information about these commands, see Chapter 6, "License Use Management Runtime Command Line Interface," on page 105.

Clients and Servers Separated by a Firewall

In this section, the customer wants LAN A computers and LAN B computers to communicate correctly via TCP/IP and wants the network license server to serve both License Clients A and License Clients B, with License Client B behind the firewall. See Figure 25.

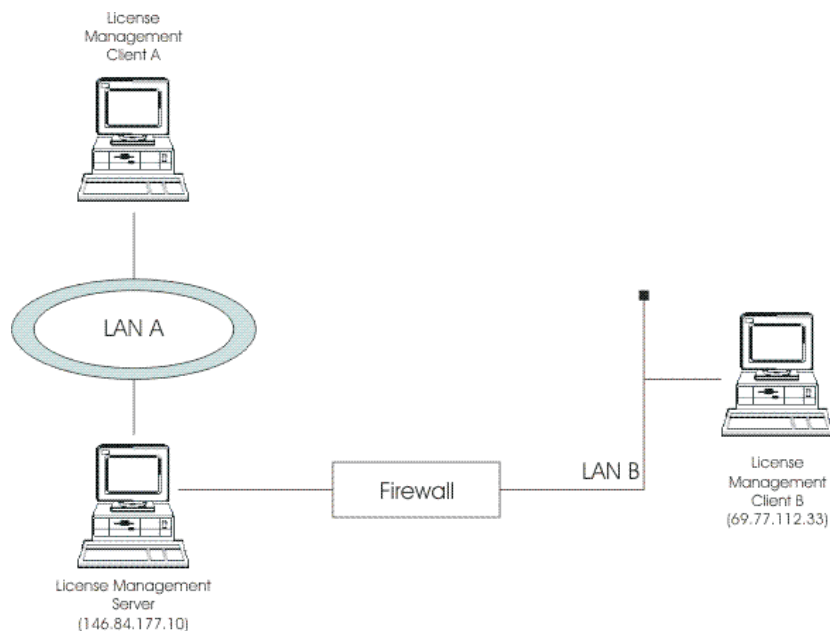


Figure 25. Network License Clients Separated by a Firewall

To set up communication between the license management server and client B, the license server and the firewall must be properly configured. To do this:

- Fix the secondary authentication server port. Edit the `lum_ini.txt` file on the license management server and set the **ipAuthPort** value to 9900.
- Define new rules on the firewall to let inbound UDP packets for the destination 146.84.177.10, and ports 2215 and 9900 pass through.
- Define rules to let outbound UDP packets from the source 146.84.177.10 and ports 2215 and 9900 pass through.
- Let ICMP packets to and from the license management server pass through

Chapter 5. Administering License Use Management Runtime

ALL

This chapter contains scenarios that illustrate the daily tasks needed to manage license-enabled products.

The tasks can be done using either the basic license tool GUI (*BLT GUI*) or the command-line interface (*CLI*). The scenarios use the GUI. The equivalent CLI commands are shown at the end of each scenario.

Attention: If you want to run the scenarios, you must substitute your own values for the sample or fictitious names: **server name**, **product name**, **vendor name**, **enrollment certificate name**, **product version**, **product features**, and **user name**.

The scenarios assume that the server **IBM-CB4812B86A2** is running a network license server and the central registry license server. The basic license tool is run from **IBM-CB4812B86A2**.

The scenarios use three sample products from three fictitious IBM vendors:

- SMARTJava Version 23, simple configuration, a product of the vendor IBM Software Group. SMARTJava has concurrent licenses, which the vendor delivers via a compound password. It is a customer-managed use product, and the vendor enabled it to allow the customer to exercise the hard stop/soft stop policy. Its enrollment certificate is named `smartjava.lic`.
- DataMaster Version 21, instrumented version, a product of the vendor IBM Corporation. DataMaster is a vendor-managed use product with reservable licenses. Its enrollment certificate is named `DataMaster.lic`.
- e-MailVision Version 12, with calendar, a product of the vendor IBM Software Solutions. e-MailVision has per-seat licenses. The enrollment certificate for the per-seat license is `emailvpt.lic`.
- TechDesign Version 52, advanced engine design, a product of the vendor IBM Design Solutions. TechDesign has concurrent licenses. It is a vendor-managed use product and the vendor enabled it for custom configuration policy. Its enrollment certificate is named `TechDesign.lic`.

The enrollment certificate files can be placed in any directory, in these scenarios the administrator has placed them in the home directory.

Using the Basic License Tool GUI

This section gives some general guidance for using the Basic License Tool GUI.

Starting the Basic License Tool GUI

To start the basic license tool GUI,

- On AIX: login with root authority and issue the command:
`LUMb1t`
- On Windows: double-click the **Basic License Tool** icon in the **License Use Management Runtime v5** folder or start the BLT GUI by issuing the command:
`LUMb1t`

The main window appears (Figure 26 on page 68).

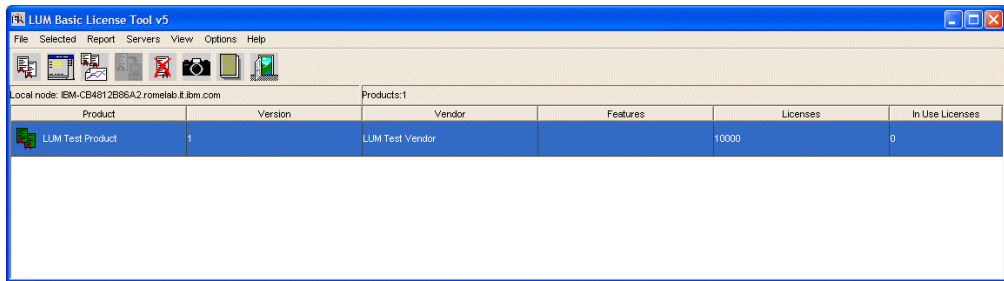


Figure 26. Basic License Tool GUI - Main Window

The products shown belong to all the active network license servers and the central registry.

In the Basic License Tool window, the heading **Licenses** indicates licenses that are available to end users (including those that are in use) unless the current date is before the start date of the licenses or the licenses have expired.

Refreshing License Information

Before viewing information about concurrent and reservable licenses in use for a product, it is a good idea to clean up stale licenses. In the main window:

1. Highlight the product.
2. Select **Clean up stale licenses** from the Selected menu.

If you turned the automatic cleanup feature on (see Appendix A, “License Use Management Runtime Configuration File,” on page 179) all stale licenses are cleaned up automatically at each BLT refresh.

Selecting Servers, Vendors, and Licenses

To reduce the number of servers, vendors, or licenses shown in the window, use the **Include...** option of the View menu. You can specify which servers and vendors are shown as of the next refresh.

Notes:

1. If a selected server shuts down, it is no longer selected, even if it is restarted. If a selected server shuts down, and you subsequently request a report or a display of information gathered from all selected servers, the request fails and error messages notify you that it was not possible to communicate with the server. In this case, use the **Refresh Now** option of the View menu, or deselect or restart the failing server and try again.
2. The **Include...** option filters information only for network servers. It does not restrict the information displayed for the central registry license server.

Performing Basic Administration

The scenarios in this section demonstrate how to:

- Enroll a licensed product (“Enrolling the Product” on page 69).
- Distribute licenses from a compound password (“Distributing the Licenses” on page 71).
- Get a report on the use of licensed products (“Generating Reports” on page 72).

- Check the current users of licensed products (“Checking the Number of Product Users” on page 73).
- Reserve reservable licenses for specific users and monitor the use of reservable licenses (“Scenario 5: Managing Reservable Licenses” on page 74).

Scenario 4: Managing a Licensed Product

In this scenario, the administrator enrolls and manages the SMARTJava product. This scenario shows you how to:

- Enroll the SMARTJava product
- Enroll 20 licenses for SMARTJava
- Distribute five of the SMARTJava licenses to a network license server
- Request a report on usage of SMARTJava licenses during a one-month period
- Check the number of concurrent users of SMARTJava

Enrolling the Product

To enroll the SMARTJava product:

1. In the main window, select **Import certificates** from the File menu. The Open window is displayed (Figure 28 on page 70).
2. Select the **Import** button. The Import window is displayed. See Figure 27 for an example of the Import window.

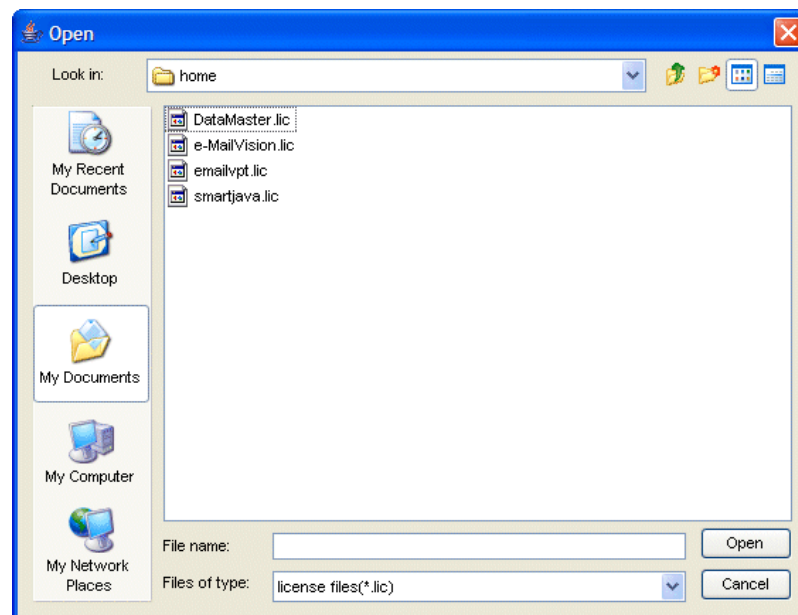


Figure 27. Import Window

- a. In the **Look In** drop-down list, select the directory containing the enrollment certificate.
 - b. From the list of files, select the enrollment certificate. For the SMARTJava product, the file is **smartjava.lic**.
3. Click **Open**. The Enroll Product window is redisplayed, filled in with the information from the enrollment certificate file. See Figure 28 on page 70.

Figure 28. Enroll Product Window

4. In the **Server name** field, select the server on which the licenses are to be installed. In this example, because the product is customer-managed and has network licenses, the licenses are enrolled on the central registry license server **IBM-CB4812B86A2.romelab.it.ibm.com**.

Notes:

- a. If the product is vendor-managed, and has a specific target ID set in the enrollment certificate, the licenses must be enrolled on the network license server of that target workstation.
 - b. If the product is vendor-managed and the target ID in the enrollment certificate file is set to **ANY**, select a network license server.
 - c. If the password is bound to a cluster rather than an individual server, select any network license server that is an activated member of the cluster.
5. Click **OK**.
Because the product is customer-managed, the Enroll Licenses window is displayed.
 6. Fill in the Enroll Licenses window with your user information and the number of licenses you want to enroll (in this example, 20) as shown in Figure 29 on page 71.

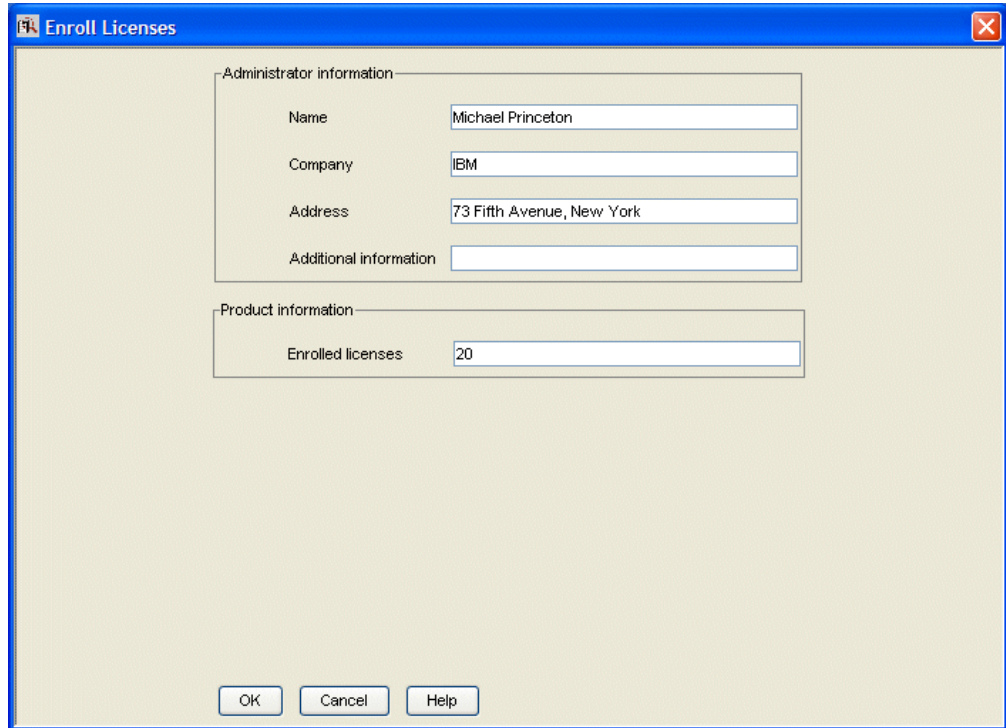


Figure 29. Enroll Licenses Window

7. Click **OK**. A message is displayed indicating that the product has been enrolled.

The main window is displayed again, as shown in Figure 30. There is a new line corresponding to SMARTJava, and the icon for the product (a wrapped box) indicates that the product has a compound password.

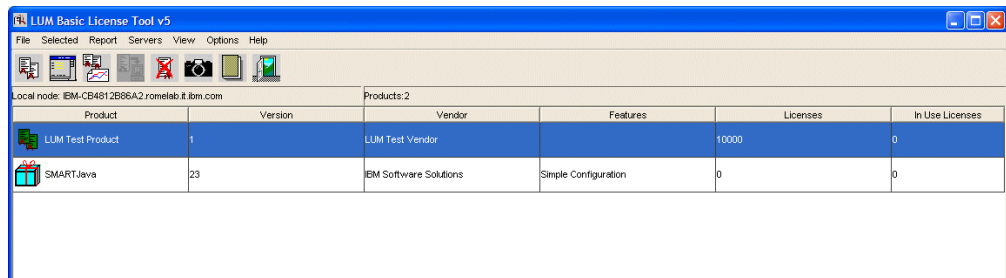


Figure 30. Main Window with SMARTJava Enrolled

Distributing the Licenses

Before the network license clients can be granted licenses to use the product, the administrator must distribute the licenses to a network license server.

Network licenses delivered with a compound password must be distributed. Simple passwords (for example, per-seat licenses) must not be distributed.

To distribute five licenses to the network license server **IBM-CB4812B86A2.romelab.it.ibm.com**:

1. In the main window, select the line for the product.

2. Select the **Distribute licenses...** option from the Selected menu. The Distribute Licenses window is displayed, as shown in Figure 31.

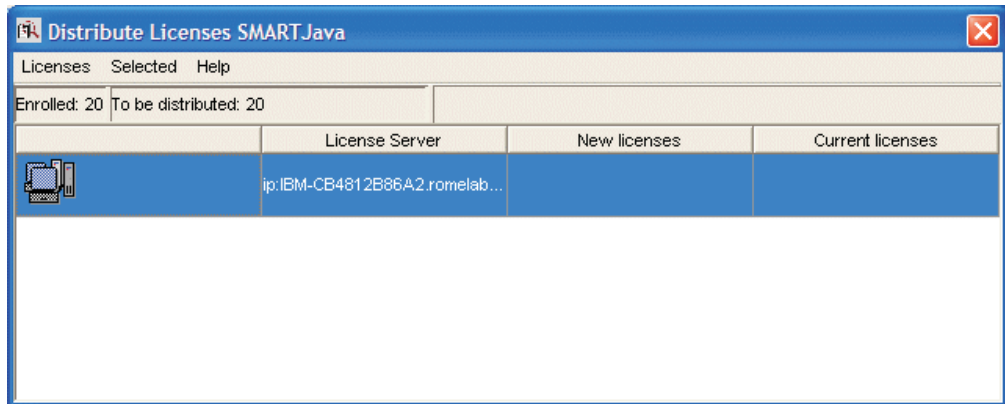


Figure 31. Distribute Licenses Window

3. In the Distribute Licenses window, select the network license server. Right-click the selected server, and select the **Selected ► Set number of licenses....** option from the pop-up menu. The Set Number of Licenses window is displayed.
4. Enter 5 in the Number of licenses field, as shown in Figure 32, and click **OK**.

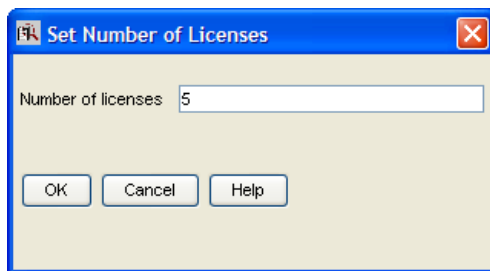


Figure 32. Set Number of Licenses Window

The Distribute Licenses window is redisplayed. The window now shows 15 as the number of licenses available to be distributed. Select the **Distribute** option from the Licenses menu to confirm data and distribute the licenses.

5. In the main window, the number of available licenses changes to 5 and the icon for SMARTJava changes to show a compound password with distributed concurrent licenses.

End users can now use the SMARTJava product.

Generating Reports

This section shows how to get a report of SMARTJava usage for one month: from July 2 to August 2, 2005.

1. Select SMARTJava in the main window (Figure 26 on page 68).
2. Select the **Report selected...** option from the Report menu.

The Select report window is displayed.

Note: You can not generate reports if a selected server shuts down. For more information see “Selecting Servers, Vendors, and Licenses” on page 68

3. Fill in the Reports window as shown in Figure 33.

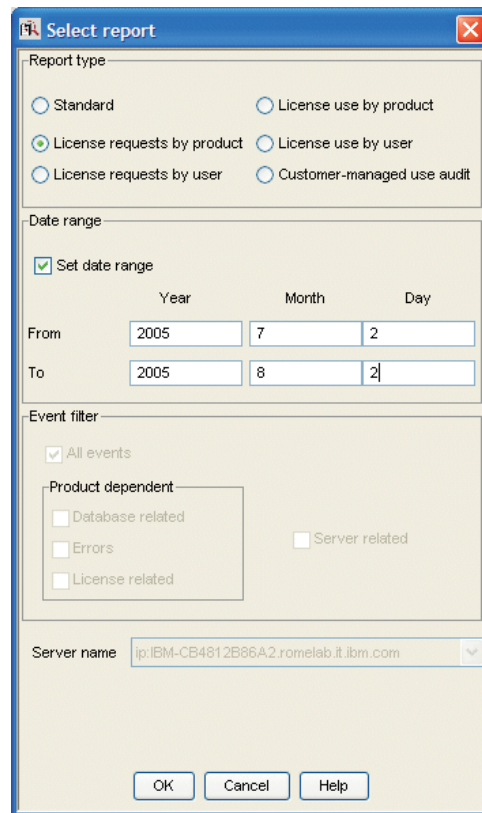


Figure 33. Reports Window

- a. Select the report type **License requests by product**.
 - b. Check the **Set date range** check box and set the date range for the report in the **From** and **To** fields (in this example, from July 2 to August 2, 2005).
 - c. Click **OK**.
4. View the Report window, which contains the following report:

```

=====
L i c e n s e   R e q u e s t s   B y   P r o d u c t
=====

Vendor/Product                Vrsn   Licenses  Licenses  Percent
-----                -----  Requested  Granted   Rejections
IBM Software Group            23      120        120         0
SMARTJava

*** End of License Requests By Product ***
=====

```

The report shows that 120 requests were made to use SMARTJava Version 23, and all of them were granted.

5. Click **Cancel** in the Reports window.

Checking the Number of Product Users

To check the number of concurrent users of SMARTJava:

1. Select the line corresponding to the SMARTJava product on the main window.

2. Select the option **Open as Details** from the Selected menu. The Details notebook is displayed.
3. Select the **Concurrent Users** tab. The Concurrent Users page is displayed, as shown in Figure 34.

Name	Group	Node ID	Acid	Licenses	Capacity Type	Date	ip:IP
administrator	Administrators	IBM-CB4812...		1		November 9, ...	

Figure 34. Concurrent Users Page

It shows the number of licenses in use, with the name of each user. In this example, the user administrator is using one SMARTJava license.

4. Close the notebook.

Command-Line Equivalent

The GUI scenario shows how to enroll SMARTJava licenses on the central registry license server, distribute five of the licenses to network license server *IBM-CB4812B86A2.romelab.it.ibm.com*, get a report on one month's usage, and check the number of concurrent users.

The equivalent CLI commands are as follows.

- To enroll the product on the central registry license server:


```
LUMblt -a -n IBM-CB4812B86A2.romelab.it.ibm.com -f smartjava.lic -T 20
-R "'Michael Princeton' IBM '73 Fifth Avenue, New York'"
-I "'First installed by Ian'"
```
- To distribute five licenses to a network license server:


```
LUMblt -E -n IBM-CB4812B86A2.romelab.it.ibm.com -v "'IBM Software Group'"
-p "SMARTJava 23 'Simple Configuration'" -A 5 -w lab15099 -I "'Alex
using root'"
```
- To generate a report of requests for SMARTJava from July 2 to August 2, 2005:


```
LUMblt -r2 -p "SMARTJava 23 'Simple Configuration'" -b 07/02/2005
-g 08/02/2005
```
- To display information about concurrent users of SMARTJava:


```
LUMblt -s -lc -p "SMARTJava 23 'Simple Configuration'"
```

For more information about the command line interface, see Chapter 6, "License Use Management Runtime Command Line Interface," on page 105.

Scenario 5: Managing Reservable Licenses

In this scenario, the administrator manages licenses of the DataMaster product. This scenario shows you how to:

- Reserve one reservable license for the exclusive use of a specified user, group and node.
- Monitor use of unreserved reservable licenses by other users

In this scenario, 100 reservable licenses for DataMaster have already been enrolled. The enrollment process is the same as for concurrent licenses of a

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customer-managed use product, as shown in “Enrolling the Product” on page 69, except that the Enroll Licenses window is not used. After enrollment, the product appears in the main window. Note that the icon (a hand holding some licenses) indicates that the licenses are reservable.

To reserve some of the licenses for a specific user and monitor use of the reservable licenses:

1. Double-click the product in the main window and go to the **Reservable tab** of the Details notebook, as shown in Figure 35.

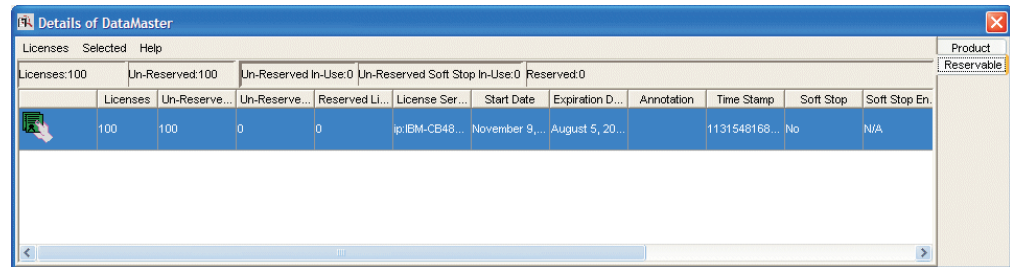


Figure 35. Details Notebook with Reservable Tab. Custom configuration serial number not shown.

Note that there are 100 total licenses, with none in use and none reserved.

2. Right click the product, and select **Selected ► Reserve...** from the pop-up menu. The Reserved Licenses - Details window is displayed.
3. Fill in the user, group, and node ID for which you want to reserve licenses; and the date and time that the reservation is to expire, as shown in Figure 36. The latest allowed expiration date of a reservation is 12/31/2037.

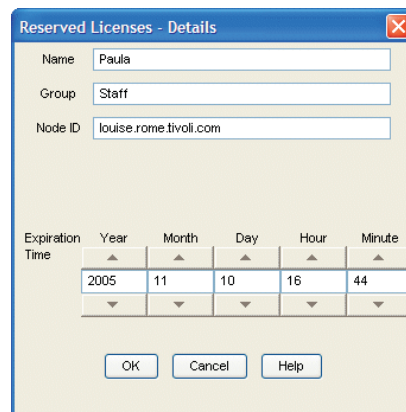


Figure 36. Reserving Reservable Licenses

In the figure, the administrator is reserving one license for user Paula, a member of the group staff, for use on the node louise.rome.tivoli.com. The reservation is to expire on November 10, 2005 at 16:44. Note that normally you reserve one license for a specific user and more than one license for a group or node.

4. Click **OK**.
5. The **Reserved** page is added to the Details notebook, as shown in Figure 37 on page 76.

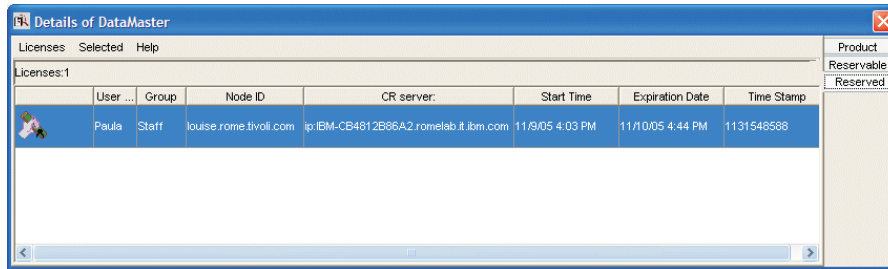


Figure 37. Details Notebook with Reserved Licenses

The example shows one license reserved for the user Paula in the group staff.

6. User Paula can now request the DataMaster.license without restriction (as many times as required).
7. Now assume that the user root requests a license to DataMaster. No licenses have been reserved for root, but there are 99 unreserved licenses. Such licenses are available to all users until the license administrator reserves them. One of those licenses is granted to root. It is managed exactly like a concurrent license. The **Un-Reserved Users** page is added to the Details notebook for DataMaster, as shown in Figure 38.

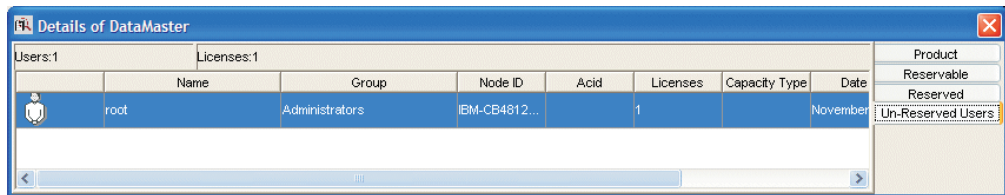


Figure 38. Un-Reserved Users Page

8. The Reservable page now shows one reserved licenses, one unreserved license in use, and 99 unreserved licenses, as shown in Figure 39.

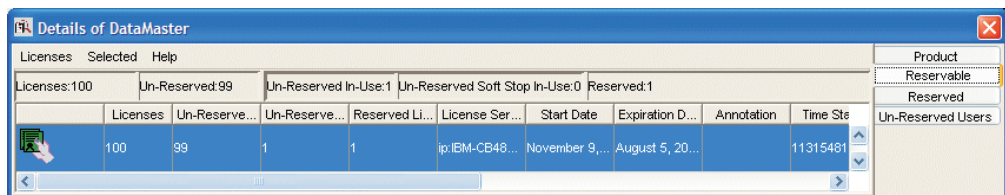


Figure 39. Reservable Page with Unreserved Licenses in Use

Command-Line Equivalent

The GUI scenario shows how to reserve one DataMaster license for the user Paula, display information about that user's use of the reserved licenses, display information about the use of the unreserved licenses by other users, and display detailed information about the product.

The equivalent CLI commands are as follows.

- To get the timestamp of the licenses to be reserved:


```
LUMblt -lp -i -v "'IBM Corporation'" -p "DataMaster 21 instrumented"
```

- To reserve one DataMaster license for the user Paula in group staff on node louise.rome.tivoli.com using the license password identified by timestamp 112407185449612:

```
LUMblt -R r -v "'IBM Corporation'" -p "DataMaster 21 instrumented"
-t 112407185449612 -g 11/10/2005 -H 16:44 -u "Paula staff
louise.rome.tivoli.com"
```

- To display information about the users of unreserved licenses:
- ```
LUMblt -s -lru -v "'IBM Corporation'" -p "DataMaster 21 instrumented"
```
- To display detailed information about the product, including the number of reserved and unreserved licenses:
- ```
LUMblt -lp -i -v "'IBM Corporation'" -p "DataMaster 21 instrumented"
```

Exercising Customer-Controlled Policies

The scenarios in this section explain how to exercise the customer-controlled policies outlined in “Customer-Managed Use Products” on page 4. The scenarios show how to:

- Use per-seat licenses (“Scenario 6: Using Per-Seat Licenses”)
- Use the hard stop/soft stop policy (“Scenario 7: Using the Hard Stop/Soft Stop Policy” on page 78)
- Update the number of licenses of a customer-managed use product (“Scenario 7: Using the Hard Stop/Soft Stop Policy” on page 78)
- Control the set of users who are permitted to use a specific application (“Scenario 8: Restricting User Access” on page 80)

Scenario 6: Using Per-Seat Licenses

The Telephone dialer product, version 2 with the European model feature, from the vendor TeleSoft is enabled with per-seat licenses. The administrator enrolls the per-seat license certificate for this product (telephon.lic) as described in “Scenario 4: Managing a Licensed Product” on page 69.

1. Install the per-seat license, importing the per-seat enrollment certificate telephon.lic and enrolling 50 licenses. The enrollment process is the same as for customer-managed concurrent licenses, as described in “Enrolling the Product” on page 69.
2. One user, internally identified as 800900800, starts the “Telephone dialer” that is connected to its application server running on the node pbaratt1. The application server successfully requests a license on behalf of user 800900800, thus he can use the license.
3. Open the details of the Telephone dialer product and click on the **Per Seat Users** tab. The Details notebook showing the summary of usage by the Application server is displayed, as shown in Figure 40.

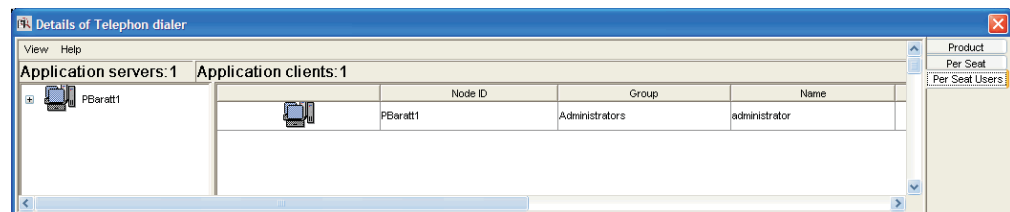


Figure 40. Per Seat Users Page

- Clicking on the + at the left of the Application server expands all the application clients connected to that application server as shown in Figure 41.

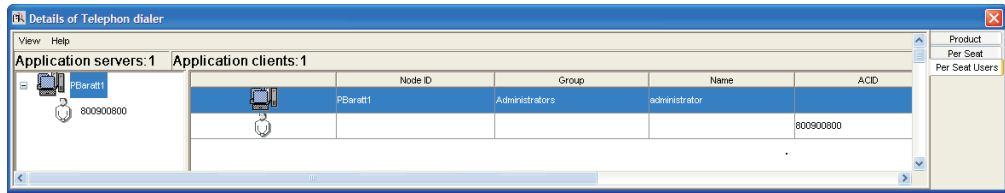


Figure 41. Per Seat Users Page Showing Expanded Application Clients

- The user 800900800 has allocated a license for himself and will keep it for the lifetime of per-seat licenses that is specified by the ValidityPeriod tag in the lum_ini.txt file (15 days by default).

Only the administrator can decide to revoke a license in order to make it available for other users:

- Right-click on the Per Seat Users page to switch to the By application clients view, as shown in Figure 42.

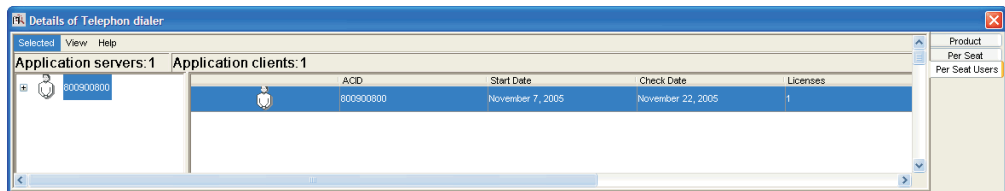


Figure 42. Per Seat Users Page - Application Clients View

- Highlight an application client and select **Remove** from the **Selected** menu.

Command-Line Equivalent

The GUI scenario shows how to enroll and request the Telephone dialer product with per seat licensing.

The equivalent command line interface commands are as follows.

- To enroll the per-seat licenses for Telephone dialer:


```
lumblt -a -f /telephone.lic -T 2 -R "'Keith Hogson'"
```

Scenario 7: Using the Hard Stop/Soft Stop Policy

In “Scenario 4: Managing a Licensed Product” on page 69, the administrator enrolled the SMARTJava product and distributed five licenses from a network compound password. Now the administrator has distributed the remaining 15 enrolled licenses. Because the vendor enabled this product to use the hard stop/soft stop policy, and the administrator is running it with soft stop set, it is possible that more than 20 licenses are being used at any given time.

In this scenario, the administrator:

- Checks the current number of licenses in use and the maximum number of licenses that have been granted beyond the 20 enrolled (the high-water mark, which in this example is 10)
- Decides to acquire ten more licenses
- Updates the number of enrolled licenses to 30

- Resets the high-water mark to 0
- Distributes ten more licenses from the compound password

Follow these steps:

1. Check the current license usage in the main window (Figure 43).

Product	Version	Vendor	Features	Licenses	In Use Licenses
DataMaster	21	IBM Software Solutions		100	1
LUM Test Product	1	LUM Test Vendor		10000	0
SMARTJava	23	IBM Software Solutions	Simple Configuration	20	30

Figure 43. Main Window with Soft-Stop Licenses in Use

The window shows that ten licenses beyond the 20 enrolled are in use.

2. Check the longer-term license usage:
Select SMARTJava in the main window. Select **Update licenses...** from the **Selected** menu. The Details notebook is displayed.
3. Go to the Concurrent page, right-click an entry for the product, and select **Selected ► Update licenses...** from the pop-up menu. The Update Licenses window is displayed (Figure 44).

Update

Hard/Soft stop

Disable soft stop

Reset HWM licenses

High Water Mark licenses

Threshold

Enrolled licenses

OK Cancel Help

Figure 44. Update Licenses Window with High-Water Mark

The **High Water Mark licenses** field shows that **10** is the maximum number of soft-stop licenses ever in use at one time since the high-water mark was last reset.

4. Decide to acquire ten more licenses, and pay the vendor for them.
5. Returning to the Update Licenses window, enter **30** in the **Enrolled licenses** field. At the same time, reset the high-water mark to **0** by clicking on **Reset HWM Licenses**.

6. Click OK. A confirmation message is displayed.
7. Distribute the ten newly enrolled licenses (see “Distributing the Licenses” on page 71). In the main window (Figure 26 on page 68), the Licenses column for SMARTJava is updated to 30.

Command-Line Equivalent

The GUI scenario shows how to check usage of soft stop licenses for SMARTJava, enroll and distribute an additional ten licenses, and reset the high-water mark to 0.

The equivalent command line interface commands are as follows.

- To display information about usage of soft stop licenses of SMARTJava:

```
LUMblt -lp -p "SMARTJava 23 'Simple Configuration'" -i
```
- To update the enrollment, enrolling ten more licenses on the central registry license server:

```
- LUMblt -U -v "'IBM Software Group'" -p "SMARTJava 23 'Simple Configuration'" -T 30 -I "'Margaret using root'"
```
- To reset the high-water mark to 0:

```
LUMblt -U -v "'IBM Software Group'" -p "SMARTJava 23 'Simple Configuration'" -M
```
- To distribute the ten licenses to network license server **IBM-CB4812B86A2**:

```
LUMblt -E -n lab15099 -v "'IBM Software Group'" -p "SMARTJava 23 'Simple Configuration'" -A 10 -w IBM-CB4812B86A2
```

Scenario 8: Restricting User Access

There are two methods for restricting user access;

- “Restricting User Access Using the BLT (Concurrent Licenses)”
- “Restricting User Access Using the BLT (Concurrent-Offline Licenses)” on page 83
- “Restricting User Access With the User File” on page 85

Restricting User Access Using the BLT (Concurrent Licenses)

This scenario explains how to restrict user access using the basic license tool. This scenario is applicable only to concurrent licenses. This scenario shows you how to:

- Modify the default authorization.
- Create authorization records for a specific concurrent license. This allows the authorized users to take the license.
- Modify a created authorization.

To manage this kind of license:

1. Double-click the product in the administration tool main window, then click the **Concurrent** tab. The Concurrent Licenses - Details window is displayed (Figure 45 on page 81).

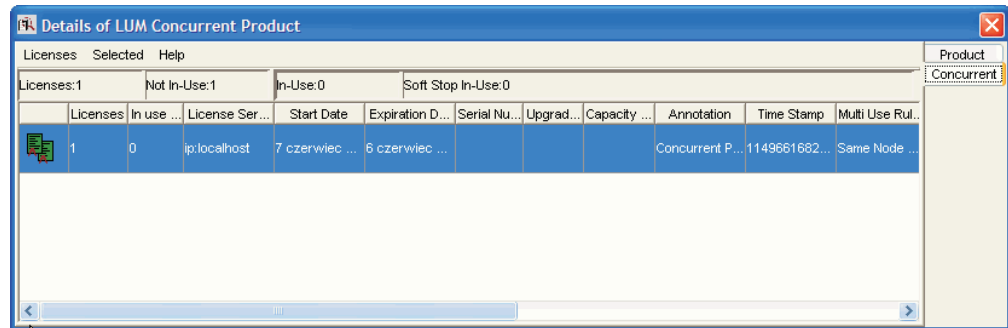


Figure 45. Concurrent Licenses - Details window

- To modify the default authorization, from the Concurrent Licenses - Details window, right-click on the product and select **Selected ► Authorizations**. The Authorization window is displayed (Figure 46). The default setting is for all licenses to be allowed.

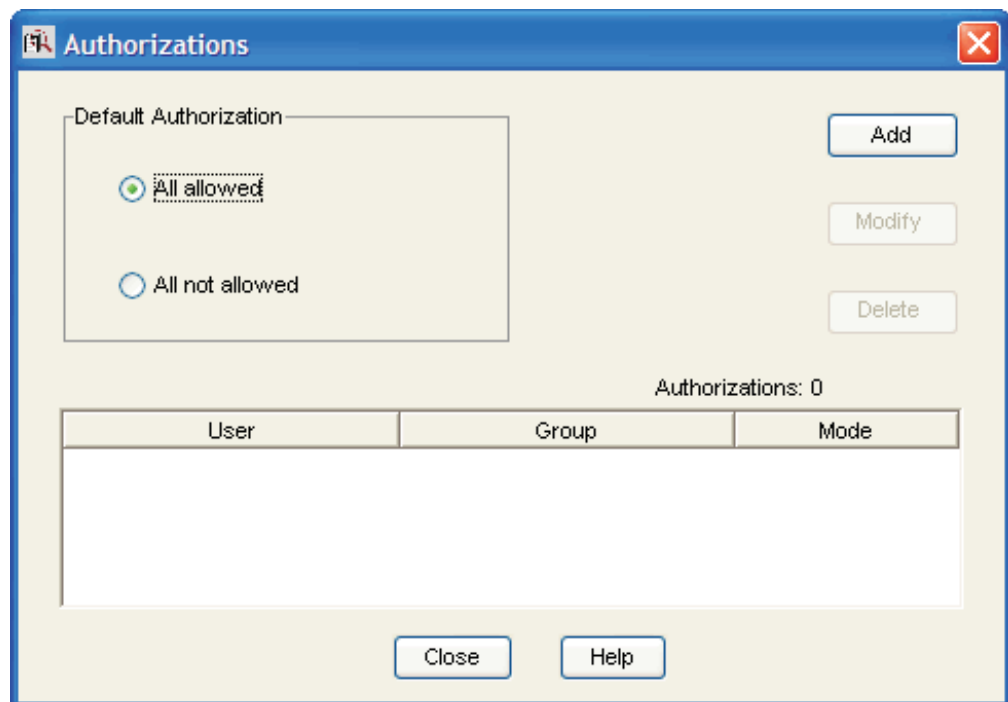


Figure 46. Authorization window

For the selected license, the window shows the mode in which each user can use the license. There are two different modes for license use:

- **All allowed.** Any user can start using the license.
 - **All not allowed.** No users are allowed to use the license. A user requires specific authorization to use the license.
- You decide that users can use the license only if they have a specific authorization, so you click **All not allowed**. Create the first authorization record for a specific user. From the Authorization window (Figure 46), click **Add**. The Add Authorization window is displayed (Figure 47 on page 82). Fill in the details for the new User and Group (alone, or in any combination). Set the Mode for the use of the license for this specific user. The modes are similar to the modes in the Authorization window (Figure 46), except that they are for

the individual user and group being authorized. Click **OK**.

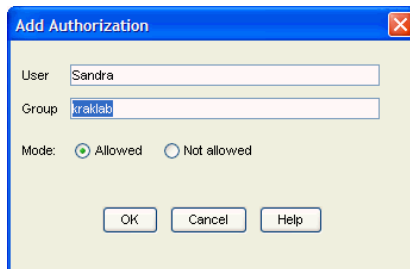


Figure 47. Add Authorization window

The authorization record has now been created (as shown in Figure 48).

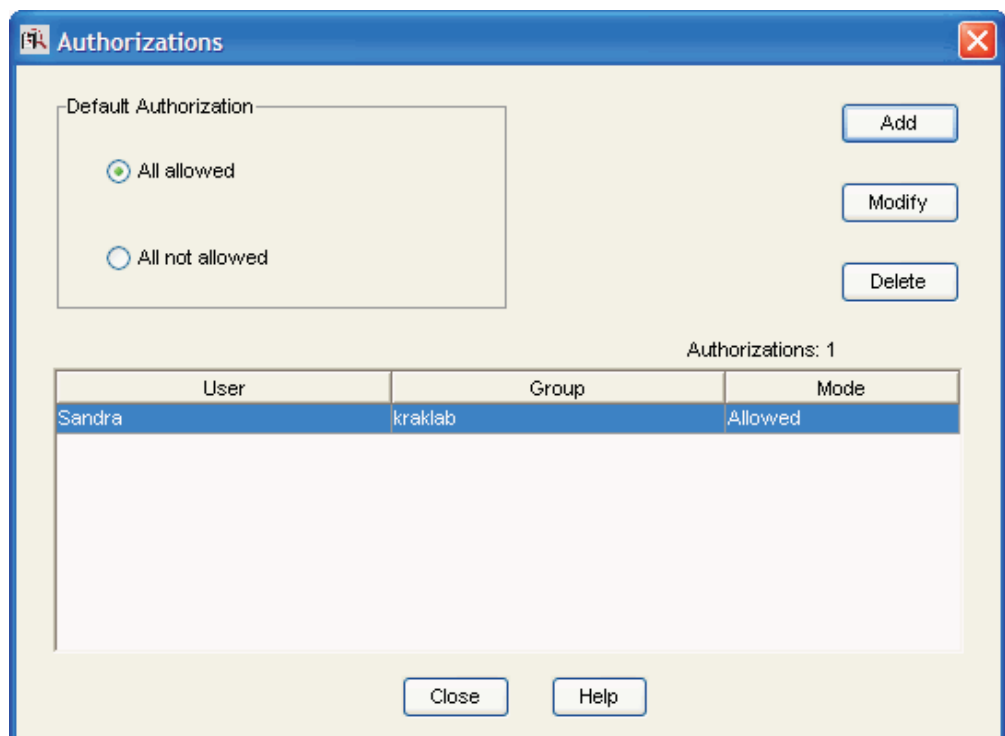


Figure 48. Authorization window — showing new authorization

4. When you have created an authorization record, you can change the settings for the authorization record. Select the authorization record file in the Authorization window (Figure 49 on page 83) and click on **Modify**. The Modify Authorization window is displayed. You decide to change the Group for the user Sandra from Guest to System. Type in the new group, then click **OK**.



Figure 49. Modify Authorization window

The authorization record has now been modified.

Restricting User Access Using the BLT (Concurrent-Offline Licenses)

This scenario explains how to restrict user access in case of upgrade installation using the basic license tool. This scenario is applicable only to concurrent-offline licenses. This scenario shows you how to:

- Modify the default authorization.
- Create authorization records for a specific concurrent-offline license. This allows the authorized users to take the license.
- Modify a created authorization.

To manage this kind of license:

1. Double-click the product in the administration tool main window, then click the **Concurrent-Offline** tab. The Concurrent-Offline Licenses - Details window is displayed below (Figure 50).

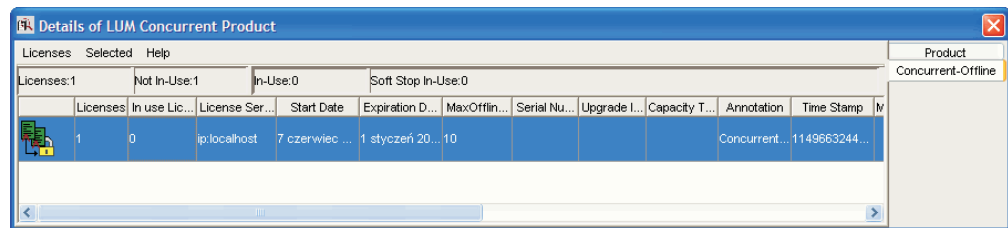


Figure 50. Concurrent-Offline Licenses - Details window

2. To modify the default authorization, from the Concurrent-Offline Licenses - Details window, right-click on the product and select **Selected ► Authorizations**. The Authorization window is displayed (Figure 51 on page 84). The default setting is **All concurrent allowed**.

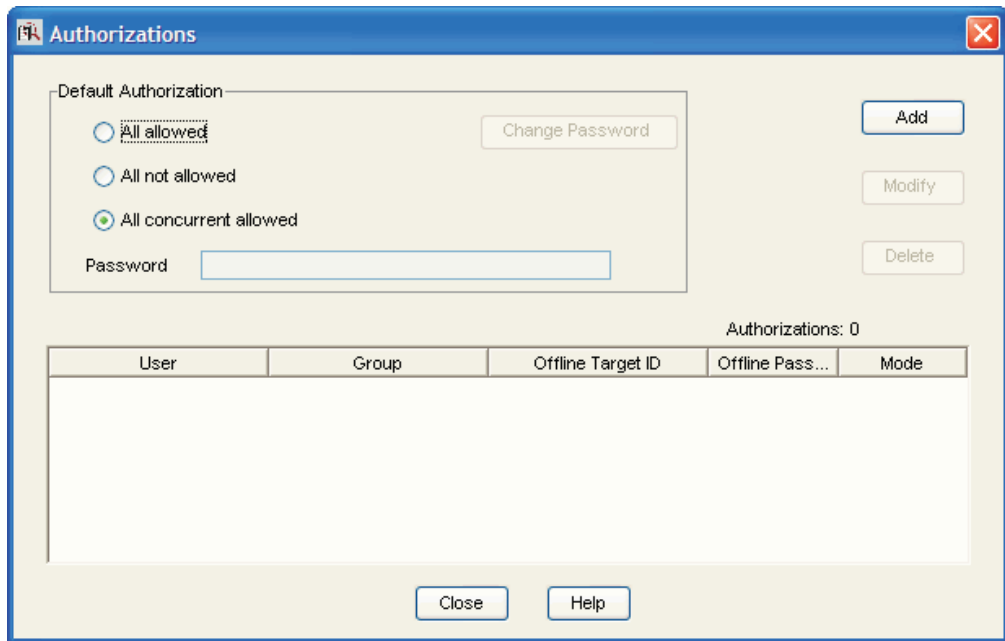


Figure 51. Authorization window for Concurrent-Offline licenses

For the selected license, the window shows the mode in which each user can use the license. There are three different modes for license use:

- **All allowed.** Any user can start using the license either as concurrent or as offline (i.e. disconnected from the network).
 - **All not allowed.** No users are allowed to use the license. A user requires specific authorization to use the license.
 - **All concurrent allowed.** Any user can start using the license either as concurrent but not as offline (i.e. disconnected from the network).
3. You decide that users can use the license only if they have a specific authorization, so you click **All not allowed**. Create the first authorization record for a specific user. From the Authorization window (Figure 51), click **Add**. The Add Authorization window is displayed (Figure 52). Fill in the details for the new User and Group, Offline Target ID, Offline Password . Set the Mode for the use of the license for this specific user. The modes are similar to the modes in the Authorization window (Figure 51), except that they are for the individual user and group being authorized. Click **OK**.

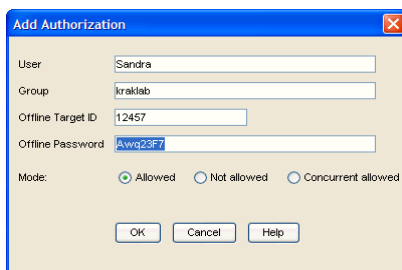


Figure 52. Add Authorization window for Concurrent-Offline licenses

The authorization record has now been created (as shown in Figure 53 on page 85).

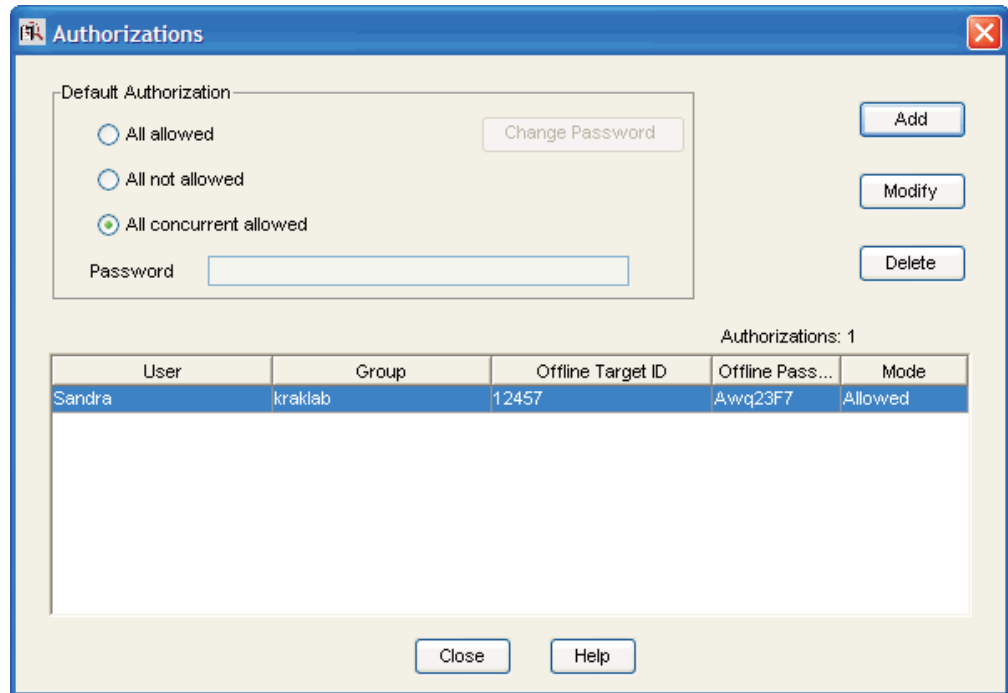


Figure 53. Authorization window for Concurrent-Offline licenses— showing new authorization

- When you have created an authorization record, you can change the settings for the authorization record. Select the authorization record file in the Authorization window (Figure 53) and click on **Modify**. The Modify Authorization window is displayed (Figure 54). You decide to change the Group for the user Sandra from Guest to System. Type in the new group, then click **OK**.

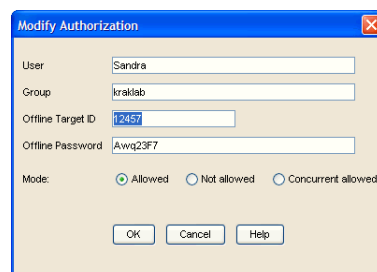


Figure 54. Modify Authorization window for Concurrent-Offline licenses.

The authorization record has now been modified.

Restricting User Access With the User File

This scenario explains how to create a user file to designate that certain users might or might not use certain products. You could also use a previously created user file as a base. To create a user file, follow these steps:

- Using a text editor, open a file named:
 - user_file on AIX
 - userfile on Windows
- Within the file, to restrict access to a product, use the **VENDOR** keyword, followed by the name of the vendor, followed by either **ALL** (meaning all

products of this vendor) or the name of a product. Enclose vendor names and product names in quotation marks if they contain embedded blanks. For example:

```
VENDOR "IBM Software Group" SMARTJava
VENDOR Grafix,Inc. all
```

You need one VENDOR statement for each product of the same vendor, unless ALL is sufficient for your purposes.

3. After each vendor statement, code either an ALLOW or a DISALLOW statement. ALLOW and DISALLOW are mutually exclusive.

- ALLOW

Specifies that the user names that follow this keyword are allowed to use the product. If no user names follow this keyword, no users can use the product. The user name is the login user name. For example:

```
VENDOR "IBM Software Group" SMARTJava
ALLOW fritz harry monique penny
```

This specifies that only four users can use the SMARTJava product: Fritz, Harry, Monique, and Penny. ALLOW and DISALLOW are mutually exclusive.

- DISALLOW

Specifies that the user names that follow this keyword are not allowed to use the product. If no user names follow this keyword, all users can use the product. The user name is the login user name. For example:

```
VENDOR Grafix,Inc. all
DISALLOW heather jason
```

This specifies that all users *except* Heather and Jason can use all Grafix, Inc software products.

4. Store the file in the /var/LicenseUseManagement/ directory on AIX and the Documents and Settings\All Users\Application Data \IBM\License Use Management\ directory on Windows. Store it on the workstation where the licenses to be restricted are installed. In this example, the complete user file is:

```
% This line is a comment
% *****
VENDOR "IBM Software Group" SMARTJava
ALLOW fritz harry monique philip
% *****
VENDOR Grafix,Inc. all
DISALLOW heather jason
```

5. For a consistent user authorization policy, store the same user file on all network license servers in your environment, including the central registry license server.
6. When adding a new product, remember to update user files at all the license servers accordingly.

Note: You cannot use the User File to restrict access when you extract nodelocked offline licenses from concurrent offline licenses.

Managing High-Availability Licensing (HAL)

The scenario in this section shows how to set up and manage a cluster of network license servers to ensure high availability of concurrent licenses.

When you create a cluster, License Use Management Runtime generates the cluster ID. For an independent software vendor to create passwords that are bound to a

cluster rather than to a single server, you must provide the cluster ID to the vendor. Therefore, you must create the cluster before you can request licenses bound to the cluster from an independent software vendor.

Scenario 9: Creating and Managing a Cluster

In this scenario, the administrator:

- Creates a cluster consisting of three network license servers (members)
- Activates all the servers in the cluster
- Adds a fourth server to the cluster
- Deactivates a cluster member

Creating a Cluster

To create a cluster:

1. Before you begin, be sure all the servers you intend to put in the cluster are configured to communicate with each other through direct binding.
2. In the main window (Figure 26 on page 68), select **Servers** from the menu bar and the **Clusters...** option from the menu. The Clusters window is displayed, as shown in Figure 55.

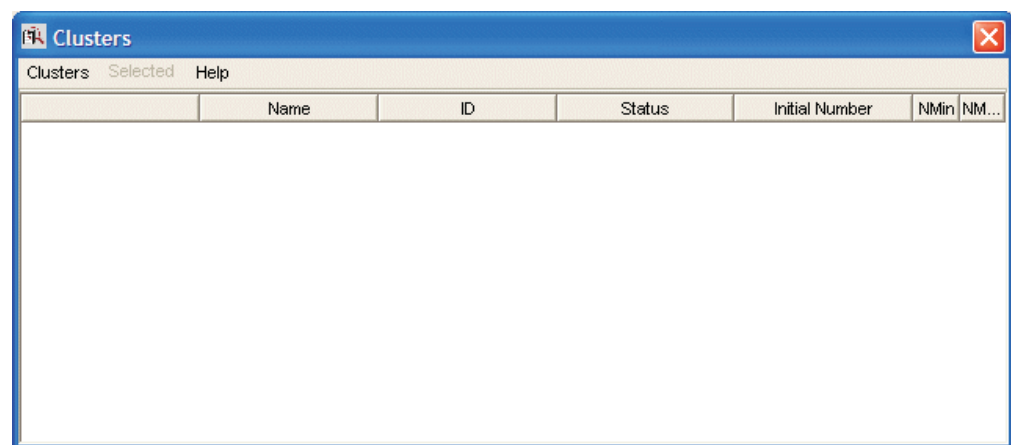


Figure 55. Clusters Window

3. Select **Clusters** from the menu bar and **Create...** from the menu. The Create Cluster window is displayed.
4. Use the **Initial Number** spin box to specify how many servers you intend to put in the cluster. Make sure that this number is what you want, because it determines the maximum number of members the cluster can ever have and the minimum number of activated members necessary to run the cluster. In this example, as shown in Figure 56, the administrator specifies that the initial number of members is 3.

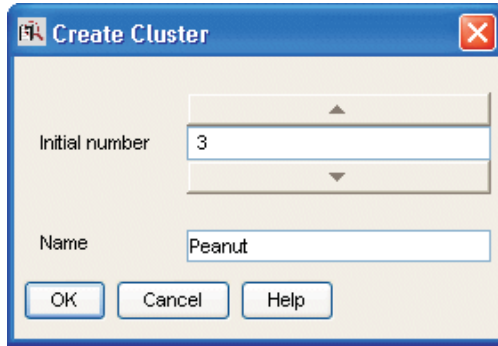


Figure 56. Create Cluster Window

Use the **Name** field to give the cluster a unique name. You will use the name to specify the cluster in GUI and command-line operations. In this example, the administrator names the cluster *Peanut*.

5. Click **OK**. A pop-up message gives you a chance to change the initial number of members.
6. After you confirm your choices, the Define Cluster Members window is displayed.

Potential members of the cluster are shown in the **Available NetworkLS** box. These are network license servers that are up and running, and are not activated in any other cluster.

Select a server from the **Available NetworkLS** list and use the **Add>>** push button to move it to the **Cluster Members** list. Continue until the **Cluster Members** list has exactly the number of servers you specified in **Initial Number**. You can move servers between the **Available NetworkLS** and **Cluster Members** boxes until your selections are final. In the example shown in Figure 57, the administrator adds servers **lab132028**, **lab132041**, and **lab237141**.

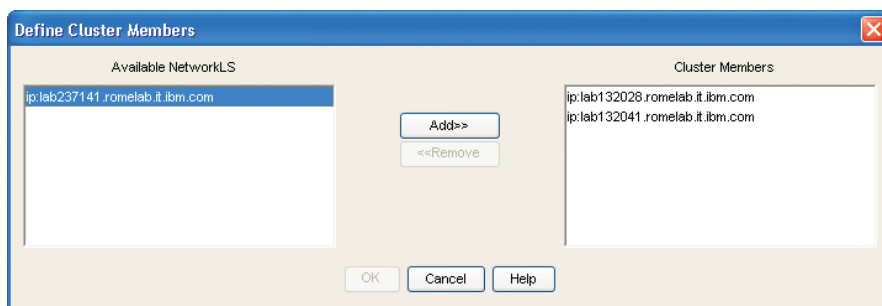


Figure 57. Define Cluster Members Window

7. Click **OK**. A pop-up window is displayed to give you the chance to change your selections. The Clusters window is redisplayed with an entry for the newly-defined cluster, as shown in Figure 58.

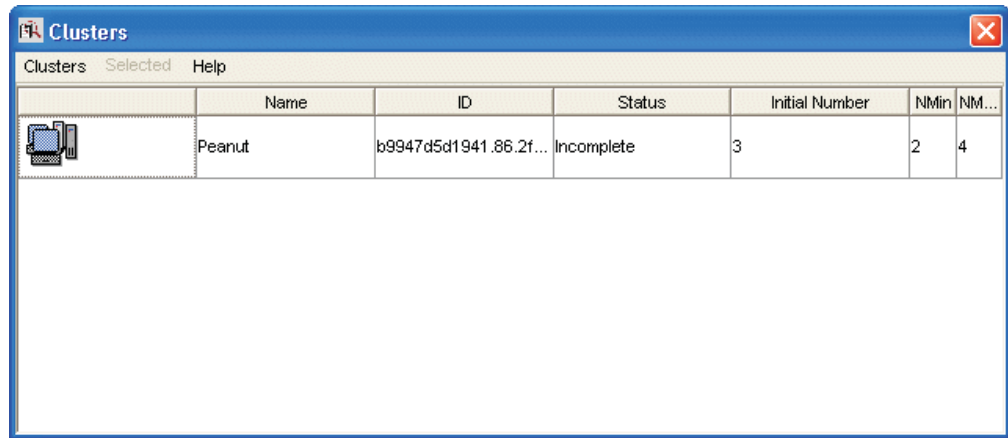


Figure 58. Clusters Window with New Cluster Added

Note that the status of the cluster is **Incomplete**, because not enough servers have been activated yet.

Note: Due to incompatibility between HAL cluster members 5.1.1 and HAL cluster members 5.1.0 of License Use Management Runtime, creating a cluster using a mixed server environment is not recommended. The mixed mode environment results in unstable HAL operation. All HAL cluster members have to be 5.1.1 or higher.

Activating Cluster Members

For a cluster to be able to serve licenses, a minimum number of servers must be activated, and more than half of the activated servers in the cluster must be available. When you create a cluster, only the first server (in this example, **lab132028**) is activated. To activate the other servers, follow these steps:

1. In the Clusters window, highlight the cluster *Peanut*. Select **Selected** from the menu bar and **Open As Details...** from the menu. The Details of Peanut window is displayed, as shown in Figure 59.

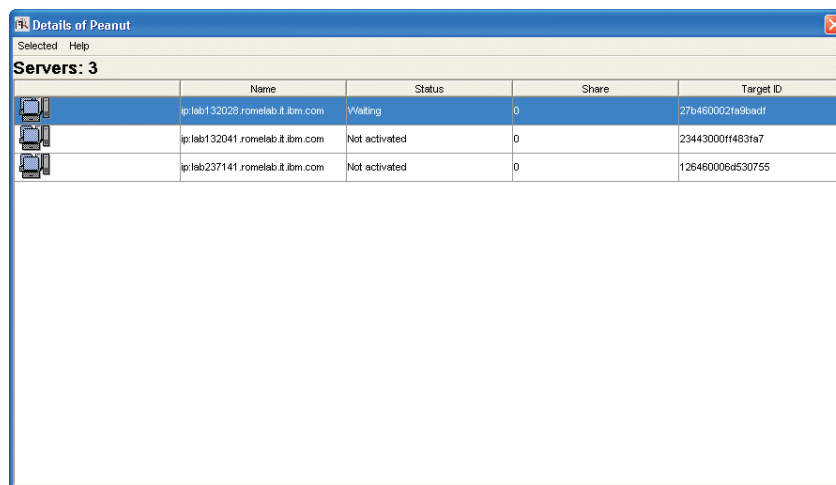


Figure 59. Details of New Cluster

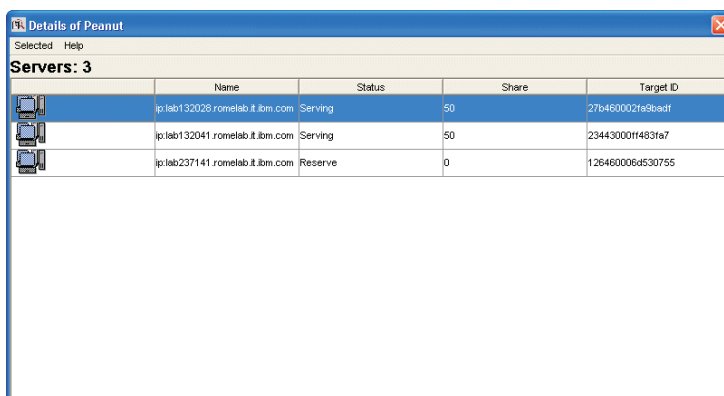
The status of server **lab132028** is **Waiting**, because it has been activated but the cluster does not yet have enough activated members to start serving licenses.

Next to each activated server is displayed the number of the port on which the server performs its high-availability licensing activities.

2. Select server **lab132041**. Right-click it and select **Activate** to activate the server. Similarly activate the server **lab237141**.

While each activation is being processed and all the servers in the cluster are being updated, the cluster goes into **Change Pending** status for a time that depends on the number of activated servers in the cluster. While the cluster is in this status, you cannot perform any administration on the cluster. Return to the main window and use F5 to refresh the display, and then view the Clusters window again until the cluster has exited from **Change Pending** status.

3. Return to the Details of Peanut window, where:
 - The status of servers **lab132028** and **lab134041** has changed to **Serving**.
 - Each server is serving 33% of the licenses, as shown in Figure 60.
 - Server **lab237141** is in **Reserve** status, ready to take over if **lab132028** or **lab132041** goes down.

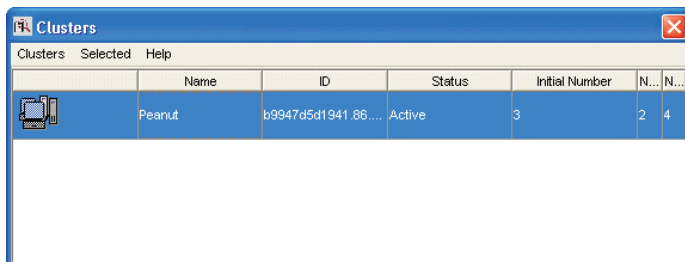


The screenshot shows a window titled "Details of Peanut" with a menu bar containing "Selected" and "Help". Below the menu bar, it says "Servers: 3". A table lists the servers with columns for Name, Status, Share, and Target ID. Each row has a server icon to the left of the Name column.

Name	Status	Share	Target ID
ip:lab132028.romelab.it.ibm.com	Serving	50	27b460002fa2eacdf
ip:lab132041.romelab.it.ibm.com	Serving	50	23443000ff483fa7
ip:lab237141.romelab.it.ibm.com	Reserve	0	126460006d530755

Figure 60. Details of Cluster after Three Activations

4. Return to the Clusters window (Figure 59 on page 89). The status of the cluster has changed to **Active**. The cluster ID has been generated and is displayed. The administrator can now give the cluster ID to software vendors who will create passwords bound to the cluster.



The screenshot shows a window titled "Clusters" with a menu bar containing "Clusters", "Selected", and "Help". Below the menu bar, there is a table with columns for Name, ID, Status, Initial Number, and N... N... Each row has a cluster icon to the left of the Name column.

Name	ID	Status	Initial Number	N... N...
Peanut	b9947d5d1941.86....	Active	3	2 4

Figure 61. Clusters Window with Cluster ID

5. Return to the main window, where the HAL test product has been enrolled on the cluster. You can use it to test operation of the cluster.

Adding a Cluster Member

If a cluster has fewer than its maximum number of members, you can add members, one at a time, up to the maximum number. In this example, you can add additional members to **Peanut**, as follows:

1. In the Clusters window, highlight the **Peanut** cluster. From the **Selected** menu, select **Add cluster member....** The Add Cluster Members window is displayed. The window is similar to the Define Clusters window shown in Figure 57. Potential members of the cluster are shown in the **Available NetworkLS** box. They can already be members of a cluster. Select a server (in this example, **thelma**) from the **Available NetworkLS** list and use the **Add>>** push button to move it to the **Cluster Members** list. You can move servers between the **Available NetworkLS** and **Cluster Members** boxes until your selection is final.
2. Click **OK**. A pop-up window is displayed to give you the chance to change your selection. The Clusters window is redisplayed. Return to the main window and use F5 to refresh the display, and then view the Clusters window again until the cluster has exited from **Change Pending** status. The number of servers in **Peanut** is now **4**, and the status of the cluster is **Active**. The newly added server is automatically activated.
3. Open the Details of Peanut window (Figure 59). The status of servers **lab132028**, **lab132041**, and **lab237141** is **Serving**, and each one is serving one third of the licenses. The status of **thelma** is **Reserve**.

Deactivating a Server

If you want a server to stop functioning as part of a cluster, you can deactivate it. You can then activate the server in another cluster. You cannot, however, substitute another server for the deactivated server in the cluster where it is deactivated.

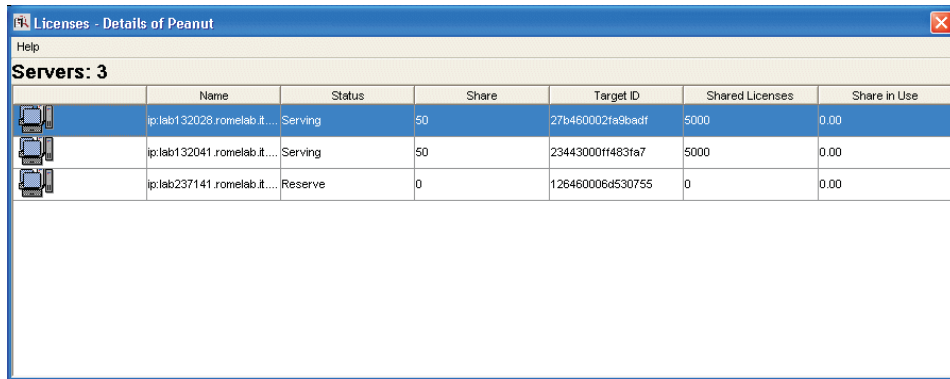
To deactivate a server in a cluster:

1. In the Details of Peanut window, select server **thelma**. Click it with the right mouse button and select **Deactivate** to deactivate the server. While the deactivation is being processed and all the servers in the cluster are being updated, the cluster goes into **Change Pending** status for a time that depends on the number of activated servers in the cluster. While the cluster is in this status, you cannot perform any administration on the cluster. Return to the main window and use F5 to refresh the display, and then view the Clusters window again until the cluster has exited from **Change Pending** status.
2. Return to the Details of Peanut window. The status of server **thelma** has changed to **Not Activated**.

Note: To delete a cluster, deactivate all its members. When you deactivate a server, it must be up and running.

Viewing Licenses Being Served

For a view of a cluster by product, go to a high-availability product (in this case, the HAL Test Product) in the main window. Open the product's Details notebook. On the **Concurrent** page, right-click the product and select the **Selected — Show Servers** option. The Details of Cluster window is displayed with additional information about the number of licenses being served by each server, as shown in Figure 62.






Licenses - Details of Peanut						
Help						
Servers: 3						
	Name	Status	Share	Target ID	Shared Licenses	Share in Use
	ip.lab132028.romelab.it...	Serving	50	27b460002f98badf	5000	0.00
	ip.lab132041.romelab.it...	Serving	50	23443000ff483fa7	5000	0.00
	ip.lab237141.romelab.it...	Reserve	0	126460006d530755	0	0.00

Figure 62. Details of Servers Serving HAL Test Product

Enrolling and Removing Licenses on a Cluster

Checking the Clusters window, you can see the cluster ID of any cluster. Give the cluster ID to the independent software vendor, who can use it to create passwords that are bound to the cluster, rather than to an individual server. Enroll the licenses on only one server of the cluster, as shown in “Enrolling the Product” on page 69.

If you later decide to remove licenses enrolled on a cluster, make sure that all activated servers in the cluster be up and running at the time you do the removal.

Command-Line Equivalent

- To create a cluster named *Peanut* that has members **lab132028**, **lab132041**, and **lab237141**:

```
LUMblt -H c -N Peanut -T 4 -n "lab132028 lab132041 lab237141"
```

- To activate the servers **lab132041**, and **lab237141**:

```
LUMblt -H a -N Peanut -n lab132041
LUMblt -H a -N Peanut -n lab237141
```

The server **lab132028**, which is the first in the list, is automatically activated.

- To add the server **thelma** to the cluster:

```
LUMblt -H a -N Peanut -n thelma
```

- To deactivate the server **thelma**:

```
LUMblt -H d -N Peanut -n thelma
```

- To get an overall report of cluster status:

```
LUMblt -H s -N Peanut
```

- To get a report of cluster status from the perspective of one of the activated servers in the cluster:

```
LUMblt -H s -n lab132041
```

Scenario 10: Displaying Value Units

This scenario explains how to view the Value Units Policy outlined in Chapter 1 of this book. This policy allows products to be priced by introducing a common unit of a measure called Value Units.

This scenario shows you how to:

- View the information about the metrics used.
- Start the application and check the number of Value Units in use.

Viewing the Value Units

In the basic license tool main window select the line corresponding to the MailVision product in the main window. For information on how to enroll the product see “Enrolling the Product” on page 69, for information on how to distribute the licenses see “Distributing the Licenses” on page 71.

To view the Value Units, perform the following steps:

1. Select the **Open as Details** option from the **Selected** menu. The Details notebook is displayed.
2. Select the **Concurrent** tab. The Concurrent page is displayed (Figure 63).

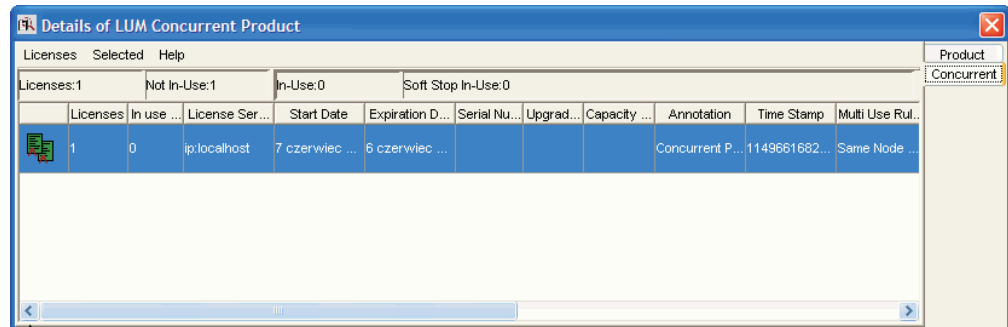


Figure 63. Concurrent Page

In this page the number of licenses represents the Value Units available, while the capacity type is *Value Units* which indicates that this license uses the value units policy.

3. Select **Selected** from the menu bar and **Value Units details**. The Value Units Details window is displayed, as shown in Figure 64.

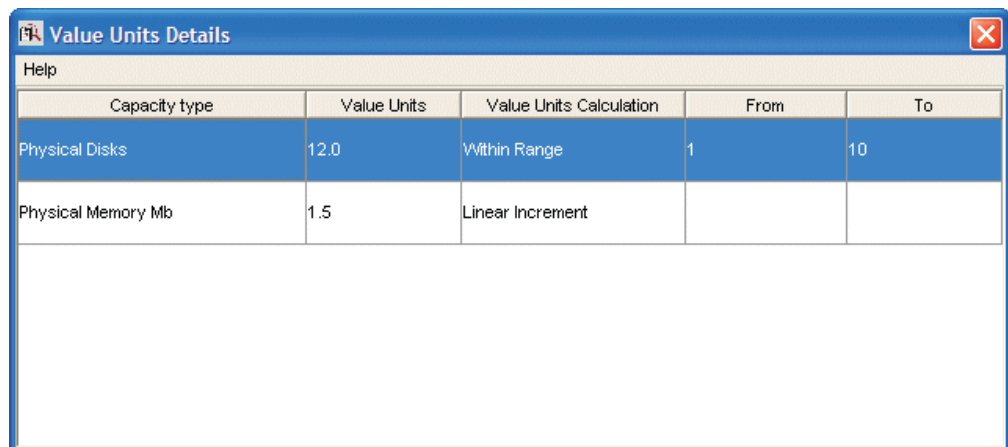


Figure 64. Value Units Details Window

This table describes the different system capacity measurements used to calculate the number of value units assigned for a capacity type.

The **Capacity Type** column shows a list of items for which a capacity type has been assigned, such as:

- 100 configured processors
- 101 online processors
- 103 Physical Disks
- 104 Physical Memory Mb
- 105 Value units
- 108 RISC 32-bit Processors
- 109 x64 Processors
- 110 RISC 64-bit Processors

For a complete list of possible values for capacity types, see the *-F* parameter for the LUMact - Annotation Creation Tool, described in *Using License Use Management Application Developer's Toolkit*.

The **Value Units** column shows the number of units assigned to a specific capacity type required for an application to start.

The **Value Units Calculation** column indicates the method by which the units are calculated: *Within Range* specifies the allowable range. For example, if the range is 4 to 28, 29 x 45 value units for RISC processors would be out of range. For *Linear Increment*, the number of needed value units is proportional to the number of licenses required. For example, if one x64 processor is 6 value units, then two would be 12 value units.

Start the Application and Check the Number of In-use Value Units

While running the product the Concurrent Users page is added to the Details notebook for e-MailVision product, as shown in Figure 65. Check the number of Value Units in use: it is calculated as the sum of the different metrics used.

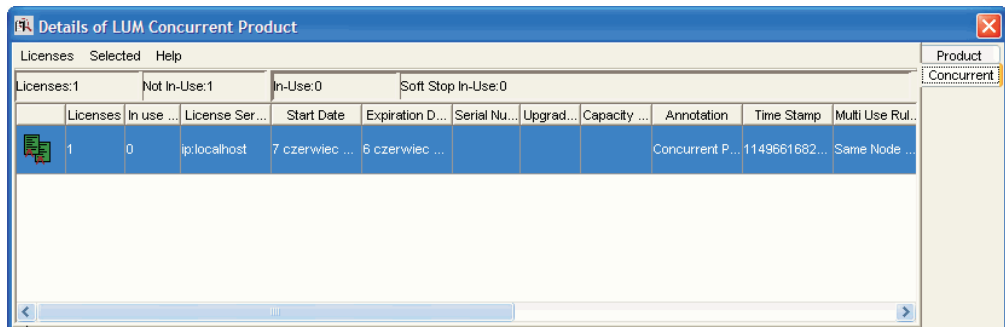


Figure 65. Concurrent Page with Value Units in use

Command-Line Equivalent

To accomplish the same results (viewing the annotation details, starting the application), use the following commands.

To display the annotation table:

```
To show the table of the metrics:
LUMblt -ll -Z -p "EmailVision 11 *"
The following table is shown
```

Value Units - Details				
Capacity Type	Value Units	Value Units Calculation	from	to
On-line Processors	12.00	Within Range	1	10
Physical Disks	1.50	Linear Increment		

To show the number of Value Units in use:

Scenario 11: Managing Concurrent-Offline Licenses

This scenario explains how to manage the use of concurrent-offline licenses, as outlined in “Concurrent-Offline Licenses” on page 6. Using this type of license, an administrator allows users to take a concurrent license for a certain number of days and to use it on a portable computer. This scenario shows you how to:

- Reduce the maximum number of days a product can be reserved.
- Modify the default authorization.
- Add a password for the default authorization.
- Create authorization records for a specific concurrent-offline license. This allows the authorized users to take the license.
- Modify a created authorization.
- Display details about the offline users.

In this scenario, 100 concurrent-offline licenses for DataMaster have already been enrolled. For information on how to enroll the product see “Enrolling the Product” on page 69. After enrollment, the product is displayed in the administration tool main window. Note that the icon indicates that the licenses are concurrent-offline.

To manage this kind of license:

1. Double-click the product in the administration tool main window, then click the **Concurrent-Offline** tab. The Concurrent-Offline Licenses - Details window is displayed (Figure 66). Note that the maximum offline period of the license is 120 days.

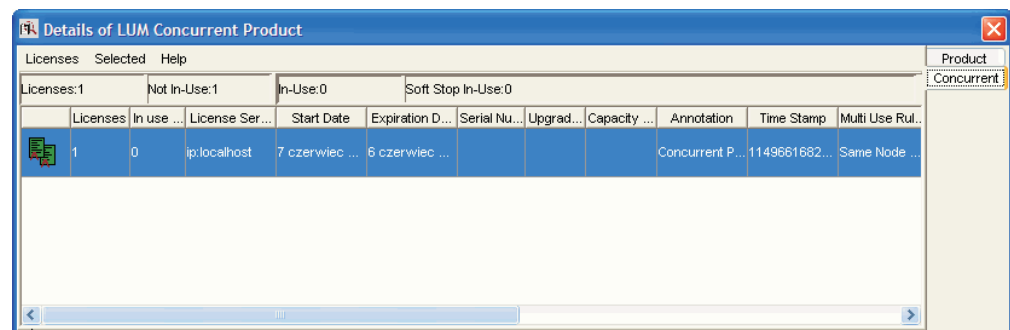


Figure 66. Concurrent-Offline Licenses - Details window

2. To reduce the maximum number of days a product can be reserved, from the Concurrent-Offline Licenses - Details window, right-click on the product and select **Licenses ► Set maximum offline period**. The Update Offline Period window is displayed (Figure 67 on page 96). You can modify the maximum number of days that a user can reserve a license. For example, you can change the value from 30 to 5 days. Click **OK** to save the new value and close the window.

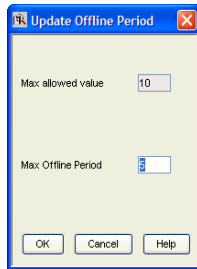


Figure 67. Update Offline Period window

- To modify the default authorization, from the Concurrent-Offline Licenses - Details window (Figure 66 on page 95), right-click on the product and select **Selected ► Authorizations**. The Authorizations window is displayed (Figure 68). The default authorization setting is for all concurrent licenses to be allowed.

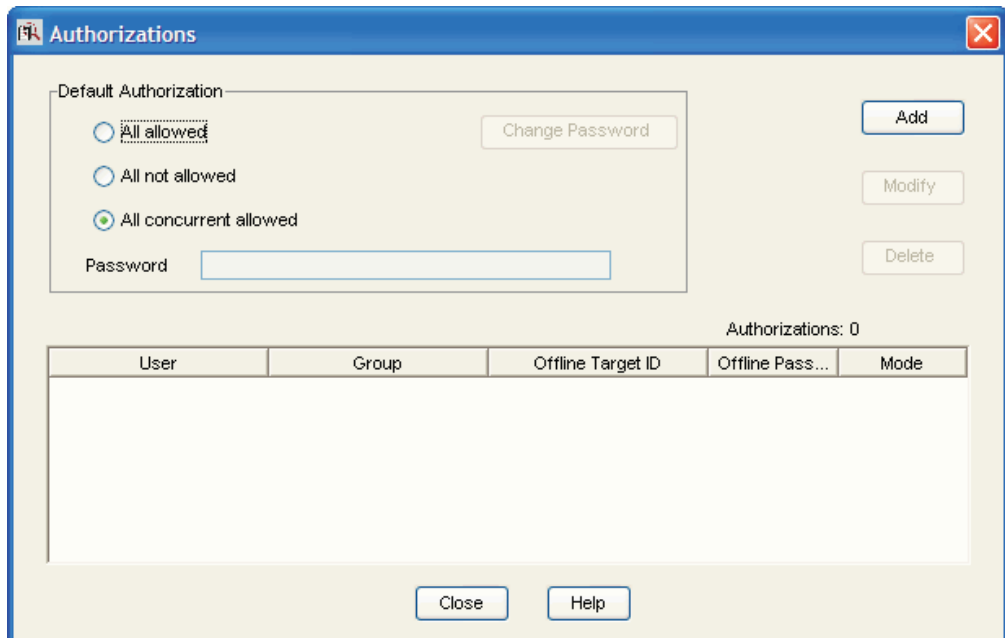


Figure 68. Authorizations window

For the selected license, the window shows the mode in which each user can use the license. There are three different modes for license use:

- **All allowed.** A user can start using the license as a concurrent license or can reserve it for nodelocked-offline use.
 - **All not allowed.** The license cannot be granted in any mode. A user requires specific authorization to be granted to use the license.
 - **All concurrent allowed.** A user can take the license as a concurrent license, but the license cannot be reserved in the nodelock directory.
- To add a password to the default authorization, from the Concurrent-Offline Licenses - Details window (Figure 66 on page 95), right-click on the product and select **Selected ► Authorizations**. The Authorizations window is displayed (Figure 68). The default setting is **All concurrent allowed**, no password assigned, and for **Change Password** to be disabled. Select **All allowed**. **Change**

Password is now enabled. Click **Change Password** and type in the new password. Click **OK** to set the new password.

Note: You cannot define a password for the **All not allowed** and **All concurrent allowed** authorizations. If you have set a password for the **All allowed** authorization, and you change the authorization to one of the other two settings, the password is deleted, and **Change Password** is disabled.

5. You decide that users can use the license only if they have a specific authorization, so you click **All not allowed**. Now create the first authorization record for a specific user:
 - a. From the Authorizations window (Figure 68 on page 96), click **Add**.
The Add Authorization window is displayed (Figure 69).
 - b. Fill in the details for the new User, Group, and Offline Target ID (alone, or in any combination), and the Offline Password.
 - c. Set the Mode for the use of the license for this specific user.
The modes are similar to the modes in the Authorization window (Figure 69), except that they are for the individual user, group, offline target ID, or offline password that is being authorized.
 - d. Click **OK**.

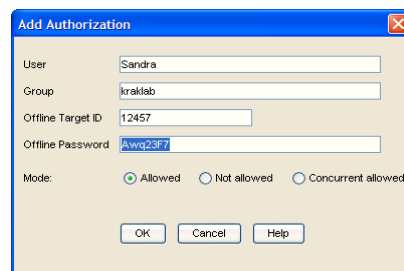


Figure 69. Add Authorization window

The authorization record has now been created (as shown in Figure 70 on page 98).

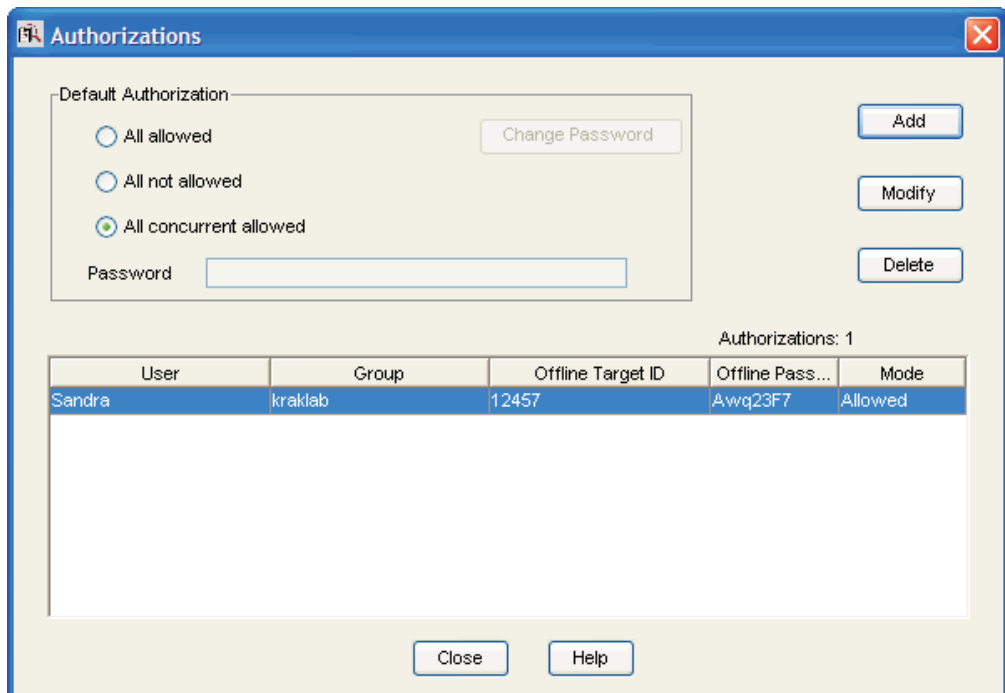


Figure 70. Authorizations window — showing new authorization

- When you have created an authorization record, you can change the settings for the authorization record. Select the authorization record file in the Authorizations window (Figure 70) and click on **Modify**. The Modify Authorization window is displayed. You decide to add the Offline Target ID of a specific machine (1fa460002fdf41a1 in this example) for the user Sandra. Click **OK**. The authorization record has now been modified (as shown in Figure 71).

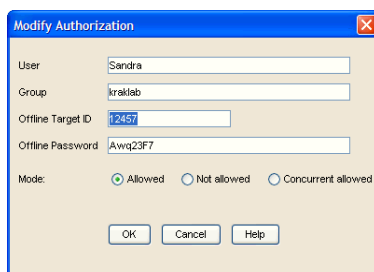


Figure 71. Modify Authorization window

- User Sandra requires an offline-nodelocked license from her portable computer and reserves it for five days. In the administration tool, the display changes to show that there is a license in use (see Figure 72 on page 99).

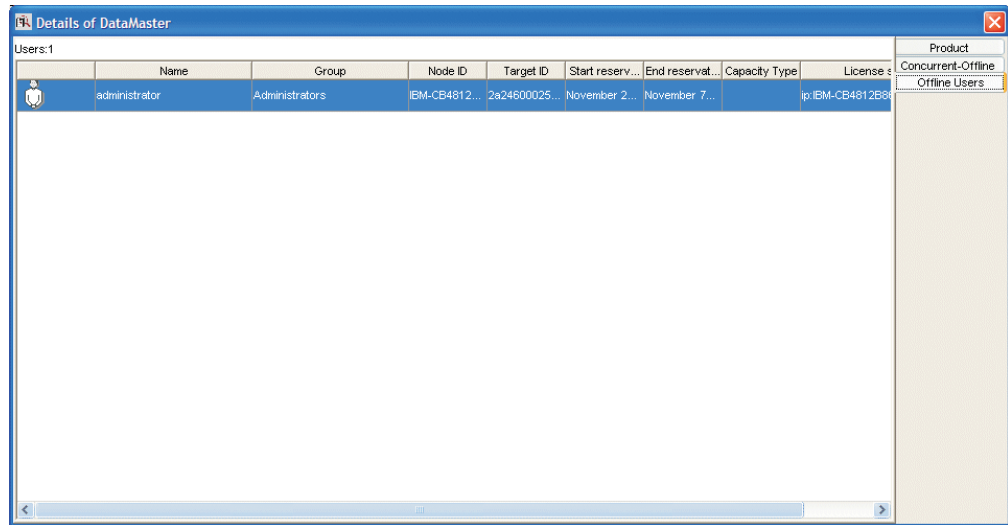


Figure 72. Administration tool, showing an in-use license

- After three days, user Sandra decides that she no longer needs a license for her portable. Using the hand back procedure, she releases the license. The administration tool displays that the license is no longer in use.

Note: If the user Sandra did not hand back the license, when the five-day reservation period expires, the license is handed back. The administration tool displays that the license is no longer in use.

Command-Line Equivalent

The equivalent CLI commands are as follows.

To update (to 50) the maximum number of days a product can be reserved.

```
LUMblt -U -v "'IBM Corporation'" -p "DataMaster 31 ' ' " -O 50
```

To modify the default authorization for DataMaster licenses:

```
LUMblt -A m -v "'IBM Corporation'" -p "DataMaster 31 ' ' " -t 112407185449783  
-T no -w "password"
```

To create a reservation record for the DataMaster license for the user Sandra, for any group and target ID:

```
LUMblt -A a -v "'IBM Corporation'" -p "DataMaster 31 ' ' " -T yes  
-u "Sandra * *" -w "lum_group"
```

It is not possible modify using a unique command an authorization record other than the default record. The administrator needs to delete the old record and create a new record. To delete a reservation record for DataMaster licenses for the user Sandra:

```
LUMblt -A d -v "'IBM Corporation'" -p "DataMaster 31 ' ' " -u "Sandra * *" -t 1124071854496125
```

To create a authorization record for the DataMaster license for the user Sandra for a specific machine with target id 1fa460002fdf41a1:

```
LUMblt -A a -v "'IBM Corporation'" -p "DataMaster 31 ' ' " -T yes -u "Sandra * 1fa460002fdf41a1" -w "lum_group"
```

To list all the authorization records for the DataMaster 31 license:

```
LUMblt -A 1 -v "'IBM Corporation'" -p "DataMaster 31 *"
```

To display information about the users of concurrent-offline licenses for the DataMaster product:

```
LUMblt -s -l co -v "'IBM Corporation'" -p "DataMaster * *"
```

Scenario 12 : Upgrading a Custom Configuration

The scenario in this section shows how to upgrade a custom configuration by adding a set of products to a concurrent custom configuration.

To ensure that the products might be "up_to_date", functionally suitable and competitive, you occasionally need to add new product components, increase the number of licenses, extend the license period, or change the license version. To do this you have to request from the vendor one or more custom configuration passwords and supply the serial number for the concurrent license. This serial number identifies your concurrent custom configuration so that you can install the upgrade licenses as shown in the describing procedure below.

1. Double-click the product in the **Basic License Tool** main window (see Figure 26 on page 68), then click the **Concurrent** tab of the Details notebook. The window **Details of TechDesign TaxEngine** is displayed (Figure 73).

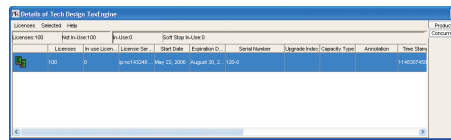


Figure 73. Details Window of TechDesign TaxEngine

To upgrade your Concurrent Licenses:

1. In the **Basic License Tool** main window (see Figure 26 on page 68), select import certificates from the **File** menu.
2. Look in the pull-down list, select the path to the directory where the enrollment certificates are stored (for example /home/cert), and then from the **File** menu choose the custom configuration enrollment certificates (for example techdesignupdate1.lic; techdesignupdate2.lic) as in (Figure 74).

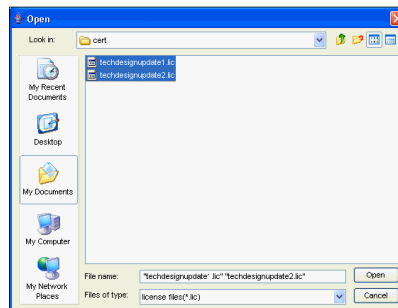


Figure 74. Open window with custom configuration enrollment certificates

3. Click **OPEN** to save the selected values. The enrolled certificates windows (Figure 75 on page 101), (Figure 76 on page 102) are displayed.

Enroll Certificate

Product

Product Name: Tech Design TaxEngine

Product Version: 12

Product Features: ER

License

License Serial Number: 120

License Amount: 70

License Expiration: August 30, 2006

Vendor

Vendor Name: Tech Design Corp.

Vendor ID: 1aa23483fc02.a1.bc.2e.34.10.00.00.00

Server name: ip:nc143248.kraklab.pl.ibm.com

OK Cancel Help

Figure 75. Enroll Certificate Window

Enroll Certificate

Product

Product Name: Tech Design TaxEngine

Product Version: 12

Product Features: ER+EZ.

License

License Serial Number: 120

License Amount: 30

License Expiration: August 30, 2006

Vendor

Vendor Name: Tech Design Corp.

Vendor ID: 1aa23483fd02.a1.bc.2e.34.10.00.00.00

Server name: ip.nc143248.kraklab.pl.ibm.com

OK Cancel Help

Figure 76. Enroll Certificate Window

4. In the **Server name** field (Figure 76), select the server number from the pull-down list where the initial key was installed on. This is required, because the product is vendor-managed and has a network license. The custom configuration licenses are enrolled on the network license that has the target ID for which licenses were created.

Note:

- a. If a specific target ID is in the enrollment certificates, the licenses must be enrolled on the network licenses server of that target workstation.
 - b. If the target ID in the enrollment certificates is any, select a network license server.
5. Click **OK** and the Main window is displayed (Figure 77 on page 103).

Product	Version	Vendor	Features	Licenses	In Use Licenses
LUM Test Product	1	LUM Test Vendor		10000	0
Tech Design TaxEngine	12	Tech Design Corp.	ER	70	0
Tech Design TaxEngine	12	Tech Design Corp.	ER+EZ1	30	0

Figure 77. LUM Basic License Window

The concurrent page of the Details notebook contains the updated licenses information. To display this page, double-click on the **Product** name, then click the **Concurrent** tab of the Details notebook, scroll to the right to view the serial number, subserial number, upgrade count and upgrade index.

Command-Line Equivalent

To upgrade a custom configuration license, using the license certificate files `techdesignupdate1.lic` and `techdesignupdate2.lic` on server **lab15099**

```
LUMblt -a -f 'techdesignupdate1.lic techdesignupdate2.lic' -n lab15099
```

Note:

1. Each upgrade set is identified by a different subserial number.
2. An upgrade set with a lower subserial number cannot be enrolled if a set with a higher subserial number has already been enrolled.
3. Concurrent and concurrent-offline licenses in use as concurrent will be no longer in use after the upgrade.
4. Reserved offline licenses can still be handed back after an upgrade.
5. It is not possible to reserve offline licenses if licenses with a lower subserial number are currently reserved.
6. Authorizations are moved to the upgraded licenses with the following algorithms.

Authorizations are moved to the upgraded certificates according to restrictive rules that prevent granting extra access for a user.

If the license you are going to replace do not have the same default authorization no transfer is done and ALL NOT ALLOWED is applied as the default authorization.

If the default authorization is transferred then user authorization are transfer as follows:

- If the authorization level assigned to the user is equal or more restrictive then the default one is transferred if it exists under any of the previously considered license.
- If the authorization assigned to the user is less restrictive then the default one is transferred only if it exists under all of the previously considered certificate.

Chapter 6. License Use Management Runtime Command Line Interface

This chapter describes how to use the License Use Management Runtime CLI.

In the descriptions of command syntax, the following conventions are used:

- Bold type** Code this item exactly as shown.
- Italic type* Replace this item with your own value.
- Brackets []** The item or items in brackets are optional.
- Braces {}** Choose one item from the list of alternative items inside the brackets.
- Vertical line |** This OR sign separates the alternative items.
- Three dots** An ellipsis following an item means you can include more than one of the item. For example, *[filename]...* specifies an optional list of files.

The following commands are available on *all* operating systems:

- LUMblt** Basic License Tool (page 106)
- LUMcfg** Configuration Tool (page 138)
- LUMtv** Test Verification Tool (page 142)
- LUMtarget** Target View Tool (page 143)
- LUMlmd** Network License Server (page 145)
- LUMgdb** Central Registry (page 147)

LUMblt - Basic License Tool

ALL

Primary Command Options

The LUMblt command has the following primary command options:

(No option)	Start the basic license tool GUI.
LUMblt -a Enroll a Product	Add products to a license database.
LUMblt -A Authorize	Authorize a concurrent or concurrent-offline license.
LUMblt -C Clean Up Stale Licenses	Update the number of concurrent; concurrent-offline and reservable licenses in use.
LUMblt -d Delete a Product License	Delete products from a license database, or delete Application Client Identifiers from the central registry.
LUMblt -E Extract and Distribute Licenses	Extract and distribute licenses from a network compound password of a given product to the servers.
LUMblt -h Display Help	Display command syntax and usage information about the basic license tool CLI.
LUMblt -H Administer High-Availability Licensing	Create a cluster of network license servers; add servers to an existing cluster; display cluster status; activate and deactivate servers in a cluster.
LUMblt -l Display a List	List license database information about servers, vendors, products, and licenses.
LUMblt -m Monitor and Log Threshold Events	Monitor and log the threshold messages.
LUMblt -r Generate a Report	Report on information recorded in the log file of a license server.
LUMblt -R Reserve Licenses; Delete or Update Reserved Licenses	Reserve reservable licenses for use by a specific user, group, and node; delete reserved licenses; update reservation status.
LUMblt -s Display Product License Status	Gather status information about license usage.
LUMblt -S Set the Stress Threshold	Set the network license server load threshold.
LUMblt -T Activate or Deactivate Tracing	Display information about current product usage on specified license servers.
LUMblt -U Update a Product	Update the number of licenses you enrolled, update the hard stop/soft stop policy and high-water mark when enabled on the product, set the threshold value of a customer-managed product, and set the maximum allowed period that a concurrent-offline license can be reserved.
LUMblt -x Delete Server Log Entries	Delete license server and central registry log file entries.

General Rules for the LUMblt command

1. The root user (UNIX), or the administrator (Windows), can run the LUMblt command with all its options.

Other users can run the **-l** (Display a List), **-s** (Display Product License Status), **-r** (Generate a Report), **-Hs** (check a cluster status), and **-h** (Display Help) options and the equivalent GUI actions, allowing them to display the content of the license and license users databases.

2. The parameters within any of the following name specifications are positional:
 - vendor_information (*vendor_name vendor_id vendor_password*)
 - product_information (*product_name product_version product_features license_password license_annotation*)
 - administrator_information (*administrator_name company_name address additional_info*)
 - user_information (*user_id user_group user_node*)
3. All the following name specifications must be enclosed within double quotation marks (for example: "*vendor_name vendor_id vendor_password*").
 - vendor_information (*vendor_name vendor_id vendor_password*)
 - product_information (*product_name product_version product_features license_password license_annotation*)
 - administrator_information (*administrator_name company_name address additional_info*)
 - user_information (*user_id user_group user_node*)
 - signature_information
4. When a list of values (such as server names, vendor names, product names, or user names) is entered as a parameter, the list must be enclosed in double quotation marks. For example:


```
LUMblt -r3 -u "katie dustin emily adam"
```
5. A name that contains character spaces must additionally be enclosed within single quotation marks. For example:


```
-v "'IBM Corporation'"
-p "'Core - System' 11 feature"
```
6. The parameters you specify in any of the command options (for example, server names, vendor names, and product names) are case-sensitive.
7. You can display help on LUMblt command options as follows:
 - To get help on just the -a, -U, -E, -d, -m or -H option:


```
LUMblt -option
```
 - To get help on just the -R, -l, -r, or -x option:


```
LUMblt -optionh
```

Examples

- Display the LUMblt -E syntax:


```
LUMblt -E
```
- Display the LUMblt -r syntax:


```
LUMblt -rh
```

LUMblt -a Enroll a Product

This option adds a product to the license database on the license server that you specify. Use the `LUMblt -a` command to add a new product and its initial licenses to a license server database. You can also use this command to add licenses for existing vendor-managed products.

You get the product license information in the form of an enrollment certificate file. You enroll the product by importing the enrollment certificate. You can enroll more than one product at the same time.

Syntax:

LUMblt -a

```
[ -n server_name ] -f filename [filename]...  
[ -R administrator_name [ company_name address additional_info ] ]  
[-T enrolled_licenses ]  
[ -I signature_information ]
```

Parameters:

-n *server_name*

Specifies the name of the license server to which you intend to add the product. If **-n** is omitted:

- If the product is customer-managed, and the licenses are network licenses, they are enrolled on the central registry.
- If the product is vendor-managed, and the enrollment certificate file specifies a target ID, the licenses are enrolled on that workstation.
- If the product is vendor-managed, and the enrollment certificate file does not specify a target ID, the licenses are enrolled on the local workstation.

-f *filename* [*filename*]...

The complete path and file name of the enrollment certificate file containing the product license information that you intend to add.

-R *administrator_name* [*company_name* *address* *additional_info*] (for customer-managed use products only)

administrator_name

The name of the administrator who performs the operation. This parameter is required.

company_name

The name of your company.

address The address of your company.

additional_info

Comments, notices to future users, or other information about the initial enrollment of this product.

If you enroll several products, the value you specify for these options apply to all the license certificates.

-T *enrolled_licenses*

(for customer-managed use products only) The number of licenses you have acquired from the software supplier. This parameter is required.

If you enroll several products, the value you specify for this option applies to all the license certificates.

-I *signature_information*

(for customer-managed use products only) Information about the user issuing the command, to be stored with the signature stamp.

Examples: Add a customer-managed use product:

```
LUMblt -a  
-f license_certificate_name  
-R "Alex IBM Rome" -T 100  
-I "'Alex using root userid'"
```

Add a vendor-managed use product:

```
LUMblt -a -n thelma  
-f license_certificate_name
```

LUMblt -A Authorize

Use this option to create an authorization for either a concurrent, or a concurrent-offline license. LUMblt must be run on the same machine where the license is enrolled.

Note: To add an authorization for a high-availability license, you must repeat the command on each license server in the cluster.

Syntax:

LUMblt -A *action_type*

```
{ { a -v "vendor_name" -p "product_name product_version product_features"
-u "user_name user_group target ID" [ -w "password" ] -T mode [-t timestamp]}
|
{ l -v "vendor_name" -p "product_name product_version product_features"
[-t timestamp]}
|
{ d -v "vendor_name" -p "product_name product_version product_features"
-u "{ user_name | * } { group_name | * } { target ID | * }"
-t timestamp}
|
{ m -v "vendor_name" -p "product_name product_version product_features"
-t timestamp -T mode [ -w "password" ] }
```

Parameters:

action_type

Specifies the action to be taken:

- a** Adds an authorization for a product. With action type **a**, the **-v**, **-p**, **-u**, and **-T** parameters are all required. The **-t** and **-w** parameters are optional.

To add an authorization for a high-availability license, you must repeat the command on each license server in the cluster.

- l** Lists the authorizations for a product. With action type **l**, the **-v** and **-p** parameters are required. The **-t** parameter is optional.

- d** To delete an authorization for a product. With action type **d**, the **-v**, **-p**, **-u**, and **-t** parameters are all required.

To delete an authorization for a high-availability license, you must repeat the command on each license server in the cluster.

- m** To modify an authorization for a product. With action type **m**, the **-v**, **-p**, **-t**, and **-T** parameters are all required. The **-w** parameter is optional.

You can modify only the default authorization from the CLI. To modify any authorization that is already created, you must use the GUI.

```
-u " { user_name | * } { group_name | * } { target ID | * } "
```

The user name and user group for the user to be authorized, and target ID of the machine where the license is to be authorized. The target ID applies only to concurrent-offline licenses that are to be used in the offline mode. The target ID is ignored for concurrent licenses, and also for concurrent-offline licenses that are used as concurrent licenses.

The wildcard character (*) can be used to denote any.

-w "*password*"

The password for the authorized user. This is for concurrent-offline licenses only. The password must be enclosed in double quotation marks. It is for concurrent-offline licenses that are to be used for offline mode. The password is ignored for concurrent licenses, and also for concurrent-offline licenses that are used as concurrent licenses.

The wildcard character (*) can be used to clear (unset) the password.

-v "*vendor_name*"

The vendor of the licensed product that you intend to update. Enclose the *vendor_name* with single quotation marks (') when the *vendor_name* contains spaces, for example "'IBM Corporation'".

-P "*product_name product_version product_features*"

The information on the licensed product that you intend to update.

product_name

The name of the product that you intend to update. Enclose the *product_name* with single quotation marks (') when the *product_name* contains spaces.

product_version

The version of the product that you specified in the *product_name* parameter.

product_features

The features of the product that you specified in the *product_features* parameter. Enclose the *product_features* with single quotation marks (') when the *product_features* contain spaces.

-T *mode*

Set to one of:

yes A user can start using the license as a concurrent license or can reserve it for nodelocked-offline use.

no The license cannot be granted in any mode.

concurrent

This is for concurrent-offline licenses only. A user can start using the license in a concurrent mode only. The user cannot reserve the license for nodelocked-offline use.

-t *timestamp*

Unique timestamp of the product license that you intend to create, modify, list, or delete. To get the timestamp, issue the following command:

```
LUMblt -lp -p "product_name product_version product_features" -i
```

Examples: To create an authorization record for the DataMaster license, version 31, with the instrumented feature, for the user Sandra, for any group and target ID:

```
LUMblt -A a -v "'IBM Corporation'" -p "DataMaster 31 instrumented" -T yes  
-u "Sandra * *" -w "lum_group"
```

To create an authorization record for the DataMaster license, version 31, with the instrumented feature, for the user Sandra for a specific machine with target id 1fa46002fdf41a1:

```
LUMblt -A a -v "'IBM Corporation'" -p "DataMaster 31 instrumented" -T yes  
-u "Sandra * 1fa46002fdf41a1" -w "lum_group"
```

LUMblt -C Clean Up Stale Licenses

Use **LUMblt -C** to update the number of in-use concurrent, concurrent-offline, and reservable licenses.

When you issue this command, License Use Management Runtime polls all the license servers that have granted licenses of these types and verifies that the licenses are still in use. If any stale licenses are found, they are removed from the number of in use licenses.

Syntax:

LUMblt -C

```
[ -n server_names ]  
[ -v vendor_name ]  
-p product_name product_version product_features  
[ -t license_timestamp ]
```

Parameters:

-n *server_names*

The names of the servers where the products are enrolled.

-v *vendor_names*

The name of the vendors that manufactured the products whose licenses are in use.

-p "*product_name product_version product_features*"

The information on the licensed product that you want to clean up.

product_name

The name of the product whose stale licenses you want to clean up. Enclose the *product_name* with single quotation marks (') when the *product_name* contains spaces.

product_version

The version of the product whose stale licenses you want to clean up.

The wildcard character (*) can be used to denote any.

product_features

The features of the product whose stale licenses you want to clean up. Enclose the *product_features* with single quotation marks (') when the *product_features* contain spaces.

The wildcard character (*) can be used to denote any.

-t *license_timestamp*

Use the optional **-t** *license_timestamp* argument to clean up the user for a specific license

Examples: Clean up stale licenses for the Graphics product, version 31, with the additional plug-ins feature, of vendor Alpha on servers **Thelma**, **Hall**, and **Louise**:
LUMblt -C -n "Thelma Hall Louise" -v "Alpha" -p "Graphics 31 'additional plug-ins'"

Clean up stale licenses for the Graphics product, version 31, with the additional plug-ins feature, of vendor Alpha.

```
LUMblt -C -v "Alpha" -p "Graphics 31 'additional plug-ins'"
```

LUMblt -d Delete a Product License

This option deletes a product license from the license database on the license server that you specify, or an Application Client Identifier from the central registry.

Syntax:

LUMblt -d

```
[ -n server_name ]
-v vendor_name
-p product_name product_version product_features
{ -t timestamp | -A ACID }
[ -I signature_information ]
```

Parameters:

-n *server_name*

Either of the following:

- The name of the license server from which you intend to delete the product license.
- To delete a high-availability license, the name of one of the servers in the cluster on which the license is enrolled.

To delete a high-availability license, issue the command:

```
LUMblt -d -n server_name -v vendor_name -p "product_name
product_version product_features" -t timestamp
```

where *server_name* identifies one of the servers in the cluster on which the license is enrolled. You must repeat the command for each license server in the cluster.

-v *vendor_name*

Name of the vendor whose product license you intend to delete.

-p "*product_name product_version product_features*"

The information on the licensed product whose licenses you intend to delete.

product_name

Name of the product whose license you intend to delete. Enclose the *product_name* with single quotation marks (') when the *product_name* contains spaces.

product_version

Version of the product whose license you intend to delete.

product_features

The features of the product whose license you intend to delete. Enclose the *product_features* with single quotation marks (') when the *product_features* contain spaces.

-t *timestamp*

Unique timestamp of the product license that you intend to delete. To get the timestamp, issue the following command:

```
LUMblt -lp -p "product_name product_version product_features" -i
```

Do not specify the timestamp when you delete an Application Client Identifier.

-A *ACID*

Unique identifier of the Application Client Identifier of an application

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client you want to delete from the central registry. After deletion the application client no longer has the license to use the specified product. To get the Application Client Identifier, issue the following command:

```
LUMblt -s -lpt -v "vendor_name" -p "product_name product_version  
product_features"
```

Do not specify **-A** when you delete a product.

-I *signature_information*

(for customer-managed use products only) Information about the user issuing the command, to be stored with the signature stamp. Use this parameter when deleting a product license.

When the last license for the only remaining product of a vendor is deleted, the vendor is automatically deleted from the license database. Vendor-managed compound passwords and use-once licenses cannot be deleted until they expire.

Examples: Delete an expired license for a VectorComp Corporation product called EZ-Vectors Version 10, with the raster export feature. The unique timestamp of the license to be deleted from the database on server **saturn** is 1124071854456984:

```
LUMblt -d -n saturn -v "'VectorComp Corporation'" -p  
"EZ-Vectors 10 'raster export'" -t 1124071854456984
```

Delete an application client whose Application Client Identifier is **thelma** from the central registry. After this command the application client will no longer have licenses for the product EZ-Vectors Version 10, with the raster export feature, of VectorComp Corporation vendor:

```
LUMblt -d -v "'VectorComp Corporation'" -p "EZ-Vectors 10 'raster export'"  
-A thelma
```

LUMblt -E Extract and Distribute Licenses

Use the LUMblt -E command to extract licenses from an installed network compound password and distribute them to the network license servers.

Syntax:

LUMblt -E

```
-n origin_server_name
-v vendor_name
-p product_name product_version product_features
-A license_number_per_server
-w target_server_names
[-I signature_information ]
```

Parameters:

-n *origin_server_name*

The name of the server where the network compound password is enrolled.

-v *vendor_name*

The name of the vendor that manufactured the product whose licenses you want to distribute.

-p "*product_name product_version product_features*"

The information on the licensed product whose licenses you intend to distribute.

product_name

The name of the product whose licenses you want to distribute. Enclose the *product_name* with single quotation marks (') when the *product_name* contains spaces.

product_version

Version of the product whose licenses you want to distribute.

product_features

The features of the product whose licenses you want to distribute. Enclose the *product_features* with single quotation marks (') when the *product_features* contain spaces.

-A *license_number_per_server*

The number of licenses for the specified product you want to distribute on each of the servers specified after the -w parameter.

-w *target_server_names*

The servers on which you want to distribute the licenses.

-I *signature_information*

(For customer-managed use products only) Information about the user issuing the command, to be stored with the signature stamp.

Examples: Extract and distribute 10 licenses to each of the servers Louise and Hall, for the Test Compiler product, Version 11, with the special function library feature, of vendor Psychosync, installed on server Thelma:

```
LUMblt -E -n "Thelma" -v "Psychosync" -p "'Test Compiler' 11 'special function library'" -A 10 -w "Louise Hall" -I "'Paula'"
```

LUMblt - Basic License Tool

LUMblt -h Display Help

This option displays general syntax information for the basic license tool CLI.

Syntax:

LUMblt -h

Examples: Display the LUMblt syntax:

LUMblt -h

LUMblt -H Administer High-Availability Licensing

This option creates a cluster of network license servers; adds servers to an existing cluster; displays cluster status; and activates and deactivates servers in a cluster.

Syntax:

```
LUMblt -H action_type
{ { c -N cluster_name -n "server_names" -T initial_number_of_servers }
|
{ a | d } -N cluster_name -n "server_names" }
|
{ s { -N cluster_name | -n "server_names" } } }
```

Parameters:

action_type

Specifies the action to be taken:

- c** To create a cluster. With action type **c**, the **-N**, **-T**, and **-n** parameters are all required.
- a** To add a server to a cluster, or to activate a server in a cluster. With action type **a**, the **-N** and **-n** parameters are required.
- d** To deactivate a server in a cluster. With action type **d**, the **-N** and **-n** parameters are required.
- s** To request cluster status. With action type **s**, the **-N** or **-n** parameter is required. Use the **-N** parameter to get an overall view of cluster status. If you are having problems with cluster operation and you want to see a view of the cluster from the perspective of an individual server, use action type **s** with the **-n** parameter. In either case, the cluster status display includes the following information about the cluster:

- Cluster name
- Cluster ID
- Cluster status:

Active Running, serving licenses

Change Pending

Waiting for a change in the status of a server, or of the cluster, to be propagated to all the servers

Inactive Not enough servers up and running

Incomplete Not enough servers activated

- Initial number of servers
- Minimum number of members, maximum number of members, and minimum up and running for the cluster to work
- For each server in the cluster:
 - Server name
 - Server status:

Serving Running, serving licenses

Waiting Server is ready, but cluster is in incomplete or inactive state

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Unavailable	Not started or not reachable
Reserve	In reserve in case a serving server becomes unavailable
Not activated	Defined as a member of the cluster but administrator has not yet activated the server or has deactivated the server

- Percentage of licenses being served
- Target ID

-N *cluster_name*

The name of the cluster to which the command is directed. The **-N** parameter is required if action type is **c**, **a**, or **d**, and it is recommended when action type is **s**.

-T *initial_number_of_servers*

The initial number of servers in the cluster that you are creating. The **-T** parameter is required if action type is **c**, and is not valid if action type is not **c**. The **-n** parameter must specify a number of servers equal to the value of **-T**.

-n *server_names*

The names of the servers to which the command is directed. The **-n** parameter is required if action type is **c**, **a**, or **d**, and it can be used when action type is **s**. If action type is **c**, this is the list of initial members of the cluster. You must specify a number of servers equal to the value of **-T**. After this command has been processed, the first server in the list is automatically activated. Issue LUMblt **-H** again, using action type **a**, to activate each additional server. At the time the LUMblt **-H c** command is processed, all the servers specified must be up and running. If not, the command fails. If action type is **a** or **d**, this is the name of the server to be activated or deactivated. You must specify exactly one server. If action type is **a**, the server must be up and running when the command is processed. If not, the command fails. If action type is **s**, this is the name of any server that is currently activated in the cluster. The command returns cluster status from the perspective of this server.

Note: When the cluster is in **Change pending** status, different servers might return different data.

Examples: Create a cluster named **ruth** that has three members: anthony, germaine, and costanza:

```
LUMblt -H c -N ruth -T 3 -n "anthony germaine costanza"
```

Activate the servers **germaine** and **costanza**:

```
LUMblt -H a -N ruth -n germaine  
LUMblt -H a -N ruth -n costanza
```

Add the server **sandra** to the cluster:

```
LUMblt -H a -N ruth -n sandra
```

Deactivate the server **germaine**:

```
LUMblt -H d -N ruth -n germaine
```

Get an overall report of the status of the cluster **nobel**:

```
LUMblt -H s -N nobel
```


Get a report of the status of the cluster *nobel* from the perspective of one of its activated members, **pirandello** (recommended only for troubleshooting purposes):

```
LUMblt -H s -n pirandello
```

LUMblt -l Display a List

All users can use this option to display a list of servers, vendors, products, or licenses. You can also use it to display details about individual products or individual licenses.

Syntax:

```
LUMblt -l list_type { n | v | p [ -i ] | l [-k] [-Z]}  
[ -n server_names ]  
[ -v vendor_names ]  
[ -p product_name product_version product_features ]  
[ -u user_names ]  
[ -t license_timestamp ]
```

Parameters:

list_type

Indicates the type of information that you want to list. You can specify any one of the following list types:

-ln or **-ls**

To display a list of active license servers. Also displays information about trace level, load percentage and load threshold percentage. The load percentage and load threshold percentage are not applicable for a central registry license server.

-lv To create a vendor list.

Filters:

- To list vendor information gathered from servers that you specify, use the **-n** filter option followed by one or more server names.
- Do not specify the **-v**, **-p**, or **-u** filter option with this parameter.

-ll To display detailed information about each license.

-lp [**-i**] To create a product list.

Filters:

- To list product information gathered from servers that you specify, use the **-n** filter option followed by one or more server names.
- To list product information on products from particular vendors, use the **-v** filter option, followed by one vendor name.
- To list product information on particular products, use the **-p** filter option, followed by one product name, version, and feature.
- To list information on users who are currently using the products that you specify, use the **-u** filter option, followed by one or more user names.
- Specify the **-k** option to remove expired licenses from the list.

Specify the **-i** option to display detailed information about each product (for example, the number of reserved and unreserved licenses) in a product list.

-ll [**-k**][**-Z**]

To create a list of individual licenses. The output includes all the information you get by specifying **lp** with the **-i** option, plus, for products with concurrent licenses that are administered in a high-availability environment, information about the cluster and servers within the cluster.

Filters:

- To list license information gathered from servers that you specify, use the **-n** filter option followed by one or more server names.
- To list license information on products from particular vendors, use the **-v** filter option, followed by one vendor name.
- To list license information on particular products, use the **-p** filter option, followed by one product name, version, and feature.
- To list information on users who are currently using the licenses that you specify, use the **-u** filter option, followed by one or more user names.
- Specify the **-k** option to remove expired licenses from the list.
- Specify the **-Z** option to display a table containing value units annotation information.

Value Units Output:

- **Capacity Type.** Shows a list of items for which a capacity type (metric) has been assigned.
- **Value Units.** Shows the number of value units assigned to a specific capacity type.
- **Value Units Calculation.** Indicates the method by which the value units are calculated from capacity units:
 - *Within Range.* Specifies the same value units for all capacity units in the specified range.
 - *Linear Increment.* The number of value units required is proportional to the number of capacity units requested.
- **From.** Indicates the beginning of the range.
- **To.** Indicates the end of the range (if any).

High-Availability Output:

- Cluster name
- **For each server in the cluster:**
 - Server name
 - Server status:

Serving

Running, serving licenses

Waiting

Server is ready, but the cluster is in incomplete or inactive state

Unavailable

Server is unavailable to other members of the cluster

Reserve

In reserve in case a serving server becomes unavailable

Not activated

Defined as a member of the cluster but the administrator has not yet activated the server or has deactivated the server

- Percentage of licenses being served by this server
- Target ID
- Number of licenses served by this server
- Number of in-use licenses served by this server

-n *server_names*

Names of the servers about which you want to display information in a vendor or product list.

-v *vendor_name*

Name of the vendor about whose products you want to display information in a product list.

-p "*product_name product_version product_features*"

The names of the product, version, and features about which you want to display information in a product list:

product_name

The name of the product for which you want to display information. Enclose the *product_name* with single quotation marks (') when the *product_name* contains spaces.

product_version

The version of the product that you specified in the *product_name* parameter.

The wildcard character (*) can be used to denote any.

product_features

The features of the product that you specified in the *product_features* parameter. Enclose the *product_features* with single quotation marks (') when the *product_features* contain spaces.

The wildcard character (*) can be used to denote any.

-u *user_names*

Names of users about whom you want to display license usage information in a product list.

-i Specify the -i option in conjunction with a product list (LUMblt -lp) to display the following detailed license usage information about an individual licensed product in a product list:

- Vendor name
- Vendor ID
- Product name
- Product version
- Product features
- Product ID
- Licenses (total on all the selected servers)
- In-use licenses (total on all the selected servers)
- **For each license instance:**
 - Number of licenses
 - License type

- Capacity type
- Server on which the license is installed
- License annotation
- Serial number
- Subserial number
- Upgrade Count
- Upgrade Index
- Customer site
- Country usage
- Start date
- Expiration date
- Time stamp
- Password use control level
- **For products with customer-managed use control and per-seat licenses**, the following information is also displayed:
 - High-water mark licenses
 - Threshold value
 - Soft stop
 - Soft stop enabled
- **For reservable licenses**, the following information is also displayed:
 - Number of reserved licenses
 - Number of unreserved licenses
- **For reserved licenses**, the following information is also displayed:
 - User for whom licenses are reserved
 - Group for which licenses are reserved
 - Node for which licenses are reserved
- **For concurrent licenses**, the following information is also displayed:
 - Multiuse rules
 - RDK Enabled
 - Serial number
 - Subserial number
 - Upgrade Count
 - Upgrade Index
- **For try-and-buy licenses**, the following information is also displayed:
 - Try-and-buy flag
- **For concurrent-offline licenses**, the following information is also displayed:
 - The maximum offline period for offline licenses
 - RDK Enabled
 - Multiuse rules
 - Serial number
 - Subserial number
 - Upgrade Count
 - Upgrade Index
- **For compound passwords**, the following information is also displayed:

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- Derived license type
- Aggregate duration
- Derived start type
- Derived expiration date
- **For products with customer-managed use control and concurrent or reservable licenses**, the following information is also displayed:
 - Enrolled licenses
 - Distributed licenses
 - To be distributed licenses
 - High-water mark licenses
 - Threshold value
 - Soft stop
- **For products with customer-managed use control and use-once licenses**, the following information is also displayed:
 - Enrolled licenses
 - Distributed licenses
 - To be distributed licenses
 - Threshold value

-t *license_timestamp*

Use the optional **-t** *license_timestamp* argument to list information about a specific license.

Examples: List all servers:

```
LUMblt -ln
```

List all vendors on all servers:

```
LUMblt -lv
```

List all vendors on server **Hall**:

```
LUMblt -lv -n Hall
```

List all products on server **Hall**:

```
LUMblt -lp -n Hall
```

List all products on server mercury provided by vendor Opticon, Inc.:

```
LUMblt -lp -n mercury -v "'Opticon, Inc.'" 
```

List detailed information for the product PsychoSynch, with any version and any feature, on server **venus**:

```
LUMblt -lp -n venus -p "PsychoSynch * *" -i
```

List information for the 12 version only, with any feature, of the product PsychoSynch:

```
LUMblt -lp -p"PsychoSynch 12 *"
```

List all of the products on the server **neptune** that are currently being used by the user **Alex**:

```
LUMblt -lp -n "neptune" -u Alex
```

LUMblt -m Monitor and Log Threshold Events

This option displays the threshold messages and logs them if the threshold logging option is specified.

Syntax:

```
LUMblt -m
[ -T percentage [ 1...100 ] ]
[ -A periodic_mode [ yes | no ] ]
[ -X frequency [ 1...1440 ] ]
[ -l log [ yes | no ] ]
```

Parameters:

-T percentage

Specifies the level of threshold value. It can be any number between 1 and 100. The default is 80. This is the percentage over which you want to log the level of usage of each product installed on all the servers. For instance, if you have 100 licenses of the product Icon Editor Version 15, with the clipart feature, and you set the level of threshold to 10, a message appears in the vendor messages report only if more than 10 licenses are in use. If 20 licenses are being used, the message will say:

The 20% of licenses of Icon Editor 15 clipart is in use.

Note that a customer-managed product might have its own threshold value, set with the **LUMblt -U** command. Such a threshold value overrides the **-T** value.

-A periodic_mode

Specifies whether to check the license usage of the products only once, or periodically. Its values can be:

- no To check the threshold conditions on the products once, immediately. If **-A** is omitted, this is the default.
- yes To check the threshold conditions on the products periodically, with the frequency specified with the **-X** parameter.

-X frequency

Specifies the number of minutes between one license usage check and the next. Enter a value between 1 and 1440. It is mandatory if you set the **A** parameter to **yes**.

-l log

Specifies whether or not the threshold messages must be logged on the license server to be reviewed with the report function.

Examples: Set the threshold percentage to 50% and set the check on the products' usage to every 4 hours:

```
LUMblt -m -T 50 -A yes -X 240
```

LUMblt -r Generate a Report

All users can use this option to list server, event, vendor, product, and user information on specified license servers.

Syntax:

```
LUMblt -r report_type [ 1 | 2 | 3 | 4 | 5 | 6 ]  
[ -b start_date ]  
[ -g end_date ]  
[ -e event_filter ]  
[ -n server_names ]  
[ -v vendor_name ]  
[ -p product_name product_version product_features ]  
[ -u user_names ]
```

Parameters:

-r *report_type*

Specifies the type of report to generate. The following report types are available:

1 - Standard Event Report

Displays detailed information about significant events occurring on the license servers that you specify. Available for all license types.

2 - License Request by Product Report

Displays statistical information about the use of the licenses of a product, on the license server that you specify, for the time interval you specify. For each product, it reports the licenses requested, the licenses granted, and the percentage of rejections. Not available for simple nodelocked or use-once licenses. You can specify only one server for each report.

3 - License Request by User Report

Displays statistical information about the use of products by users, on the license server that you specify, in the time interval you specify. For each user, it reports the licenses requested, the licenses granted, and the percentage of rejections for each product the person is using. Not available for simple nodelocked, reserved, or use-once licenses. You can specify only one server for each report.

4 - License Use by Product Report

Displays statistical information about the use of the licenses of a product, on the license server that you specify, in the time interval you specify. For each product, it lists the maximum number of concurrent nodes that used the product, the maximum number of concurrent users, and the average time of use of the product. Statistical information about events appears after the license release. Not available for per-seat, simple nodelocked, reserved, or use-once licenses. You can specify only one server for each report.

5 - License Use by User Report

Displays statistical information about the use of the licenses of a product, on the license server that you specify, in the time interval you specify. For each user, it lists the number of times each product was invoked, and the average time the user used each product. Statistical information about events appears after the license release. Not available for per-seat, simple nodelocked, reserved, or use-once licenses. You can specify only one server for each report.

6 - Customer-Managed Use Audit

Reports the following information for customer-managed use product transactions:

- Vendor name
- Product name
- Product version
- Product features
- Administrator information
- Time stamp of the event
- Number of licenses involved in the transaction
- Event list (product enrolled, license distributed, license deleted, license updated)
- Signature stamp (user, group, and node)
- Signature information

Available for all license types.

-b *start_date*

Specifies the start date of a report. Be sure to express the date using the mm/dd/yyyy format. If you specify a start date and do not specify an end date, the report will include all information logged from the specified start date until the present.

-g *end_date*

Specifies the end date of a report. Be sure to express the date using the mm/dd/yyyy format. If you specify an end date and do not specify a start date, the report will include all information logged prior to (and including) the specified end date.

-e *event_filter*

You can use the *event_filter* argument to generate a Standard Event report on the following types of events which you specify, by number, on the command line. (Separate multiple event type arguments with a comma.)

- | | |
|---|--|
| 1 | All events |
| 2 | License-related events |
| 3 | Database-related events |
| 4 | Errors — general errors, but not including unrecoverable errors |
| 5 | Server-related events — start/stop events, threshold events, vendor events, unrecoverable errors |

-n *server_names*

Names of the servers about which you want to display information. If you want to generate a report for report types 2, 3, 4, or 5, you can specify only one server name.

-v *vendor_name*

Name of the vendor about whose products you want to display information.

-p "*product_name product_version product_features*"

The information on the licensed product about which you want to display information.

product_name

The name of the product for which you want to display

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information. Enclose the *product_name* with single quotation marks (') when the *product_name* contains spaces.

product_version

The version of the product that you specified in the *product_name* parameter.

product_features

The features of the product that you specified in the *product_features* parameter. Enclose the *product_features* with single quotation marks (') when the *product_features* contain spaces.

-u *user_names*

Names of users about whom you want to display license usage information.

Examples: Standard Event Report:

Report on license-related events (2) and server start and stop events (5) that were logged on server **neptune** since May 21, 2005:

```
LUMblt -r1 -n "neptune" -b 05/21/2005 -e 2,5
```

License Use by Product Report:

Report current license usage information on server **saturn** for the product LUM Test Product, version 10, with the debug feature:

```
LUMblt -r4 -n "saturn" -p "'LUM Test Product' 10 debug"
```

License Request by User Report:

Report current license usage information on server **mercury** for users alex, ann, mary, christine, paul, and alby:

```
LUMblt -r3 -n "mercury" -u "alex ann mary christine paul alby"
```

Customer-Managed Use Audit Report:

Report information about customer-managed use product transactions on all network license servers from May 1, 2005 to July 31, 2005:

```
LUMblt -r6 -b 05/01/2005 -g 07/31/2005
```

LUMblt -R Reserve Licenses; Delete or Update Reserved Licenses

Use **LUMblt -R** to reserve reservable licenses and to delete or update the reservation status of reserved licenses.

Syntax:

```
LUMblt -R action_type [ r | d | u ]
-n server_name
-v vendor_name
-p "product_name product_version product_features"
[ -t timestamp ]
[ -g end_date ]
[ -H end_time ]
[ -u user_id user_group user_node ]
```

Parameters:

action_type

To reserve licenses, **r**; to delete license reservation, **d**; to update an existing reservation, **u**.

-n *server_name*

The name of the server where the product license is enrolled.

-v *vendor_name*

The name of the vendor that manufactured the product.

-p "*product_name product_version product_features*"

The information on the licensed product whose licenses you intend to reserve, delete, or update.

'*product_name*'

The name of the product whose licenses you intend to reserve, delete, or update. Enclose the *product_name* with single quotation marks (') when the *product_name* contains spaces.

product_version

Version of the product whose licenses you intend to reserve, delete, or update.

product_features

The features of the product whose licenses you intend to reserve, delete, or update. Enclose the *product_features* with single quotation marks (') when the *product_features* contain spaces.

-t *timestamp*

Unique timestamp of the product license from which you intend to reserve, or that you intend to delete or update. To get the timestamp, issue the following command:

```
LUMblt -lp -p "product_name product_version product_features" -i
```

If you are reserving licenses (option **-R r**), the timestamp is optional. If it is omitted, the first usable reservable license is used.

-g *end date*

The end date of the new or updated reservation (mm/dd/yyyy). The latest allowed expiration date of a reservation is 12/31/2037. If you are deleting licenses (**-R -d**), do not specify **-g**.

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-H *end time*

The end time of the new or updated reservation (hh:mm). If you are deleting licenses (**-R -d**), do not specify **-H**.

-u *user_id user_group user_node*

The identification of the user, group, and node for which a license is being reserved or a reservation is being changed. If you are deleting licenses (**-R -d**), do not specify **-u**.

Examples: Reserve one license for the Test Compiler product, taken from the reservable license identified by the timestamp 1124071854496125, Version 11, with the special function library feature, of vendor Psychosync for the user alex of the testers group, on the node venus. They expire March 2, 2007, at 11:00.

```
LUMblt -R r -v "Psychosync" -p "'Test Compiler' 11 'special function library' "  
-t 1124071854496125 -g 03/02/2007 -H 11:00 -u "alex testers venus"
```

LUMblt -s Display Product License Status

All users can use this option to display information about current product usage on specified license servers.

Syntax:

LUMblt -s

```
[ -l list_type [ c | co | pt | ru ] ]
[ -n server_names ]
[ -v vendor_name ]
[ -p "product_name product_version product_features" ]
[ -u user_names ]
[ -t license_timestamp ]
```

Parameters:

-l *list_type*

Indicates the type of license usage you want to list. You can specify one of the following list types:

- c** To display information related to concurrent users of concurrent and concurrent-offline licenses. Because concurrent-offline licenses can also be used as a concurrent license, you can see which users are using concurrent-offline licenses in a concurrent mode.
- co** To display information related to users who have reserved concurrent-offline licenses in offline mode.
- pt** To display information related to application clients that use per-seat licenses.
- ru** To display information related to users of unreserved reservedly licenses

-n *server_names*

The name of each of the license servers for which you want to display product usage information.

If you omit the -n parameter, the display defaults to all servers in your cell. This parameter is not used if you use pt as the list type.

-v *vendor_name*

The name of the vendor about whose products you want to display information.

-p "*product_name product_version product_features*"

The information on the licensed product for which you want to display information.

product_name

The name of the product for which you want to display information. Enclose the *product_name* with single quotation marks (') when the *product_name* contains spaces.

product_version

The version of the product that you specified in the *product_name* parameter.

The wildcard character (*) can be used to denote any.

product_features

The features of the product that you specified in the

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product_features parameter. Enclose the *product_features* with single quotation marks (') when the *product_features* contain spaces.

The wildcard character (*) can be used to denote any.

Note: If you use LUMblt -s without any option the usage of concurrent licenses will be displayed.

-u *user_names*

Use the optional **-u** user_names argument to display product usage information for the specified products that are currently in use by the named users.

-t *license_timestamp*

Use the optional **-t** license_timestamp argument to list information about a specific license.

This command displays the following information for the servers, vendors, products, and users that you specify:

- Vendor name
- Product name
- Product version
- Product features
- Total number of installed licenses
- Number of licenses currently in use
- Number of soft stop licenses currently in use
- Number of licenses not in use

For each user who currently holds a license, the following information is displayed:

- User name
- Node name
- Group name
- Number of licenses the user has been granted
- Check-out date for each granted license

Examples: Display current license availability and usage information for concurrent licenses of the Monolith Inc. product Megamail/2, any version, any features, on server **uranus**:

```
LUMblt -s -lc -n "uranus" -v "'Monolith Inc.'" -p "Megamail/2 * *"
```

LUMblt -S Set the Stress Threshold

Use this option to set the network license server load threshold.

Syntax:

```
LUMblt -S threshold_value -n server_name
```

Parameters:

threshold_value

Indicates the level of the load threshold. The range for this parameter is from 1 to 100.

-n *server_name*

The name of the license server for which you want to set the load threshold.

Examples: Set the workload threshold to 70% for network license server **uranus**.

```
LUMblt -S 70 -n uranus
```

LUMblt -T Activate or Deactivate Tracing

Use this option to set the trace level on a specified network license server, or to change to a different level of tracing. Traces are written to output files whose file names have the format:

LUMlmd.trcxx

where *xx* identifies a particular file in the sequence. For example, the first file would be named LUMlmd.trc1, the last file would be named LUMlmd.trc99. When LUMlmd.trc99 is full, the license server begins writing traces to LUMlmd.trc1 again. The current trace file has an underscore appended (for example, LUMlmd.trc4_). By default the trace files are stored in the following directories:

AIX /var/LicenseUseManagement/trace

Windows

Documents and Settings\All Users\Application Data \IBM\License Use Management\trace

Syntax:

LUMblt -T *level-of-tracing* **-n** *server_name*

Parameters:

level-of-tracing

Indicates the level of tracing, as follows:

0 – No trace

1 – High (high level trace). Server logic and database transactions.

2 – Low (low level trace). Network communication.

3 – Low & high (low and high level trace)

-n *server_name*

The name of the network license server for which you want to activate or deactivate the trace. You can activate or deactivate tracing for one server at a time. If you omit the **-n** *server_name* parameter, the tracing will be activated or deactivated on the local network license server (if there is one).

Examples: Set a high trace level for the network license server **uranus**.

LUMblt -T 1 -n uranus

LUMblt -U Update a Product

Use this option for the following purposes:

- To update the number of licenses you enrolled. Use it when you acquire new licenses for an already enrolled customer-managed use product, to update the total number of licenses you are entitled to use. In the case of a network compound password, the licenses must be distributed after the update to make them available to end users. This option is valid only for customer-managed use products.
- For a product with the hard stop/soft stop policy enabled, to change the hard stop/soft stop policy and to reset the high-water mark. This option is valid only for customer-managed use products.
- To update the threshold value of a product. This option is valid only for customer-managed use products.
- Set the maximum allowed period that a concurrent-offline license can be reserved.

Syntax:

LUMblt -U

```
-v vendor_name
-p "product_name product_version product_features "
[ -n server_name ]
[ -T enrolled_licenses ]
[ -H hard_soft_mode [ yes | no ] ]
[ -M hwm_reset ]
[ -t threshold [ 1...100 ] ]
[ -I signature_information ]
[ -O MaxOfflinePeriod ]
```

Parameters:

-v *vendor_name*

The name of the vendor that manufactured the product that you intend to update.

-p *product_name product_version product_features*

The information on the licensed product that you intend to update.

product_name

The name of the product for which you have acquired the new licenses. Enclose the *product_name* with single quotation marks (') when the *product_name* contains spaces.

product_version

The version of the product that you specified in the *product_name* parameter.

product_features

The version of the product that you specified in the *product_name* parameter. Enclose the *product_features* with single quotation marks (') when the *product_features* contain spaces.

-n *server_name*

Name of the license server on which you want to update product information. If the product has network licenses, this parameter need not be specified, because the server is the central registry license server.

LUMblt - Basic License Tool

-T *enrolled_licenses*

The total number of licenses you have for the specified product; that is, the number of licenses you had, plus the new ones.

-H *hard_soft_mode*

Use this parameter to switch the product behavior from hard stop to soft stop and vice versa. You can do it only on products the vendor has enabled to allow hard stop/soft stop switching. Allowed values for -H are:

no Set the soft stop

yes Set the hard stop

-M *hwm_reset*

Use this parameter to reset the high-water mark to 0. You can do it only on products the vendor has enabled to soft stop.

-t *threshold*

Use this parameter to set a specific value for the threshold value of a customer-managed product. Allowed values are 1 to 100.

-I *signature_information*

Information about the user issuing the command, to be stored with the signature stamp. Use this parameter with the -T parameter.

-O *MaxOfflinePeriod*

The maximum allowed period that a concurrent-offline license can be reserved. Use this parameter with the -v and -p parameters.

Examples: The Test Compiler product (version 11, with the special function library feature, vendor Psychosync) has network licenses. Update the number of licenses to 50.

```
LUMblt -U -v "Psychosync" -p "'Test Compiler' 11 'special function library' "  
-T 50 -I "'Paula'"
```

For the same product, set the soft stop policy and reset the high-water mark.

```
LUMblt -U -v "Psychosync" -p "'Test Compiler' 11 'special function library' "  
-H no -M
```

For the ScreenPic product (version 2, high resolution feature, vendor ArtTools), update to 5 the number of nodelocked licenses on server *Virginia*:

```
LUMblt -U -n Virginia -v "ArtTools" -p "ScreenPic 2 'high resolution' " -T 5
```

To update (to 50) the maximum number of days a product can be reserved:

```
LUMblt -U -v "'IBM Corporation'" -p "DataMaster 31 instrumented" -O 50
```

LUMblt -x Delete Server Log Entries

This option deletes all entries before a specified delete date from the log file of the license servers that you specify. If one of the specified license servers has the central registry, the central registry log entries are also deleted.

Syntax:

```
LUMblt -x delete_date  
[ -n server_names ]
```

Parameters:

-x *delete_date*

Specifies an end date for the delete operation. All log entries recorded before the delete date are removed from the log file. You must specify a delete date in the *mm/dd/yyyy* format. If you do not specify a *delete_date* value, all entries in the log file are deleted.

-n *server_names*

Specifies the license servers from whose log file you want to delete the entries.

Examples: Delete all the log file entries recorded on server neptune before August 25, 2005:

```
LUMblt -x 08/25/2005 -n neptune
```

Delete all the log file entries recorded on all network license servers before August 25, 2005:

```
LUMblt -x 08/25/2005
```

LUMcfg - Configuration Tool

ALL

Use the LUMcfg command as an alternative to the Configuration Tool GUI to configure your workstation. Before coding the LUMcfg command, see “Before You Configure” on page 52 to plan your configuration requirements. If issued with no options, the LUMcfg command starts the Configuration Tool GUI.

Syntax

```
LUMcfg [ -a {{ c,s,r } | { C,S,R } } ]
[ -b "binding_list" ]
[ -d { all: option_string } ]
[ -e { a | { c,t,e,g,v,m,p,s } } ]
[ -h ]
[ -l logfile_path ]
[ -list ]
[ -R { a,s } ]
[ -S { a,s } ]
[ -start ]
[ -stop ]
[ -t "listening_ports" ]
```



```
[ -g group_name ]
```

```
Usage : LUMcfg -h | -d {all|option_string} | -start | -stop | -list {
-a {{c,s,r}|{C,S,R}}, -g group_name, -b {[network|registry]
binding_list},-e {a}{c,t,e,g,v,m,p,s}}, -l logfile_path,-S {a,s}, -R {a,s},
-t listening_ports }
```

Parameters

ALL

- a The roles the workstation is to play in your licensing environment. Code any combination of these values, optionally separated by commas:
 - c Reset the current role of the workstation to network license client.
 - s Reset the current role of the workstation to network license server.
 - r Reset the current role of the workstation to central registry.
 - C Add the current role of the workstation to include network license client.
 - S Add the current role of the workstation to include network license server.
 - R Add the current role of the workstation to include central registry.
- b "binding_list" Specify the complete list of servers (network license servers and central registry license server) with which this workstation will communicate in a direct binding environment. Enclose the complete list in double quotes. Specify the network license servers and central registry license server as follows:


```
"'network ip:address1[port1] ip:address2
[port2 ]'
'registry ip:address[port]'"
```

-d *all:option_string*

Display the current configuration settings for the LUMcfg options specified in *option_string*. Code 'all' to see the current settings of all the options.

For example, LUMcfg -d e!S requests a display of which events are being logged, the path to the log databases, and a list of startup options showing which are enabled and which are disabled.

-e The list of events you want to be logged. Code **a** to log all events, or any combination of these values, optionally separated by commas:

c - License checkin

Tells you when a licensed product has sent a check-in call to the server to notify that the product is running. This is not logged by default.

t - License timeout

Tells you that the server has canceled the request for a license because the check period expired. This is not logged by default.

e - Errors

Describes all types of server errors that do not stop the server. This is logged by default.

g - License grant/release

Tells you when a license was granted or released. This is not logged by default.

v - Vendor added/deleted

Tells you when a product of a new vendor was registered or deleted. This is logged by default.

m - Vendor messages

Provides the log messages the vendor inserted in the enabled product. This is logged by default.

p - Product added/deleted

Tells you when a new product was registered or deleted. This is logged by default.

s - Server start/stop/threshold

Logs the successful start or stop of the license server, and when the threshold on the workload is exceeded or regained. This is not logged by default.

-h Displays command syntax and usage information about the Configuration Tool CLI.

-l *logfile_path*

The path in which you want log files to be stored.

-list Displays a list of active subsystems.

-R Startup options that you want to disable. Code any combination of these values, optionally separated by commas:

a Automatic startup of subsystems at system startup (disabled by default).

s Remote administration of network license server (enabled by default).

Note: This parameter is not valid for network clients.

LUMcfg - Configuration Tool

- S** Startup options that you want to enable. Code any combination of these values, optionally separated by commas:
- a** Automatic startup of subsystems at system startup (disabled by default).
 - s** Remote administration of network license server (enabled by default)

Note: This parameter is not valid for network clients.

- start** Starts all the subsystems you have configured to run on the workstation.

Note: If you are running in a Solaris environment and are using a non-Korn shell, you can start the server using `LUMcfg -x -start`. This will close the terminal window from which this command was run and the server will continue to work in background.

- stop** Stops all the subsystems that are running on your workstation.

- t** *listening_ports*

Change the default listening port numbers as follows:

```
"ip 'network_license_server_port,central_registry_port' "
```

The two subparameters for port numbers are positional. For example:
(if you omit a port number it is reset to the default

For example: `"ip '1516,10999'"` or `"ip ',10998'"`

- g** *group_name*

The name of the group to which the user of this workstation belongs. If it is not specify the GroupName uses the DefaultGroupName, otherwise you can choose only between User or Administrator.



Examples

1. Configure a network license server (**thelma**). Specify automatic startup of the server, and customize the path to the log files and the selection of events logged. Configure to communicate with:

- Network license server **louise**
- Central registry license server **speedy**

With direct binding on AIX:

```
LUMcfg -a s -S a,s -e cegvp -l /home/maveret -b "'network ip:thelma ip:louise' 'registry ip:speedy'"
```

With direct binding on Windows:

```
LUMcfg -a s -S a,s -e cegvp -l c:\LUM\log -g Infotech -t "ip" -b "'network ip:thelma ip:louise' 'registry ip:speedy'"
```

2. Configure a network license client that will communicate with a workstation named **thelma** that is configured as both a network license server and the central registry license server. For Windows specify the user group.

With direct binding on AIX:

```
LUMcfg -a c -b "'network ip:thelma' 'registry ip:thelma'"
```

With direct binding on Windows:

```
LUMcfg -a c -g Infotech -b "'network ip:thelma' 'registry ip:thelma'"
```

3. Configure a workstation named **thelma** as the central registry license server and a network license server. Configure to communicate with a network license server named **hydra**. Specify automatic startup of the servers, and for Windows specify the user group.

With direct binding on AIX:

```
LUMcfg -a s,r -S a,s -b "'network ip:thelma ip:hydra'  
'registry ip:thelma'"
```

With direct binding on Windows:

```
LUMcfg -a s,r -S a,s -g Infotech -b "'network ip:thelma ip:hydra'  
'registry ip:thelma'"
```

4. Display the command syntax and usage:

```
LUMcfg -h
```

Note: The server checks if file `lum_ini` exists in `LUM_CONFIG` otherwise uses the default one. If the default file does not exist either you get a message that the `lum_ini` is not found.

LUMtv - Test Verification Tool



Use the LUMtv tool after the license servers are started to verify that they are running properly.

A message describing a completed license transaction and a list of all license servers will be displayed. If an HAL cluster has been configured and activated, LUMtv tries to request all the 10,000 licenses of the HAL Test Product in order to contact all the servers in serving state.

Syntax

```
LUMtv { [ -n hostname ] [ -z ] [ -v ] | { -h | -usage | -version }
[ -p number_of_transactions ]
[ -d ] (Windows only)}
```

Parameters

- n *hostname*** Checks that the specified workstation is running a network license server. It returns 0 if the hostname is running a network license server and 1 if the hostname is not running a network license server.
- z** Turns on NCS remote procedure call (RPC) tracing messages, which can be used to diagnose problems.
- v** Displays progress messages during the license request operation.
- h** Displays command usage information (same as -usage). This parameter is valid only when issued without other parameters.
- usage** Displays command usage information (same as -h). This parameter is valid only when issued without other parameters.
- version** Displays command version information. This parameter is valid only when issued without other parameters.
- p [*number_of_transactions*]** Specifies the number of transactions to be completed before performance information is displayed. This information provides averages for the specified period. It can be used for tuning the system and for troubleshooting performance problems. The default value is 1000.
- d** Windows only. Checks whether you can exploit offline functionality on this computer.



Examples

Run the LUMtv test and verification tool:

```
LUMtv
```

Check for the presence of the license server **pluto**:

```
LUMtv -n pluto
```

Measure license server performance:

```
LUMtv -p
```


LUMtarget - Target View Tool



Use the LUMtarget tool to display the target ID of your workstation.

Syntax

LUMtarget [**-V** | **-o** | **-h** | **-d** *devicename* | **-I**] [**-z**] [**-v**]
(on Windows)

LUMtarget [**-V** | **-o** | **-h** | **-v**] (on AIX)

Parameters

- V** Displays command version information. (on Windows).
Displays tool version information (on AIX).
- o** Displays the operating system name of your workstation. (on Windows and AIX).
- h** Displays command usage information, including the program version and copyrights. (on Windows and AIX).
- v** Displays information in verbose mode. On Windows, the information that this parameter displays includes the NDIS level of the device driver. Displays verbose output. (on AIX)
- d** *devicename*
Specifies that the device driver *devicename* is to be used to retrieve the target ID (Windows only).
- z** Displays all the available network cards with their names; use it to check the available network devices before using the **-d** parameter to select a device driver manually (Windows only).



For Windows, the target ID is retrieved from the device driver that controls the network adapter, rather than from the operating system. This mechanism results in the highest level of security and makes it possible for the target ID to work even when the workstation is not connected to the network.

For this mechanism to work, the following must be installed on the workstation where the license will be installed:

- A device that complies with NDIS 4.
- The latest level of the device driver. For IBM device drivers, you can check at <http://www.networking.ibm.com> to determine the latest level.
- TCP/IP.
- If License Use Management Runtime is not yet installed on the workstation, you can download it from the License Use Management Web site (<http://www.ibm.com/software/lum/support.html>), or the vendor of the license-enabled products can supply it to customers.

The target ID is retrieved from the device driver that controls the network adapter. You might want to specify explicitly the device driver to be used to determine the target ID. You would do this if either of the following points were true:

- Your workstation has multiple network adapters and you prefer to use an adapter other than that automatically selected as the basis for the target ID.
- The **LUMtarget** command did not return a target ID.

Perform the following steps:

LUMtarget - Target View Tool

1. Get the device identifier of the adapter you want to use by entering the command **LUMtarget -z**. This displays all the devices on the workstation and card description. Make sure the network device you want to use is listed. For example:

```
LUMtarget Version 5.1.2 Windows -- LUM Target ID Tool
(c) Copyright 1995-2007, IBM Corporation, All Rights Reserved
US Government Users Restricted Rights - Use, duplication or disclosure
restricted by GSA ADP Schedule Contract with IBM Corp.
(c) Copyright 1991-1997, Gradient Technologies Inc., All Rights Reserved
(c) Copyright 1991,1992,1993, Hewlett-Packard Company, All Rights Reserved
```

```
{1802C0F6-8412-4377-97DA-24D39C637683} (Intel(R) PRO/Wireless
2200BG Network Connection)
{48EB1820-FD5A-4512-983C-9902364E3BBD} (Bluetooth LAN Access
Server Driver)
```

2. Enter the command:

```
LUMtarget -d device_identifier
```

For example, LUMtarget -d {1802C0F6-8412-4377-97DA-24D39C637683}

LUMImd - Network License Server

ALL

The LUMImd subsystem starts the network license server on the local node. If the workstation is not configured to run the network license server, LUMImd has no effect.

The parameters of LUMImd override the corresponding settings in the lum_ini.txt file.

Syntax

```
startsrc -s LUMImd [ -a " [ -no event_list ] [ -v ] [ -z ] [ -l log_name ]
[ -s ] [ -r ] [ -c ] [ -p ] "
] (on AIX)
```

```
LUMIs [ -no event_list ] [ -v ] [ -z ] [ -l log_name ] [ -s ] [ -r ] [ -c ] [ -p ]
(on Windows)
```

Parameters

- no event_list** Turns off logging of the events specified in event_list. Any combination of events is valid, but items in the list of events must not be separated by spaces or other characters. Following are the event types that you can specify:
- l** Grant and release licenses.
 - c** Check in licenses. (Licensed products usually check in with the license server at regular intervals while a user is using the product.)
 - v** Vendor events: a vendor was added, renamed or deleted.
 - p** Product events: a product was added, renamed, or deleted.
 - e** Errors.
 - m** Messages.
 - s** Logs the successful start or stop of the license server, and when the threshold on the workload is exceeded or regained.
 - t** License timeout events. (When a licensed product fails to check in with the license server, it might stop running after it times out. The vendor of the product sets the timeout interval, which is how long a product can run after it has lost contact with the license server.)
- v** License Use Management Runtime library verbose mode.
- z** Debugging flag. Prints RPC debugging information.
- l log_name** Overrides the default name and location of the file used to store log information. This allows the I/O activity to the files used by the license server to be spread across multiple file systems that might become important for large installations.
- s** Instructs the license server to ignore attempts from administrators on remote systems to modify the license database. Records in the database remain readable by all instances of the License Use Management Runtime Administration Tool.
- r** Recovers files from the automatic backup version.

LUMlmd - Network License Server

- c Specifies that this is a cold start, meaning that the license server restarts from scratch, as if it had granted no licenses before stopping.
- P Specifies that LUMlmd is to display performance information at specified intervals. The default and maximum interval is 1000 calls received from clients. To change the frequency of reporting, change the environment variable LUM_POLL_FREQ. This option is linked to the DebugProc tag in the lum_ini.txt file.

Examples

Start a license server on AIX and do not log checkin, vendor, product, timeout, or message events:

```
LUMstartprc LUMlmd -no cvptm
```

To start a license server, changing the default log-file on AIX:

```
startsrc -s LUMlmd -a "-l /home/smith/my_log"
```

To start a license server, changing the default log-file on Windows:

```
LUMls -l C:\my_log
```

LUMgdb - Central Registry License Server

ALL

The central registry is a License Use Management Runtime subsystem that provides a mechanism for storing data pertaining to licensing information.

The basic license tool requires a central registry license server up and running to administer customer-managed use products.

You must double-check that you have started one and only one central registry license server in your licensing environment by issuing the following command on every License Use Management Runtime server:

```
LUMcfg -list
```

If the workstation is not configured to run the central registry license server, LUMgdb has no effect.

The parameters of LUMgdb override the corresponding settings in the `lum_ini.txt` file.

Syntax

```
startsrc -s LUMgdb [ -a " [ -no event_list ] [ -v ] [ -l log_name ]
[ -r ] [ -c ] [ -z ] " ] (on AIX)
```

```
LUMls -a [ -no event_list ] [ -v ] [ -l log_name ] [ -r ] [ -c ]
[ -z ] (on Windows)
```

Parameters

-no event_list Turns off logging of the events specified in the event list. Any combination of events is valid, but items in the event list must not be separated by spaces or other characters. Following are the event types that you can specify:

- l** Grant and release licenses.
- c** Check in licenses. (Licensed products usually check in with the license server at regular intervals while a user is using the product.)
- v** Vendor events: a vendor was added, renamed or deleted.
- p** Product events: a product was added, renamed, or deleted.
- e** Errors.
- m** Messages.
- s** Starts and stops of this license server.
- t** Time out.

-v License Use Management Runtime library verbose mode.

-l log_name Overrides the default name and location of the file used to store log information. This allows the I/O activity to the files used by the license server to be spread across multiple file systems that might become important for large installations.

-r Recovers files from the automatic backup version.

LUMgdb - Central Registry License Server

- c Specifies that this is a cold start, meaning that the license server restarts from scratch, as if it had granted no licenses before stopping.
- z Debugging flag. Prints RPC debugging information.

Chapter 7. Hints and Tips

This chapter provides information that is intended to help you manage your licensing environment better.

Managing the Time Zone



To display the correct time in administration tool panels:

1. Click **Start --> Settings --> Control Panel --> System --> Advanced --> Environment Variables** for Windows XP and Server 2003 or **Control Panel --> System --> Advanced system settings --> Environment Variables** for Windows Vista.
2. In the System Variables box, click **New** to open the New System Variable dialog. In the **Variable Name** entry field, type **TZ**.
3. In the **Variable Value** entry field, type:

XXXsnnYYY

where:

XXX and YYY

Characters you choose to remind you of the setting

s A sign: + or -

nn The difference in hours from Greenwich mean time (GMT). A positive difference means the Greenwich is west of your location; a negative difference means that Greenwich is east of your location. For example, you might specify Italian standard time (one hour east of Greenwich mean time, or GMT+1) as:

IST+1GMT

4. Click **OK**.

Remember to adjust this time to account for standard time and daylight savings time in different countries.

Using the Built-In Backup and Recovery Procedure



Because the breakdown of license servers might have a potentially severe impact on production, it is important to be prepared in case definitions and database files are corrupted.

The minimum backup activity the administrator should do is to keep the enrollment certificate files (or e-mail or hard copy equivalents) received from the license provider in a secure place.

License Use Management Runtime implements a backup procedure of all databases on license server workstations.

Causes for Corrupted Definition or Database Files

There are many situations that can cause the definition or database files to become corrupted. The most common causes are License Use Management Runtime-related issues.

License Use Management Runtime-Related Issues

Because License Use Management Runtime uses the database files dynamically, any disk-related problems such as the following might cause the database files to become corrupted:

- Hardware failures (media surface errors)
- File-system problems (for example, file system full)
- Synchronization errors during writing of data (that is, loss of electrical power)

When a License Use Management Runtime database is corrupted, after the database has been recovered, try to find out the real cause of the problem.

The contents of the definition and database files used by NCS and by License Use Management Runtime are changed only by defined administrative commands and tools.

Automatic Backup Procedure

License Use Management Runtime does an automatic periodic backup on license servers by copying all files and databases to the following file system:

- /var/LicenseUseManagement/backup on AIX
- c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\backup on Windows

You can choose to get the backup on any other device by changing the **BackupPath** parameter in the configuration file (`lum_ini.txt`). You can set the automatic backup to occur daily, at a certain time, (the default), or weekly, on a certain day, or at every change on the license database, according to the **BackupMode** and **BackupParm** parameters specified in the configuration file. You can also disable the automatic backup procedure by setting the **BackupMode** parameter to none.

For detailed information on the configuration file (`lum_ini.txt`) see Appendix A, “License Use Management Runtime Configuration File,” on page 179.

Be sure that the **BackupMode** and **BackupParm** parameters have the same value on all servers in the licensing environment.

The objects listed in `/var/LicenseUseManagement/scripts/db_back.sh` on AIX are backed up if found.

Recovery Procedure

To recover the files and databases saved with the automatic procedure described in “Automatic Backup Procedure”:

1. Identify the workstation that has corrupted files or databases.
2. Stop the License Use Management Runtime services by issuing the following command:

```
LUMcfg -stop
```

or alternatively on Windows by selecting **Stop** from the Service pull-down menu of the service manager tool.

3. Issue the following command:

- `LUM1md -r` on AIX
- `LUM1s -r` on Windows

4. Start services by issuing the following command:

```
LUMcfg -start
```

This replaces the current objects with those saved with the backup procedure.

Important: In case of corruption, run this command according to the following rules:

- If the **BackupMode** in the configuration file (`lum_ini.txt`) is set to **changes**, run the recovery command only on the server where corruption occurred.
- If the **BackupMode** is set to **daily** or **weekly**, first check that the backup copies have the same date on all the servers of your licensing environment, then run the backup command on all the servers.

Manual Backup

You can run the backup procedure manually by running:

- `/var/LicenseUseManagement/scripts/db_back.sh` on AIX
- On supported Windows platforms, use the `ntbackup` tool (`ntbackup.exe`) to perform backup and recovery of the following directory and files:
 - `c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\nodelock\`
 - `c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\lum_ini.txt`
 - `c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\licdb.dat`
 - `c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\licdb.idx`
 - `c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\crpdb.dat`
 - `c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\crpdb.idx`
 - `c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\log\logdb01.dat`
 - `c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\log\logdb01.idx`
 - `c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\log\logdb00_.dat`
 - `c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\log\logdb00_.idx`
 - `c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\log\crlog01.dat`
 - `c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\log\crlog01.idx`
 - `c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\log\crlog00_.dat`
 - `c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\log\crlog00_.idx`
 - `c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\usrdb.dat`
 - `c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\usrdb.idx`

Note: The list contains the file names from the default configuration. If you change the file names from those used in the default configuration, substitute the new file name for the one shown in the list. You can also add additional files as needed, according to your environment.

On a workstation configured only as a network license client, only manual backup is available.

This command copies the files and databases:

- to the backup file:
/tmp/lum_bak_DATE_SERVERNAME on AIX
- to a backup diskette:
the a: drive on Windows XP, Windows Server 2003 and Windows Vista.

Manual Recovery

To start the recovery procedure in case of corruption, use the following command on the failing workstation:

```
/var/LicenseUseManagement/scripts/db_recov.sh lum_bak_DATE_SERVERNAME for AIX
```

This command restores the files and databases that were saved by the **db_back** command and lum_bak_DATE_SERVERNAME is the name of the backup file.

Managing the Reports Log Files

When you ask for a report, the Basic License Tool reads the current log files:



- On AIX:
/var/LicenseUseManagement/log/logdbnn_ (network license server)
/var/LicenseUseManagement/log/crlognn_ (central registry license server)



- On Windows:
c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\log\logdbnn_ (network license server)
c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\log\crlognn_ (central registry license server)

The names of the current log files end with an underscore.

The files logdbnn, crlognn, and llmlgnn contain all the collected License Use Management Runtime events. You can specify which events are to be collected when you configure each license server. See the example in “Scenario 1: Configuring a Network License Server” on page 55. *nn* can assume values from 00 to 99. When a file is full, a new one is started. You determine the maximum value *nn* can assume and the maximum size of each file by setting the **NumberOfLogFile** and **MaxLogFileSize** parameters in the configuration file, (lum_ini.txt). When the maximum value for *nn* is reached, License Use Management Runtime wraps to 00. The filled log files are retained so that you can archive them if you wish before the numbering wraps. For details see Appendix A, “License Use Management Runtime Configuration File,” on page 179.

The numbering of log files starts from 00. Suppose you have the following files on the workstation:

```
logdb00
logdb01_
logdb02
```

The second file is the current, the first is the previous, and the third is the oldest.

On the machine where the basic license tool is run, the space needed for logfiles is given by the formula $\text{Space needed} = (\text{NumberOfLogFile} * \text{MaxLogFileSize}) * 10$, measured in kilobyte units.

If the current files, marked with the underscore, get too big, do not delete them. You can decrease the size of the current files with the following command:

```
LUMblt -x delete_date -n server_name
```

where:

- delete_date** Specifies an end date for the delete operation. All log entries recorded up to the delete date are removed from the log files. If you do not specify a date all the entries are deleted.
- server_name** Specifies the license server where you want to delete the entries of `logdbnn_`, `crlognn_`, and `llmlgnn_` if they exist on the server.

When user displays reports using both CLI and GUI, the LUMblt tool creates a temporary file in a default directory. The location of the default directory is dependent on the operating system (for example, `C:\` for Windows platforms, `/tmp` for AIX). The size of the temporary file depends on the information stored in the LUM database. Use the following formula to calculate if you have enough free space to store the temporary file:

For each server contacted: $\text{Space needed} = (\text{NumberOfLogFile} * \text{MaxLogFileSize}) * 10$, measured in kilobyte units.

Tuning the Environment to Manage the Workload



When a high volume of client/server interactions reaches the server in a short time frame (for example, 100 license requests per second), the server might not be able to keep up with the volume of workload. The external symptom is that the server seems to hang.

To optimize the license server daemon throughput and better balance its workload, use the information in the following sections:

- “Monitoring Your Environment”
- “Tuning Your Environment” on page 157

Monitoring Your Environment

The basic license tool Active License Servers window displays the load percentage and the load threshold percentage for the each license server. The **LUMblt -ln** command also displays load percentage and load threshold percentage in the list of active license servers.

Server workload can be directly monitored in four ways:

- “Using the Basic License Tool GUI” on page 154

- “Using the Basic License Tool CLI”
- “Using Standard Reports” on page 155
- “Using the Server Tracing Service” on page 155

Using the Basic License Tool GUI

Use the following procedure to monitor the environment using the basic license tool GUI:

1. From the basic license tool main window (Figure 26 on page 68), select: **Servers** → **Active License Servers**

The Active license servers window is displayed.

Name	Target type	Target ID	Server type	Annotation	Load %	Load Threshold %	Trace
ip.louise.rome.tivoli.com	Win/NT-MAC	629d827e	NodeLocke...	LUM/LS 4.6.8 Window...	0	30	Low & High
ip.thelma.rome.tivoli.com	SGI	69144bb7	Network	LUM/LS 4.6.8 SGI @ ...	6	75	None

Figure 78. Active license servers window

2. For active license servers, two columns display the load threshold that is currently set and the percentage of server workload:

Load %

An indicator of the server workload, in the range 0–100%.

Load Threshold %

The workload threshold set by the administrator, in the range 1–99%. (see “Setting the Load Threshold” on page 158).

When the value of **Load %** exceeds the **Load Threshold %** value, an alert message is displayed indicating that at least one of the network license servers is overloaded. You can now take action to reduce the load on the license server.

Note: In order to see the most up-to-date data, you must refresh the basic license tool main window.

Using the Basic License Tool CLI

To monitor the environment using the basic license tool CLI, you can use the **LUMblt -ln** command to display additional information in the list of active license servers. For example, use the following command to display a list for the server louise:

```
LUMblt -ln -n louise
```

The command displays a list of active license servers, an example is shown below:

```
=====
===                               S e r v e r s                               ===
=====
```

```

Server Name:    ip:louise.rome.tivoli.com
Target ID:     1fa46002fdf41a1
Target Type:   Windows
Server Type:   Network
Load:         1
Load Threshold: 85
Trace:        none

```

```

=====
                        =====
                        === End of Server List ===
                        =====

```

Using Standard Reports

Use the following procedure to monitor the environment using standard reports:

1. Ensure that the **Server start/stop/threshold** checkbox is selected in the Configuration Tool Notebook - Log Page, or use the **LUMcfg -es** command (see “LUMcfg - Configuration Tool” on page 138). Setting the logging of server and threshold events causes events that exceed the load threshold or regain the load threshold to be logged as Event Type = SERVER and Event Subtype = Threshold Exceeded or Event Subtype = Threshold Regained. An example report is shown below:

```

-----
Sequence      : 695                               Event Type   : SERVER
Time Stamp    : Feb 25 2005 3:09:32 PM           Event Subtype: Threshold Exceeded
Server Name   : Network License Server: ip:louise.rome.tivoli.com
-----
Sequence      : 696                               Event Type   : SERVER
Time Stamp    : Feb 25 2005 3:15:46 PM           Event Subtype: Threshold Regained
Server Name   : Network License Server: ip:louise.rome.tivoli.com
-----

```

2. Use either the basic license tool GUI (“Generating Reports” on page 72) or the **LUMblt** command (“LUMblt -r Generate a Report” on page 126) to view the events.

Using the Server Tracing Service

Use this service when you have been asked by IBM Support to provide traces, or you want to further investigate traces. The trace level can be customized at runtime. It can be customized using either of the following:

- “Using the Basic License Tool GUI to Customize the Trace Level” on page 156
- “Using the Basic License Tool CLI to Customize the Trace Level” on page 156

You must be logged in with administrator privileges to be able to use of traces.

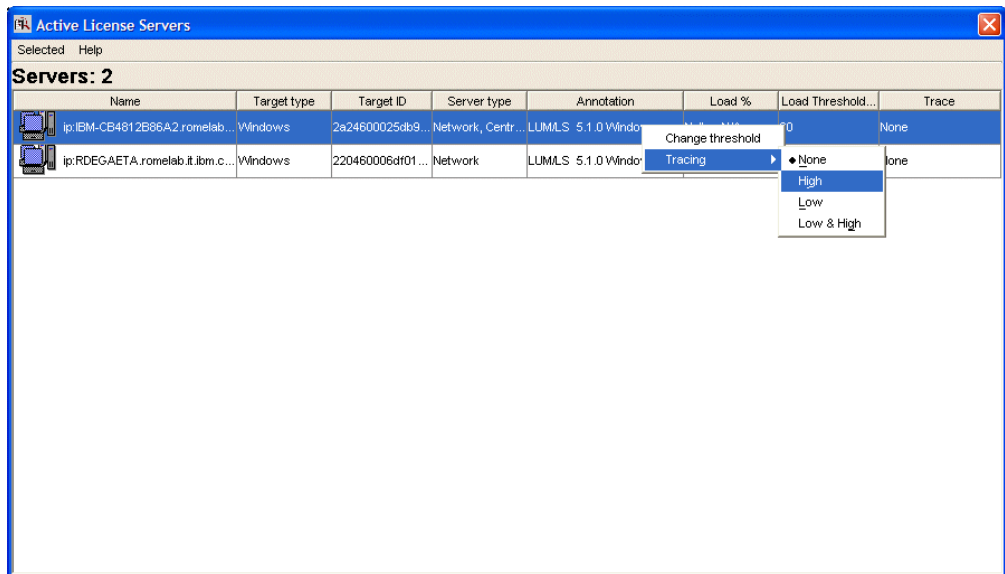
Trace levels: The trace level can be set to:

- None (CLI value is 0)
No tracing of activity for the selected license server.
- High (CLI value is 1)
High level tracing. Server logic or database transactions. This consists of entering/exiting major pieces of code, timestamps, the trace level itself, load threshold (displayed in hexadecimal format), and load percentage.
- Low (CLI value is 2)
Low level tracing. Network communications. This consists of time stamps, entering/exiting minor pieces of code, and thread identifiers (Windows only).
- Low & High (CLI value is 3)

Selects both the low level and the high level of tracing. This is the maximum level of information

Using the Basic License Tool GUI to Customize the Trace Level: Use the following procedure to start or stop tracing:

1. From the Active license servers window (Figure 78 on page 154), right-click on the server that you want to set the trace level.
2. From the pop-up menu, select **Tracing**, then the required trace level as shown below (see also “Trace levels” on page 155 for more information on the levels of traces that are available). The example below shows a trace level being changed from Low & High to High.



Using the Basic License Tool CLI to Customize the Trace Level: To monitor the environment using the basic license tool CLI, enter the following command:

```
LUMblt -T level-of-tracing -n server_name
```

where:

level-of-tracing

is the value of the level of tracing. See “Trace levels” on page 155.

server_name

is the name of the network license server for which you want to activate or deactivate the trace. You can activate or deactivate tracing for one server at a time.

If you omit the `-n server_name` parameter, the tracing will be activated or deactivated on the local network license server (if there is one). For more information on the `LUMblt -T` command, see “LUMblt -T Activate or Deactivate Tracing” on page 134.

For example, to activate low & high tracing on the server louise, enter the following:

```
LUMblt -T 3 -n louise
```

Managing Trace Files

Because the trace function can produce a large amount of output, you might find it helpful to have a procedure to store only the most recent trace files. These files can then be periodically removed in their chronological sequence, starting with the oldest files. If the **DebugToFile** tag is set to yes in the (lum_ini.txt) file, the server starts in tracing mode and trace files are stored in directory set by the **DebugToPath** parameter.

Note: You can change the default trace location by manually editing the (lum_ini.txt) file and changing the value of the **DebugToPath** parameter.

- Trace files are automatically split by the license server. The output files are written in the format

```
LUMlmd.trcxx
```

where *xx* identifies a particular file in the sequence. For example, the first file would be named LUMlmd.trc1, the last file would be named LUMlmd.trc99. When LUMlmd.trc99 is full, the license server begins writing traces to LUMlmd.trc1 again. The current trace file has an underscore appended (for example, LUMlmd.trc4_). By default the trace files are stored in the following directories:

AIX /var/LicenseUseManagement/trace

Windows

Documents and Settings\All Users\Application Data \IBM\License Use Management\trace



To periodically remove the oldest files, set up a **cron** job. Use the **crontab** command to add to the crontab file a line similar to this:

```
0,15,30,45 * * * * rm -f 'ls -lr /tmp/LUMlmd.trc* | tail -n +4'
```

Note that the characters `ls -lr.....+4` are enclosed in single quotation marks (').

This **cron** job deletes all but the three most recent trace files.

Tuning Your Environment

To determine the maximum number of client sessions that are supported by your servers, and to prevent the servers from going into an overload condition, see the following sections:

- “Displaying Performance Information”
- “Setting the Load Threshold” on page 158
- “Determining the Minimum RPC Rate” on page 158

Displaying Performance Information

To display performance information, use the LUMtv test verification tool. Enter the command **LUMtv -p**. This command can be used only when License Use Management Runtime has been installed. This tool shows the maximum number of RPCs that are being handled by the server at that instance. It can be used for tuning the system and for troubleshooting performance problems.

To use the **LUMtv -p** command, perform the following procedure:

1. Change the configuration of the license server so that it is the only one in the direct binding list.
2. Restart the server
3. Run **LUMtv -p** several times on the same computer where you have started the license session in order to have an average of the RPC rate supported by the License Use Management server. An example report is shown below:

```
LUMtv -p
Completed license transaction on node 1fa460002fdf41a1 running LUM 5.1.2 AIX
issued RPCs rate: 200 per second
```

```
Active License Servers:
ip:louise.rome.tivoli.com. (IBM/AIX) running LUM 5.1.2 AIX
```

Setting the Load Threshold

Administrators can set the threshold on the license server to prevent it from reaching an overload condition. When the load threshold percentage is exceeded, no more license requests will be accepted by the server. The server will continue to serve existing clients and HAL cluster synchronization will continue to work: No additional clients will be accepted. If the load threshold percentage is set too low, then the **Load %** indicator will be constantly high. You should monitor these values over a period of time and adjust them to suit your needs. You can set the load threshold using either the basic license tool GUI, or the basic license tool CLI.

Setting the Load Threshold Using the Basic License Tool GUI: Use the following procedure to set the load threshold:

1. From the Active license servers window (Figure 78 on page 154), highlight the server that you want to set the load threshold.
2. Right-click to display the pop-up menu.
3. Select **Change threshold**. The Change Load Threshold dialog box is displayed. Type the new threshold level that you require and click **OK**.

=

Setting the Load Threshold Using the Basic License Tool CLI: Set the load threshold using the following command:

```
LUMblt -S threshold_value -n server_name
```

For example, to set the load threshold on the license server *louise* to 75%, enter the following:

```
LUMblt -S 75 -n louise
```

Determining the Minimum RPC Rate

The minimum RPC rate required will depend on the number of client sessions that can be simultaneously active. A License Use Management server performing x RPCs per second can support approximately 10 times x client sessions. For example, a server performing 200 RPCs per second can support approximately 2000 client sessions. Over short periods of time the License Use Management server will be able to support more client sessions, but over prolonged periods the 10 times x client sessions value should be used.

However, these values can be influenced by other factors, such as hardware (CPU performance and the amount of installed RAM), and the configuration of the environment.

Conditions which Affect Licensing System Performance

The following information can be useful when tuning your environment:

- Trace Level

There is a license server performance degradation when the trace level is changed to a more detailed level of tracing. The worst case is when the trace level is changed from None to Low&High. For example, on a 1.65 GHz, with 1 GB of RAM and AIX 5.3, passing from trace level None to trace level Low&High caused a decrease in performance of approximately 55%.

- Heavy administrative tasks

Heavy administrative tasks can degrade license server performance. Examples of heavy administrative tasks are:

- Making the license server produce large standard reports while serving client sessions
- Running frequent batch jobs of LUMblt commands

- Level of logging

Producing many large log files causes a degradation of license server performance. The levels of logging which most degrade performance are "license grant" and "license check in". Up to a 30% degradation can be experienced when these two levels of logging are active.

- Hardware configuration

From the tests that IBM has made, results have shown that, for example, on a AIX 5.3 with 1 GB of RAM and 1.65 GHz CPU, the average RPC rate is 620 RPCs per second. Therefore, the license server can support approximately 6200 client sessions.

- Resource sharing

It is recommended that the license server runs on a dedicated computer. Any other resources running on the license server will degrade its performance.

- Too many client sessions

The performance of the license server will be reduced when the number of client sessions greatly exceeds the suggested 10 x RPCs per second rate and the load on the license server approaches maximum. If this occurs, the administrator can:

- Change the load threshold (see "Setting the Load Threshold" on page 158)
- Reduce the number of requesting client sessions
- Improve the performance of the license server

There is no possibility for the license administrator to revoke active licenses.

The Load Threshold value (corresponding to MaxActivitiesThreshold parameter in the lum_ini.txt file) keeps account of the speed of the network connecting servers with clients and the number of requesting client sessions. When the value of this parameter is set too high for the particular licensing system, the server might become easily overloaded. The solution is to reduce the value of the threshold (using the basic license tool, either with the GUI ("Using the Basic License Tool GUI to Customize the Trace Level" on page 156) or the CLI ("Using the Basic License Tool CLI to Customize the Trace Level" on page 156). You can also edit the value of the MaxActivitiesThreshold parameter in the lum_ini.txt file, then stop and restart the server. In the case of HAL licensing, this action should prevent the cluster from entering a possible instable condition.

Tuning the Timeout To Detect a Non-Responding server

ALL

You can increase or decrease the timeout using a scaling factor. You can modify the timeout for connections between client and server by changing the LUM_TIMEOUT_FACTOR environment variable on the client side of the connection.

The default value of LUM_TIMEOUT_FACTOR is 1000; values greater than 1000 increase the timeout interval, while values below 1000 decrease it.

Managing a Custom Configuration

This section gives advice about custom configurations and their licenses.

Before Requesting the License Upgrade

Before you request an upgrade to your current custom configuration license, double-check the serial number.

Deleting Keys

The initial key is always required. Do not delete it from either the network license server or the nodelock directory.

Chapter 8. Troubleshooting

ALL

This chapter provides suggestions for problem determination, and debugging when you use products managed with License Use Management Runtime.

Checking the Version of License Use Management Runtime

The suggestions in this chapter pertain only to License Use Management Runtime Version 5.1.X, not to earlier versions of License Use Management Runtime. If you are in doubt about which License Use Management Runtime version is installed on your system check the file:

- /var/LicenseUseManagement/VERSION (on AIX)
 - c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\version (on Windows)
-

Checking License Details

Before you proceed, be sure you know the following details about the product that is not starting properly. Check the product enrollment certificate file for all these details.

- Product name (ProductName parameter)
- Product version (ProductVersion parameter)
- Vendor name (VendorName parameter)
- Product features (ProductFeatures parameter)
- Target ID
- Whether the product implements customer-managed or vendor-managed use control (RegistrationLevel parameter; CMU= customer-managed, VMU= vendor-managed)
- Whether the product is enabled for a custom configuration policy (SerialNumber parameter)
- Whether the password is simple or compound (LicenseStyle parameter= compound, or LicenseStyle parameter= license type if the password is simple)
- License type (LicenseStyle parameter if the password is simple; DerivedLicenseStyle parameter if the password is compound)
- Whether the product is enabled for the hard stop/soft stop policy (SoftStop parameter)
- When the license becomes valid and when it expires (LicenseStartDate and LicenseEndDate parameters)

This is an example of an enrollment certificate file:

```
[LicenseCertificate]
Checksum=103C2B48A901E15A48838007BBF4ED4B
CreatorID=220460006df010a9
TimeStamp=1128697865812000 (Oct 07 2005 15:11:05 GMT )
PasswordVersion=1
CustomerSite=
CountryOfUsage=
VendorName=IBM Coproration
VendorPassword=vttpDuzNpStmEPTzgzj7qb2kuzxJVT7CFxHl14qte105/DBYDJLhmg5p
Q6paze3MGK/P53p3BLF1ANn1USLTS3f4+swzZE7VW179LiEW8mc4QJHgkaBQp6jrIAXItK2
9WbA5Laed0f2APwk27fjK9VnPs1hdebFh0BKxuv/SD7Y/kZRGmEayxvkt67hltI8xM/K2a9
```

```

35uduY0/wjBCim/TsqSWknvEUN00/EVCpM1iIDpWud7pctB1xpjp1MkZ1nnY6/UCcBQJpA1
IitXRioZnkTZh44xVjbXIiAMXOxPRvy8gBQrxYC8KJhaRbr9RLo9SnYXGC9MU2UasLZROAN
xuEb5m5mUjzzHj3b0/9pT0Y=
VendorID=b8e01c44c5f4.03.09.84.e2.17.00.00.00
ProductName=DataWare
ProductID=2222
ProductVersion=21
Features=
ProductPassword=E1GNRnAvF4mr3Hdf1rUR0/lzifSwgbyPraUtNRYKHatzv9HMcGysMIc
PzW7PcABt0W+99u0rdq1/1TVT5keFhmzh6MDuj60C1KcCtwIZHZnmxlqANK4/UOU9yORyXs
KcJG19Q3GNRVak3WKRd0ANVpeRMPxqdpq0JnuyYDD5vKQbzeQ9zpxrTS/6T1hB0tP4I7MUJ
XPT0BK8LJVx99RLblis4/OLncE1kb+fYtdLNqMFZZHH
ProductAnnotation=
LicenseStyle=concurrent
LicenseStartDate=11/01/2005
LicenseDuration=11414
LicenseEndDate=01/30/2037
LicenseCount=24
MultiUseRules=User/Accessor
RegistrationLevel=VMU
CapacityType=Processors configured
TryAndBuy=No
SoftStop=No
CustomAttribute1=No
CustomAttribute2=No
CustomAttribute3=No
MaxOfflinePeriod=
TargetID=ANY
TargetType=Open Target
TargetSource=open
ExtendedTargetType=
ExtendedTargetID=
SerialNumber=
Upgrade=No
SubSerialNumber=
UpgradeCount=
UpgradeIndex=
DerivedLicenseStyle=
DerivedLicenseStartDate=
DerivedLicenseEndDate=
DerivedLicenseAggregateDuration=

```

Troubleshooting Licenses (All Types)

If a user tries to start a license-enabled product and it does not start, some of the first things to check are:

- First, check the product documentation.
- Check to be sure the license for the application you are running is installed, and, if not, install it. See “Enrolling the Product” on page 69 for information on how to install a license.
- Check that the license you have installed is the correct license for the version of the software you are running.
- Check that the date and time on the workstation are set correctly. Each license has a start date and an end date built in. If the date or time is set incorrectly on the workstation where you are running the product or on a license server, the license might not be recognized as active.
- Check that the time zone and daylight saving time settings are correct.
- Check that the start date of the enrolled license is not later than the current date, and that the license has not expired.

Troubleshooting Nodelocked Licenses

If a workstation with a nodelocked license does not allow an end user to use a license-enabled product, check the product documentation to determine whether the product was enabled for License Use Management Runtime Version 5.

If the product uses non-runtime-based enabling:

- Check that the enrollment certificate file is in the path specified by the vendor of the product and that its permissions are set so that all users can read it.
- Check that the license is correctly installed in the nodelock directory specified by the vendor and that its permissions are set so that all users can read it.

The default location of the nodelock directory is:

- /var/LicenseUseManagement/nodelock (on AIX)
 - c:\'COMMON_APPDATA'\IBM\License Use Management\nodelock (on Windows)
- where:

COMMON_APPDATA

is the initial part of the path that is returned by the SHGetFolderPath API

An example of a typical path for the nodelock directory on a Windows operating system is as follows:

```
c:\Documents and Settings\All Users\Application Data\IBM\License Use Management\nodelock
```

If the file is not in the default directory, check your product documentation or contact the product vendor.

Troubleshooting Network Licenses (All Types)

If a user tries to start a product with a network license and the product does not start, do the following steps. These suggestions apply to concurrent, use-once, reservable/reserved, and per-seat licenses.

- Use the LUMtv command from the client workstation to verify the connection to the license server where you have the licenses installed.
 - If the LUMtv output shows no active servers, check that the network license server is running on the server workstations where you have the licenses installed.
 - If LUMtv does display active servers, check that they include a workstation where licenses for the product are installed. Use LUMBlt -lp to display the licenses installed on each server. You might need to reconfigure the client to connect to the proper servers.
 - In direct binding, verify that the client is configured to connect to the correct servers.
- If you get the error message:
Time disparity is too large
check that the date and time on the servers and client are synchronized. If server and client are in different time zones, be sure that time zone and daylight saving time have been set correctly.
- If an enabled application requests more than one license to run, be sure the requested number of licenses is available on one server.

License Use Management Runtime does not combine licenses installed either on different servers, or on the same server but with multiple enrollment actions, to satisfy the same request, unless the capacity policy applies.

Similarly, if you received the licenses in a compound password, check that you have distributed, in one single distribution, on one server, at least the number of licenses requested.

For the same reason, if the product is enabled for soft stop, you might see soft stop licenses in use even if there are still some available licenses.

Troubleshooting Reservable and Reserved Licenses

Reservable licenses are enrolled on a network license server. When reserved they are moved to the central registry license server. If a license has been reserved for a user but, when that user tries to use the product, it does not start:

- Check that the central registry license server is up and running (see “Starting Required Subsystems” on page 169).
- Check that the client workstation can reach the central registry.
- Check that the date and time set on the central registry are the same as that set on the network license client. It is possible that, according to the date, time and time zone set on the central registry, the license is not yet valid or has expired.
- Double-check the name of the user, group, and node for which licenses are reserved. Be careful with leading and trailing blanks. Note that the domain is part of the node specification.



- Check the local host name specification of the client workstation in the `/etc/hosts` file. Make sure it is in the form:

ip_address hostname_including_domain hostname_without_domain

For example:

```
69.100.67.70 lab67070.rome.tivoli.com lab67070
```

Troubleshooting Per-Seat Licenses

If an application with per-seat licenses fails to start:

- Be sure the central registry license server is up and running.
- Be sure the per-seat license is enrolled.
- Be sure the workstation where the application server runs can reach the central registry.

Troubleshooting Concurrent-Offline Licenses

If you are having problems with concurrent-offline licenses:

- If you are unable to reserve an offline license, check with the license Administrator that you have been correctly authorized for that license, and check that your password is correct.
- If you are unable to use an offline license that you reserved, check if the reservation period has expired. If the reservation period has expired, the handback has been automatically made. If you still have problems with reservation and handback, check permissions on the nodelock directory. Write permissions should be set for all users of the nodelock directory.
- If you are unable to use a license you have reserved, check that the system date on your machine is consistent with the system date on the machine where the reservation was made.
- If you still are unable to work with offline licenses, check that you have enough free space:
 - On AIX platforms, check that `/var` and `/opt` have at least 10 Mb free.

- On Windows platforms, check that there is at least 10 Mb free on the disk drive where the operating system is installed.
- A reboot might be needed on Windows in order to refresh the system environment.
- Using a mixture of concurrent licenses and concurrent-offline licenses for the same product is not recommended, because it could lead to some inconsistent data being displayed by the basic license tool (in both the CLI and the GUI).
- If you have tried everything and still cannot resolve your problem, contact License Use Management support.

Troubleshooting Licenses of Customer-Managed Use Products

If you are unable to enroll, update, or distribute licenses for a customer-managed product, a customer-managed use product fails to start, if soft stop does not work, or the high-water mark does not work:

- Be sure that the central registry license server is up and running, and that you have defined only one central registry license server in the direct binding servers list.
- Be sure the workstation where you are working can reach the central registry.
- If you received the licenses in a compound password, make sure you have distributed the licenses. See “Distributing the Licenses” on page 71 for information on how to distribute licenses.
- If soft stop does not work, be sure the soft stop policy is enabled.

Troubleshooting Licenses of Vendor-Managed Use Products

If enrollment of a vendor-managed use product fails, check that the target ID and the target type in the license match the target ID and target type of the workstation where the license is installed. To get the target ID of the workstation, run the target view tool (LUMtarget - Target View Tool) on that workstation.

If there is a mismatch, one of the following is possible:

- The vendor put the wrong target ID or target type into the license.
- You are using the license on the wrong workstation.
- The target ID of your target workstation has changed (see “Troubleshooting the Hardware” on page 171).

Troubleshooting Custom Configuration

If for a custom configuration, you are unable to install concurrent or concurrent-offline licenses, or nodelocked licenses from the nodelock directory:

- Check the SerialNumber
- Check the SubSerialNumber:
 - If you are installing the initial key, no other key with the same serial number and product ID can already be installed
 - If you are installing a replacement key, another key with the same serial number, product ID and lower subserial number must be installed
- Check if the set of licenses you are going to replace is completed. (That is, there are Upgrade Count licenses enrolled).

Troubleshooting HAL Licenses

ALL

An application cannot have its HAL license granted even if it was successfully enrolled. In this case, check the status of the cluster using the basic license tool. The status must be **active**. If the status is not **active**, do one of the following:

- If the status is **Change pending**, wait for the state transition to finish.
- If the status is **inactive**, restart the servers that are listed as **unavailable**.
- If the status is **incomplete**, activate the server members that are listed as **not activated**.

An application cannot have its HAL license granted even if the cluster is active. In this case, using the basic license tool, go to the product details notebook, select the license and right-click on **Show Servers**. If one of the servers in the list has a non-zero "share" but has zero "shared licenses", try to start that server again. If the problem persists delete the license and enroll it again.

An application that had its license granted stops working when one of the cluster members goes down. A possible reason for a failure in the automatic re-granting of the license is that another instance of the same application has started before the first application instance was notified of the change and the total number of available licenses is not enough to satisfy this second request. In this case, install additional licenses.

Troubleshooting License Database

If the basic license tool displays frequent non-recoverable error messages when enrolling or deleting license certificates, or when trying to clean up stale licenses, you should refresh the license database. To do this, use the `-clean` option of the license server, as follows:

1. Stop the license services by entering the command:
`LUMcfg -stop`
2. Back up the following files:
 - On AIX/`/var/LicenseUseManagement/licdb.dat` and `/var/LicenseUseManagement/licdb.idx`
 - On Windows:
`C:\Documents and Settings\All Users\Application Data\IBM\License Use Management\licdb.dat`

and c:\Documents and Settings\All Users\Application Data\IBM\License Use Management\licdb.idx

3. Edit the lum_ini.txt file and set the **CleanStart** parameter to **yes**.
4. Restart the license services by entering the command:
LUMcfg -start

Defining Rules for Multiple-Use Concurrent Licenses

Multiuse rules define the conditions under which multiple invocations of a product require only a single license. These rules are applicable only to concurrent and concurrent-offline licenses.

See “Multiuse Rules” on page 8 for general information about multiuse rules.

Multiuse rules are specified for individual passwords when the independent software vendor runs **LUMlct**, rather than in calls from the product to the license server. This means that rules are applied to individual licenses, rather than to the product itself. The vendor can therefore specify multiple use rules for each customer, without making any changes to the product itself, and without affecting other customers’ licenses for the product.

Scenarios

The following scenarios describe how the multiuse rules work when:

- A license with same group rule is installed on the server (10 licenses are available on the server).
- Two clients are in the same group.

When the second request in a scenario is higher than the first, License Use Management Runtime adds the requests, ignoring the multiuse rule.

- Scenario 1
 1. Client1 requests 1 license; License Use Management Runtime shows 1 license in use
 2. Client2 requests 1 license; License Use Management Runtime still shows 1 license in use
- Scenario 2
 1. Client1 requests 5 licenses; License Use Management Runtime shows 5 licenses in use
 2. Client2 requests 2 licenses; License Use Management Runtime still shows 5 licenses in use
- Scenario 3
 1. Client1 requests 2 licenses; License Use Management Runtime shows 2 licenses in use
 2. Client2 requests 5 licenses; License Use Management Runtime shows 7 licenses in use

Troubleshooting Performance Problems

Read this section for assistance with optimizing performance.

Basic License Tool Performance

In a network with many users, or when you are creating large reports, if performance is consistently slow when you use the Basic License Tool graphical user interface, consider switching to the command line interface.

Performance in a Direct Binding Environment

In a direct binding environment, careful configuration can help you to optimize performance. See the performance notes under “Planning Direct Binding” on page 25.

Troubleshooting Heavy Server Workloads



When a License Use Management server is overloaded, performance could deteriorate to the point that the server can no longer manage licenses. Use the tools described in “Monitoring Your Environment” on page 153 to determine if the server is being overloaded.

License Server Startup Time



On Windows platforms, the license server might need a lot of time at startup in order to populate its cache, possibly because of a high number of licenses enrolled, or on a high number of transactions. An environment variable, LUMTIMESERV, extends the standard timeout period that the service waits for the notification that the license server is working, so you can determine if the license server has been able to start correctly or not. The default value of LUMTIMESERV is 30 seconds. This can be altered as follows:

1. Open **Start --> Settings --> Control Panel --> System --> Advanced --> Environment Variables** for Windows XP and Server 2003 or **Control Panel --> System --> Advanced system settings --> Environment Variables** for Windows Vista.

The Environment Variables dialog is displayed.

2. In the System Variables box, click **New**. In the New System Variable dialog, add the following information:
 - In the **Variable Name** field, type:
LUMTIMESERV
 - In the **Variable Value** field, type the timeout period (in seconds) that the service waits for the notification; for example, **45**.
3. Click **OK**.
4. Reboot the computer.

Troubleshooting Network Connections

If connections to license servers seem not to be working properly, use the test verification tool (LUMtv) tool to verify that the license servers are up and running, or use the LUMblt -ln command to get a list of active servers (network license servers and the central registry). For more information about these commands, see Chapter 6, “License Use Management Runtime Command Line Interface,” on page 105.

If servers and clients are not communicating correctly in a direct binding environment the LUMtv command reports (No servers found), check that exactly

the same server names and direct binding port numbers were configured for each client, each network license server, and the central registry license server.

For example, if you have a server called *louise* running the network license server and the central registry license server, and clients connected to *louise*, the direct binding configuration for each workstation, including *louise* itself, must contain the entries:

```
ip:louise[10998]
ip:louise[2215]
```

The port numbers must match the values of the **ipPort** and **ipGDBPort** parameters in the configuration file of *louise*. *louise* and its clients all must have TCP/IP installed.

Troubleshooting License Use Management Runtime Servers

This section covers problems that could arise if License Use Management Runtime is not started, or fails.

Starting Required Subsystems



When a license-enabled product fails to start, the problem might be that a required License Use Management Runtime is not running.

To get a list of the License Use Management Runtime that are running on a workstation, use the `LUMcfg -list` command or double-click the **Service Manager Tool** icon in the License Use Runtime folder. The names of the subsystems are shown in Table 13. For an overview of which license servers are required for each license type, see Table 11 on page 52.

Table 13. License Use Management Runtime Subsystems

Subsystem	Name
Network License Server	LUMlmd
Central Registry License Server	LUMgdb

To start the subsystems, either use the `LUMcfg -start` command, or select **Start** from the **Service** pulldown menu to start all subsystems configured on a workstation.

If the subsystem or process fails to start when you issue the command, check the error messages in the `LUMls.log`, `LUMlmd.log`, and `LUMgdb.log` files in the `/var/LicenseUseManagement/log` directory on AIX or the `c:\Documents and Settings\All Users\Application Data\IBM\License Use Management\log` directory on Windows.



Automatic Startup of Subsystems

If the License Use Management Runtime and NCS subsystems do not start automatically when you start your workstation, do the following:

1. Login with root authority.
2. Check if the file `/etc/LUMls.rc` exists. If not, create a text file called `/etc/LUMls.rc` containing the following string:
"LUMcfg -start -nopause"

3. Check the permission on the file `/etc/LUMls.rc`. If it is different from `744`, change it by running the following command:

```
chmod 744 /etc/LUMls.rc
```

4. Check that the LUMls entry is in the `inittab` file, by running the following command:

```
lsitab -a
```

If not, add it by running the following command:

```
mkitab LUMls:2:wait:"/etc/LUMls.rc > /dev/console 2>&1 #Start LUMls"
```

Restart and Recovery



- If a network license server or the central registry license server goes down, a record of users who currently have licenses is kept on disk. When the server is restarted, the record is reinstated and the licenses are still assigned to those users.

If you want a cold start (that is, if you want the server to restart as if it had granted no licenses before going down), use the `-c` parameter on the command used to restart the server (LUMlmd or LUMgdb, all described in Chapter 6, "License Use Management Runtime Command Line Interface," on page 105). To change the default permanently to cold start, edit this parameter of the `lum_ini.txt` file:

```
ColdStart=yes
```

and then restart services (`LUMcfg -start`).

Cold start is not possible for per-seat licenses.

- If the client workstation goes down or the network fails, the licenses it was using become *stale* (after a check period expires, if the application is enabled using concurrent access or reservable licenses, and the application is programmed to check in with the server after a specified check period). In this case, the licenses are available to be granted to other clients. Note that those licenses will still be displayed as in use until you perform the **Clean up stale licenses** function or until a license is newly requested and none is available, in which case the server does its own cleanup of stale licenses. The client behavior depends on the software product that is in use.



License Server Startup

The License Server fails to start with the message "GRL-2050:Fatal error from LUMLMD: expected VENDOR token in user file". If you get this fatal error from LUMlmd, do the following steps:

- Check if the `user_file` is correct
- Check the `LANG` variable

If you are using, for example `en_US.UTF-8` change it to `en_US` on the field when you are going to start the License Server.

Troubleshooting the Communication Protocol

If you have communication problems, first verify that the TCP/IP protocol is installed on the workstation and configured properly.

Following is a brief checklist to help you make sure your TCP/IP system is working correctly:

1. Check that the TCP/IP system is up and running.
2. Check whether IP addresses or network interfaces have been changed.
3. Check whether normal TCP/IP communications are working between the nodes you want to be connected (for example, using ping or FTP).
4. Make sure your routing setup definition is valid.
The netstat command shows the local definition. To see the hubs, use the route print command.
5. Is name resolution working?
Name resolution is very often the reason for long startup times or many sorts of problems in large networks. Use the DNS (Domain Name System), and spend some time developing a good layout.
6. Is the MTU (Maximum Transmission Unit - Internet protocols) size equal on all hosts?
7. Is the token ring speed equal on all hosts?
8. License Use Management Runtime is based on universal datagram protocol (UDP). In a very highly loaded network, UDP connections might receive time-outs before data is delivered. This is normal behavior; you need to reduce the total network load.
9. If your License Use Management Runtime server is on a workstation configured with the loopback facility of TCP/IP, when you use the LUMblt -a command to enroll a product on the server, you must specify:

```
-n ip:localhost
```


in the LUMblt command.

Troubleshooting the Hardware



The following is a brief checklist to help you make sure your hardware is working correctly.

1. If you get the error message:
Invalid target ID
 - On AIX:
 - check that the CPU planar of your License Use Management Runtime server has not changed.
 - Vendor-managed licenses on the License Use Management Runtime server might be tied to the CPU ID, which changes after a CPU planar swap.
 - On Windows:
 - check that your target ID has not changed
2. Check that the cables are still where they should be.
3. Check whether you have reached the Ethernet length limitations on your LAN.
4. Check whether a security feature has been enabled on a router.
Some routers allow enabling of security features. It is possible to block certain TCP/IP ports.
The ports are predefined in the configuration file.
If you are in a AIX environment the LUMlmd, and LUMgdb programs use runtime-assigned ports whose port numbers are predefined in the configuration file.

Troubleshooting Installation of License Use Management Runtime on Windows XP

If, after installing License Use Management Runtime on a Windows XP workstation, you have problems communicating with the server, reboot your workstation, even if it is not required by the installer.

Collecting Error Log Data

In order to help IBM help you in problem determination, you should gather additional information to send to your IBM representative when you request support. License Use Management Runtime subsystems and tools can be run in trace mode as explained in the following sections.

Running Servers in Trace Mode

To run License Use Management Runtime Servers in trace mode, see the section “Using the Server Tracing Service” on page 155.



Viewing the trace data on AIX:

The trace files produced by the Server Tracing Service are as follows:

- For the network license server, the files are named LUMlmd.trc*, where * is a number from 1 to 99 with a wrap around mechanism. The current trace file has an underscore appended (for example, LUMlmd.trc44_).
- For the central registry server, the files are named LUMgdb.err and LUMgdb.out.

By default, all of the trace files are located in the /var/LicenseUseManagement/ trace directory on AIX. You can specify a different path using the **DebugToPath** tag of the lum_ini.txt file.



Viewing the trace data on Windows using the GUI:

1. In the **Service Manager Tool** window, select **Stop** from the **Service** pulldown menu.
2. Select the line corresponding to a specific process in the list.
3. Select **View** trace from the **Selected** pulldown menu. The **View trace** window is displayed. It shows the trace messages.

The output trace information is collected in the files with a .trc extension.

See “Managing Trace Files” on page 157 for information about managing the trace files produced by the Server Tracing Service.

Running Enabled Applications in Trace Mode

To run enabled applications in trace mode, set the following environmental variables:

- LUM_LIB_VERB=Yes
- LUM_LT_DEBUG=Yes
- LUM_RPC_DEBUG=Yes

On AIX use the **export** command, on Windows use the **set** command, then start the enabled application from the same window.

Trace messages will be displayed in the same window where you have set the variable and from which you run the application. You can redirect the output of the trace in a log file by setting the environment variable as follows:

- export LUM_LOG_PATH=name_file on AIX
- set LUM_LOG_PATH=name_file on Windows

Running Tools in Trace Mode

To run tools in trace mode use the flag **-B** as the first option when you invoke LUMblt and LUMcfg. The trace records will be displayed in the window where you run the tools.

Set Windows Services Trace Mode



The environment variable LUM_TRACE_SERV enables the tracing of the start and stop phases of Windows services on License Use Management servers. To set the LUM_TRACE_SERV variable, follow these steps:

1. Open **Start --> Settings --> Control Panel --> System --> Advanced --> Environment Variables** or **Control Panel --> System --> Advanced system settings--> Environment Variables** for Windows Vista.

The Environment Variables dialog is displayed.

2. In the System Variables box, click **New**. In the New System Variable dialog, add the following information:
 - a. In the **Variable Name** field, type:
LUM_TRACE_SERV
 - b. In the **Variable Value** field, type **Y**.
 - c. Click **OK**.

The Environment Variables dialog is redisplayed.

3. Click **OK**.
4. Reboot the computer.

The output LUM_TRACE_SERV logfile is stored in: C:\Documents and Settings\All Users\Application Data \IBM\License Use Management\trace\LUMlogservices.txt.

Collecting Other Data on AIX



Other information concerning License Use Management Runtime servers is automatically collected by the license server subsystems (LUMlmd, and LUMgdb). This data is stored in the following files:

/var/LicenseUseManagement/log/LUMls.log

Most of the messages you find in these files and the related return codes are not documented.

Also provide IBM with:

- /var/LicenseUseManagement/lum_ini.txt (the configuration file)
- License Use Management Runtime Databases
 - License Databases
 - /var/LicenseUseManagement/licdb.dat
 - /var/LicenseUseManagement/licdb.idx
 - /var/LicenseUseManagement/crpdb.dat

```

/var/LicenseUseManagement/crpdb.idx
/var/LicenseUseManagement/usrdb.dat
/var/LicenseUseManagement/usrdb.idx
- Log Databases
/var/LicenseUseManagement/log/logdbnn_.dat
/var/LicenseUseManagement/log/logdbnn_.idx
/var/LicenseUseManagement/log/crlognn_.dat
/var/LicenseUseManagement/log/crlognn_.idx

```

Collecting Other Data on Windows



Other information concerning License Use Management Runtime servers is automatically collected by the license server processes (LUMlmd, and LUMgdb). This data is stored in the following files:

```

c:\Documents and Settings\All Users\Application Data \IBM\License Use
Management\log\LUMls.log
c:\Documents and Settings\All Users\Application Data \IBM\License Use
Management\log\LUMlmd.log
c:\Documents and Settings\All Users\Application Data \IBM\License Use
Management\log\LUMgdb.log

```

Most of the messages you find in these files and the related return codes are not documented.

Also provide IBM with:

- The default location of the configuration file, lum_ini.txt, is as follows:

```
c:\'COMMON_APPDATA'\IBM\License Use Management\lum_ini.txt
```

where:

COMMON_APPDATA

is the initial part of the path that is returned by the SHGetFolderPath API. An example of a typical path for the lum_ini.txt file on a Windows operating system is as follows:

```
c:\Documents and Settings\All Users\Application Data \IBM\License Use
Management\lum_ini.txt
```

If the file is not in the default directory, use the **SHGetFolderPath** API to retrieve it.

- License Use Management Runtime databases

– License databases

```

c:\Documents and Settings\All Users\Application Data \IBM\License
Use Management\licdb.dat
c:\Documents and Settings\All Users\Application Data \IBM\License
Use Management\licdb.idx
c:\Documents and Settings\All Users\Application Data \IBM\License
Use Management\crpdb.dat
c:\Documents and Settings\All Users\Application Data \IBM\License
Use Management\crpdb.idx
c:\Documents and Settings\All Users\Application Data \IBM\License
Use Management\usrdb.dat

```



```
c:\Documents and Settings\All Users\Application Data \IBM\License
Use Management\usrdb.idx
```

– Log Databases

```
c:\Documents and Settings\All Users\Application Data \IBM\License
Use Management\log\logdbnn_.dat
```

```
c:\Documents and Settings\All Users\Application Data \IBM\License
Use Management\log\logdbnn_.idx
```

```
c:\Documents and Settings\All Users\Application Data \IBM\License
Use Management\log\crlognn_.dat
```

```
c:\Documents and Settings\All Users\Application Data \IBM\License
Use Management\log\crlognn_.idx
```

Troubleshooting the License Use Management Runtime on Windows Vista



If, after installing License Use Management Runtime on a Windows Vista workstation, you have problems communicating with the server, reboot your workstation, even if it is not required by the installer.

Collecting Error Log Data

In order to help, IBM help you in problem determination, you should gather additional information to send to your IBM representative when you request support. License Use Management Runtime subsystems and tools can be run in trace mode as explained in the following sections.

Getting Error Message

This section covers problem that could arise if you try to run License Use Management Runtime tools on Windows Vista. When you start the License Use Management Runtime tools and this message appears: "Windows cannot access the specified device, path, or file. You may not have the appropriate permissions to access the item" you have to increase the rights to the administrator level, switching to the *elevated mode*.

This behavior is introduced in the Windows Vista operating system only as a brand new concept of User Account Control (UAC) for increasing the system security. For more information see the Windows Vista site.

If the License Use Management Runtime tools do not run when you start your workstation you might have to set up your rights to the administrator level. See the section "Getting Administrator Rights."

Getting Administrator Rights

To get administrator rights by switching to the *elevated mode* for the License Use Management Runtime Windows Vista, use the following methods:

The first method

1. Press **Window** key and **Start** menu opens.
2. Type **cmd** command in the **Start Search** field.
3. Press **Ctrl+Shift+Enter** and **User Account Control** window appears.
4. Click the **Continue** button.
5. The new title with the prefix 'Administrator' appears on the **Command Prompt** window.

The second method

1. Open **Start --> All Programs --> Accessories** and the pull-down menu opens.
2. Right click on **Command Prompt** and press the option **Run as administrator**.

The Administrator level permission is set up.

Note: If you want to run Configuration Tool type LUMcfg and LUMcfg -services for Service Manager Tool in the **Command Prompt** window where the 'Administrator' prefix is in the title.

Troubleshooting the Java GUI

Refer to the following sections or to the readme.jgui file if you are having trouble with the License Use Management Runtime Java GUI.



AIX

If you have trouble with the LUM Runtime Java GUI:

- Run LUMblt with the -B option to collect debugging information.
- Make sure Java Runtime Environment 1.4.1, or later is installed on your workstation.
- Make sure that the PATH variable is properly set to find the Java interpreter. (To identify the Java interpreter in use, use the **java -version** command.)
- Make sure the DISPLAY environment variable is properly set in the format 'hostname':0

Troubleshooting the lum_ini.txt Configuration File

If the lum_ini.txt configuration file becomes corrupted, destroyed or lost, or the file is the wrong file, the customer can try to recover the file using the **LUMcnvini** command. The LUMcnvini file is an executable located in one of the following directories:

AIX /opt/LicenseUseManagement/bin

Windows

C:\Program Files\IBM\License Use Management\bin

The **LUMcnvini** command performs the following tasks:

- Creates a new lum_ini.txt file if it is missing
- Updates an old lum_ini.txt file (for example it is called during migration)
- Repairs a corrupted lum_ini.txt file.

Syntax:

- On AIX there are no parameters, the syntax is:

LUMcnvini

- On Windows, the syntax is:

LUMcnvini c:

where c: is the drive where License Use Management was installed (LUM_INSTALL_DRIVE). It is followed by the component that was installed:

Note: If the **LUMcnvini** command fails to recover the `lum_ini.txt` file, the suggested procedure is to manually delete the `lum_ini.txt` file and then run the **LUMcnvini** command again. This recreates a brand new configuration file. The machine must then be configured.

Appendix A. License Use Management Runtime Configuration File

This appendix describes the License Use Management Runtime configuration file (lum_ini.txt).

The default location of the configuration file, lum_ini.txt, is as follows:

AIX /var/LicenseUseManagement/

Windows

c:\'COMMON_APPDATA'\IBM\License Use Management\lum_ini.txt

where:

COMMON_APPDATA

is the initial part of the path that is returned by the SHGetFolderPath API

An example of a typical path for the lum_ini.txt file on a Windows operating system is as follows:

c:\Documents and Settings\All Users\Application Data \IBM\License Use Management\lum_ini.txt

You should normally use the configuration tool to configure License Use Management Runtime. In case you have no access to the configuration tool or you just want to change a few parameters in your configuration, the information in this appendix will enable you to modify the parameters by editing the file. Also, some parameters (designated in this appendix) can only be changed by editing the configuration file. The default lum_ini.txt can be overridden by setting the environment variable *LUM_CONFIG*.

Note: The server checks if file lum_ini exists in LUM_CONFIG otherwise uses the default one. If the default file does not exist either you get a message that the lum_ini is not found.

If a parameter has a default value, it is shown with the parameter name (for example, **BackupMode=daily**).

[LUM Server Startup]

RunLMD=no	All platforms
	Whether the network license server is to be started on this workstation. Possible values are yes and no .
RunGDB=no	All platforms
	Whether the central registry license server is to be started on this workstation. Possible values are yes and no .
ColdStart=no	All platforms
	Whether the license servers restart from scratch, with no record of licenses in use granted before stopping (yes), or not (no). Cold start is not possible for reserved and per-seat licenses. This parameter can be changed only by editing the configuration file.
CleanStart=no	All platforms

By default, this is set to no. If set to yes, the server performs a database refresh before starting to listen.

[LUM Server Network]

ipPort=2215	All platforms
	The TCP/IP port number that the license server listens to when supporting its clients.
ipGDBPort=10998	All platforms
	The TCP/IP port number that the central registry license server listens to when supporting its clients.
ipHALPort=11998	All platforms
	The TCP/IP port number used for internal communication between servers in a cluster. Change this number only if 11998 is already used for some other purpose. If you change this value, change it on cluster members too.
ipAuthPort=	All platforms
	By default, the port number is randomly chosen, but if a specific value is set then the authentication server port is fixed to that value. This parameter can be changed only by editing the configuration file. Setting this parameter to a specific value will disable remote administration of the server.
UseHostTable=no	All platforms
	Change this parameter to yes on a workstation with multiple network interfaces if you want to control on which network interface (such as token ring or Ethernet) the network license server and the central registry license server will start. The first entry in the <code>/etc/hosts</code> file on the local workstation will be used.
PassiveTime=300	All platforms
	Specifies the length of time in seconds that an activity is to be kept in the server activity pool after the activity has been completed. You can change this parameter only by editing the configuration file.
MaxActivities=1024	All platforms
	Specifies the maximum number of activities that any server can manage. The actual maximum for any particular server depends on the server's capabilities. The actual maximum could therefore be lower. You can change this parameter only by editing the configuration file. Allowed values are in the range 1—2048 (1024 is the only value allowed on Windows). The default value is 1024.
MaxActivitiesThreshold=90	All platforms
	Specifies the percentage of activities beyond which license requests are rejected. Licenses can still be checked and released beyond this threshold.
	This parameter is updated every time the LUMbit -S command is run.
HALFrequency=30	All platforms
	The length, in seconds, of the interval at which servers in a cluster synchronize data among themselves. You can increase this number if you have performance problems, but doing so delays synchronization between members of a cluster.
DebugNCS=no	All platforms

Specifies whether or not the License Use Management Runtime subsystems must be started in debug traced mode and additional communication-related information collected. For UNIX operating systems it also specifies whether the NCS subsystems must be started in debug traced mode. Possible values are **yes** and **no**.

[LUM Server Logging]

NumberOfLogFile=2	All platforms
The number of log files License Use Management Runtime writes. For example, if logdb is the log file name, and NumberOfLogFile is set to 2 , License Use Management Runtime changes the name to logdb00_. When it is full, it starts logging events on logdb01_. When this is full, it restarts writing on logdb00_. This parameter can be changed only by editing the configuration file.	
MaxLogFileSize=10	All platforms
The maximum length of the log files, in tens of kilobytes. After that size is reached, License Use Management Runtime starts writing on another log file. This parameter can be changed only by editing the configuration file.	
LogAllEvents=no	All platforms
Whether or not all the events are to be logged on the license servers. Possible values are yes and no .	
LogPath=/var/LicenseUseManagement/log	AIX
LogPath=C:\Documents and Settings\All Users\Application Data\IBM\License Use Management\log	Windows
Log file path of the license server subsystem log (UNIX) or process log (Windows).	
LogGrant=no	All platforms
Log when a license was granted or released. Possible values are yes and no .	
LogCheckin=no	All platforms
Log when a licensed product has sent a check-in call to the server to notify it that the product is running. Possible values are yes and no .	
LogVendor=yes	All platforms
Log when a new vendor was added or deleted. Possible values are yes and no .	
LogProduct=yes	All platforms
Log when a new product was registered or deleted. Possible values are yes and no .	
LogTimeout=no	All platforms
Log when the server has canceled the request for a license because the check period has expired. Possible values are yes and no .	
LogErrors=yes	All platforms
Log server errors that do not stop the server, but return a status code and a message. Possible values are yes and no .	
LogVendorMsg=yes	All platforms
Log error messages the vendor inserted in the product. Possible values are yes and no .	
LogSvrStartStopThr=no	All platforms

Log the successful start or stop of the license server and workload threshold-related events. Possible values are **yes** and **no**.

[LUM Server Misc]

DisableRemoteAdmin=no	All platforms
Whether the administration of this network license server is to be disabled when using the administration tool started on a different server. Possible values are yes and no .	
ValidityPeriod=15	All platforms
Internal period, in days, to validate per-seat licenses stored on the central registry. This parameter can be changed only by editing the configuration file.	
BackupMode=daily	All platforms
The mode of the License Use Management Runtime database backup procedure. Possible values are:	
daily	The backup is started at the time specified in the BackupParm parameter.
weekly	The backup is started at approximately midnight (00:00) of the day specified in the BackupParm parameter.
changes	The backup is made each time the database is changed, such as when an object is added or deleted.
none	No backup takes place.
BackupParm=0	All platforms
If BackupMode is daily , the hour when the backup occurs (midnight=0). If BackupMode is weekly , the day of the week when the backup occurs (Sunday=0).	
This parameter value must be the same on all servers within your licensing environment. It can be changed only by editing the configuration file.	
BackupPath=/var/LicenseUseManagement/backup	AIX
BackupPath=C:\Documents and Settings\All Users\Application Data\IBM\License Use Management\backup	Windows
The path where the server files and databases are copied during the automatic backup procedure. This parameter can be changed only by editing the configuration file.	
DebugProc=no	All platforms
Specifies whether or not the License Use Management Runtime subsystems (UNIX) or processes (Windows) must be started in debug traced mode. Possible values are yes and no .	
DebugToFile=no	All platforms
Specifies whether or not the License Use Management Runtime processes are started in debug trace mode and the output is redirected to a file. Possible values are yes and no .	
DebugToPath=/var/LicenseUseManagement/trace	AIX
DebugToPath=C:\Documents and Settings\All Users\Application Data\IBM\License Use Management\trace	Windows

The path where the trace files are copied. This parameter can be changed only by editing the configuration file.

[LUM Server Tools]

Threshold_Automatic=0 All platforms
Whether the threshold is automatically checked periodically. Possible values are **0** (no) or **1** (yes).

Threshold_Level=80 All platforms
The default value of the threshold level used in the Basic License Tool GUI. Used for vendor-managed use products, and for customer-managed use products when no specific threshold value is specified.

Refresh_Automatic=0 All platforms
Whether the Basic License Tool is to do a periodic automatic refresh. Possible values are **0** (no) or **1** (yes).

Refresh_Frequency=60 All platforms
The frequency, in minutes, of the automatic refresh.

Cleanup_Automatic=no All platforms
Whether the Basic License Tool automatically cleans stale licenses. Possible values are **yes** and **no**. You can change this parameter only by editing the configuration file.

[LUM Client]

GroupName=DefaultGroupName Windows
The name of the group to which the user of this workstation belongs. If it is not specify the GroupName uses the DefaultGroupName, otherwise you can choose only between User or Administrator.

GDBServer= All platforms
The format is *ip:[servername][port]* or not found.
Note: This value allows client to bind to Central Registry Server, its format is *ip: [servername] [port]* where:

- *servername* - the hostname of the Central Registry Server
- *port* - the port number of the Central Registry Server

NumDirectBindServers= All platforms
The number of direct binding servers the client applications are configured to point to directly, using just transport family protocol, name, and port number.

DirectBindServerX= All platforms
Where *X* is a value between 1 and NumDirectBindServer. The format is *ip:servername[port]*. Specify the **DirectBindServer** keyword for each server the client points to. If you need to contact the central registry license server, there must also be an entry for it. The default ip port numbers are 2215 for the license server and 10998 for the administration server. Make sure you insert the correct ones if you are not using the defaults.

Appendix B. Environment Variables

This appendix describes the environment variables used by License Use Management Version 5.1.2

To run enabled applications or License Use Management tools (for example, **LUMtv**, **LUMblt**) in trace mode, set the following environment variables:

```
LUM_DEBUG = Yes
LUM_LIB_VERB = Yes
LUM_RPC_DEBUG = Yes
LUM_LT_DEBUG = Yes
LUM_THR_VERB = Yes
LUM_LOG_PATH = path_name file_name
LUM_CONFIG = path_name file_name
LUM_RPCLOG_PATH = path_name file_name
```

where:

path_name file_name

Is the absolute path and file name of the file in which traces will be written.

For the LUM_LOG_PATH variable, you can redirect the output of the traces to a log file by setting the environment variable to the name of the file. For the LUM_CONFIG variable, you can use an alternative configuration file. For example, LUM_CONFIG = */tmp/lum.config*. For the LUM_RPCLOG_PATH variable, you set the absolute path and file name of the file in which traces will be written. The file will be used to store License Use Management communication traces for License Use Management enabled applications.

Use the following variables to override the indicated tags in the *lum_ini.txt* configuration file:

- On AIX:

LUM_MAX_ACTIVITIES

Specifies the maximum number of activities that any server can manage. The actual maximum for any particular server depends on the server's capabilities. The actual maximum could therefore be lower for some servers. Allowed values are in the range 1--2048. The default value is 1024.

LUM_MAX_ACTIVITIES_THRESHOLD

Specifies the percentage of activities beyond which license requests are rejected. Licenses can still be checked and released beyond this threshold. This parameter is updated every time the **LUMblt -S** command is run.

LUM_PASSIVE_TIME

Specifies the length of time in seconds that an activity is to be kept in the server activity pool after the activity has been completed.

LUM_LOG_TRACE = YES

Enable the tracing of the activities on the license server.

- On Windows:

LUM_TIMESERV

Specify the timeout the system waits for the service to start. The default value is 30 (seconds).

LUM_TRACE_SERV

This variable enables the tracing of the start and stop phases of Windows services on License Use Management servers. To set the LUM_TRACE_SERV variable, follow the instructions in "Set Windows Services Trace mode" section.

- On all operating systems

LUM_POLL_FREQ

Specify the frequency of sampling of the performance of the license server. The default value is 1000.

LUM_TIMEOUT_FACTOR

You can increase or decrease the timeout using a scaling factor. You can modify the timeout for connections between client and server by changing the LUM_TIMEOUT_FACTOR environment variable on the client side of the connection. The default value is 1000. Values greater than 1000 increase the timeout interval, while values below 1000 decrease it.

Appendix C. Using the Nodelock Directory

This appendix explains how to manually prepare the nodelock directory and how to use it. The nodelock directory is a repository that contains nodelock certificates and is managed automatically. However you can perform some limited tasks.

To manually create the nodelock directory:

1. On a Windows workstation, log in as administrator.
On an AIX workstation, log in as root, or use the **su** command.
2. Create the nodelock directory:

- On a Windows workstation, the default directory (unless specified by the product) is:

```
c:\'COMMON_APPDATA'\IBM\License Use Management\nodelock
```

where:

COMMON_APPDATA

is the initial part of the path that is returned by the SHGetFolderPath API

An example of a typical path for the nodelock directory on a Windows operating system is as follows:

```
c:\Documents and Settings\All Users\Application Data\IBM\License Use Management\nodelock
```

- On an AIX workstation:

```
/var/LicenseUseManagement/nodelock
```
- Assign the necessary permissions to the nodelock directory.

To enroll a nodelock license, move the nodelock certificate to the nodelock directory. The directories nested under the nodelock directory will not be checked by License Use Management. Do not remove the license certificates from the nodelock directory.

Appendix D. Operating Systems and License Use Management Support

This appendix identifies the operating systems supported by the various versions of License Use Management. The tables also indicate which versions have been tested and the level of support provided.

- Version 5.1.0 (Table 14)
- Version 5.1.1 (Table 15)
- Version 5.1.2 (Table 16)

Table 14. Operating Systems and License Use Management Version 5.1.0 Support

Operating System	License Use Management Version 5.1.0				
	Application Developer's Toolkit	Runtime	Application Developer's Toolkit 64-Bit	Java GUI	Native Java APIs
AIX 5.2, and 5.3	Yes	Yes	Static link only	Yes	Yes
HP-UX 11.i	Yes	Yes	Static link only	Yes	Yes
IRIX 6.5	Yes	Yes	No	Yes	Yes
Solaris 8, 9, and 10	Yes	Yes	Static link only	Yes	Yes
Windows 2000	Yes	Yes	No	Yes	Yes
Windows XP and Windows Server 2003 32-bit and 64-bit	Yes	Yes	Static link only (AMD Opteron)	Yes	Yes

- Version 5.1.1 (Table 15)

Table 15. Operating Systems and License Use Management Version 5.1.1 Support

Operating System	License Use Management Version 5.1.1				
	Application Developer's Toolkit	Runtime	Application Developer's Toolkit 64-Bit	Java GUI	Native Java APIs
AIX 5.2, and 5.3	Yes	Yes	Static link only	Yes	Yes
HP-UX 11.i	Static link only	No	No	No	Yes
Solaris 8, 9, and 10	Static link only	No	No	Yes	Yes
Windows XP and Windows Server 2003	Yes	Yes	Static link only (AMD Opteron)	Yes	Yes

- Version 5.1.2 (Table 16)

Table 16. Operating Systems and License Use Management Version 5.1.2 Support

Operating System	License Use Management Version 5.1.2				
	Application Developer's Toolkit	Runtime	Application Developer's Toolkit 64-Bit	Java GUI	Native Java APIs
AIX 5.2, and 5.3	Yes	Yes	Static link only	Yes	Yes
Windows XP, Server 2003 and Vista	Yes	Yes	Static link only (AMD Opteron)	Yes	Yes

Appendix E. Accessibility

Accessibility is a product feature that helps anyone who has a physical disability, such as restricted mobility or limited vision, to use the software product successfully.

The major accessibility features in License Use Management Runtime include:

- Keyboard accessibility features
- Object information
- Sound and multimedia
- Display
- Documentation

Using License Use Management Runtime, you can:

- Use accessibility technologies such as screen-reader or screen-magnifier software.
- Perform tasks or actions by using only the keyboard.
- Customize display attributes, such as color and font size.

In addition, the License Use Management Runtime product documentation aids accessibility by providing:

- Accessible documentation formats, such as Hypertext Markup Language (HTML) or convertible Portable Document Format (PDF). You can access HTML documents using screen-reader software.
- Alternative text for all graphics so that any documentation user with vision impairments understands the contents of the images.

Keyboard Accessibility Features

License Use Management Runtime supports these keyboard accessibility features:

- Keyboard equivalents for all mouse actions.

For each software platform, there are standard keys and key combinations for doing common actions. See “Keys Help” on page 193 for a list of the keyboard equivalents so that, if you are unable to use the mouse, you can access all product functions using the keyboard.

- Access to the accessibility features of the operating system.

License Use Management Runtime does not provide keyboard sequences for the shortcut keys that are reserved for the accessibility features of the operating system. The Windows operating system, and AIX system have a set of accessibility options. These accessibility options allow anyone with a disability to customize system-wide keyboard settings to improve accessibility. For example, you can customize Windows systems using the Windows Accessibility Options on the Control Panel. On AIX systems, accessibility options are part of the AccessX package.

Java Interface and Object Information

License Use Management Runtime uses a Java-based graphical user interface, which provides object-oriented accessibility features, such as:

- Implementing the Java Accessibility programming interfaces, or adhering to guideline for building custom components when extending the Java Foundation Classes.
- Setting the focus. In an application, access devices, software, and users need to know where to direct the focus. For License Use Management Runtime, use the Tab key to change the focus.
- Setting the name and description on components, icons, and graphics such as using an image to identify programmatic elements. All License Use Management Runtime icons have alternate text for icons and graphics.
- Associating labels with controls, objects, and icons, such as associating the text label with an entry field control. License Use Management Runtime labels all components that you can access with speech-reader software.

Sound and Multimedia

License Use Management Runtime uses the following sound and multimedia accessibility functions:

- An option to display a visual cue for all audio alerts. Typical alerts might be the receipt of new mail, beeps to indicate system errors, or sounds to indicate a change in status. License Use Management Runtime allows you to change your user preference to turn on visual cues for audio alerts.
- Use of the operating system volume setting to adjust the volume for the application.

For the Windows operating system, you control the volume by selecting **Start ► Programs ► Accessories ► Entertainment ► Volume Control**.

Display

License Use Management Runtime supports the operating system display settings for color scheme, font size, and high contrast display. License Use Management Runtime supports a variety of color selections.

- On Windows systems, you can customize colors through the Microsoft® Windows Accessibility Settings for High Contrast in the Control Panel. Or you can customize colors through the License Use Management Runtime view options.
- When you customize colors, you can produce a range of contrast levels.
- Color is not the only way that License Use Management Runtime conveys information or indicates an action. License Use Management Runtime uses other attributes, such as bold or italic, in addition to color, to distinguish the text.
- To view a document or an application work area in an enlarged font, you can use various magnifications of the Zoom option in Windows. Using magnifications does not affect the actual document or work.

Documentation

License Use Management Runtime provides documentation in these formats:

- Accessible HTML format. Accessibility tools, such as screen readers, can read directly this format.
- Accessible text. All License Use Management Runtime documentation with graphics has alternate text that describes each illustration and graphic used in the documentation.

Even though License Use Management Runtime provides an accessible HTML format, you can also create accessible Portable Documentation Format (PDF) format. You can convert Adobe V4.0 PDF files to the accessible HTML format. Use the Adobe PDF-to-HTML conversion program to create accessible PDF formats. For information about converting PDF documents to HTML, refer to the Adobe book *Optimizing Adobe PDF Files for Accessibility*

In addition, License Use Management Runtime provides documentation of all keyboard access methods, such as accelerator keys.

Keys Help

License Use Management Runtime provides documentation on all accessibility features, including keyboard access. In addition to this appendix, you can select **Help ► Help Keys** for online help.

Following are lists of keys that are available to you when using License Use Management Runtime. These keys are grouped according to their function.

Note: When you see two keys that are joined by a plus sign (+), hold down the first key while pressing the second key at the same time.

General Keys

Use the following keys to act on a window:

F1	Provide help for the panel.
F3	Exit the panel.
F5	Refresh the panel.
F10 or ALT	Go to or from the action bar.
Arrow keys	Move among choices on the action bar in menus, in dialog windows, or in list boxes.
Underlined letter	Move to a choice on the menu bar or menus.
Alt+F4	Close the window.
Alt+F5	Restore the window (only for supported Windows platforms).
Alt+F7	Move the window (only for supported Windows platforms).
Alt+F8	Size the window (only for supported Windows platforms).
Shift+Esc or Alt+Spacebar	Go to or from the system menu.
PgUp	Scroll the contents of the window up one page.
PgDn	Scroll the contents of the window down one page.
Ctrl+PgUp	Scroll the contents of the window left one page.
Ctrl+PgDn	Scroll the contents of the window right one page.
Esc	Cancel the application menu or the system menu.

Keys for Dialog Window

Use the following keys to act on a dialog window.

Enter	Perform the action indicated on the selected push button.
Spacebar	Set a check box on or off or perform the action indicated on the selected push button.
Tab	Move to the next group of entry fields or check box.
Backspace (left arrow delete)	Delete the character to the left of the cursor in input fields.

End or Ctrl+Right Arrow Key	Move to the end of a field.
Home or Ctrl+Left Arrow Key	Move to the beginning of a field.

Keys for Help

Use the following function keys to get help from the application or to get different types of help within a help window.

F1	Help
-----------	------

Accelerator Keys for the Configuration Tool

You can use accelerator and command keys to navigate through License Use Management Runtime. All accelerator keys have an underlined letter. For example, F is the accelerator for the File menu. In Windows, press the ALT key, then the accelerator key to trigger an action. For example, Alt+F shows the File menu. You can show additional accelerators for bookmarks and task buttons by pressing and holding down the ALT key.

Command keys directly trigger an action and usually make use of the CTRL (Windows) keys. For example, to print, press CTRL+P.

License Use Management Runtime uses accelerator keys. The following sections list the accelerator keys used for the configuration tool. Although the accelerator keys listed are shown as they appear on the menus (both in uppercase and in lowercase), the accelerator keys are not case sensitive.

Configuration Tabs

The following tabs are in the configuration tool:

- Configure As
- User
- Accessibility
- Direct binding
- Start up
- Direct binding ports
- Log

Each tab has its own accelerators.

Configure As Tab: Use the following accelerator keys in the **Configure as** tab:

ALT+C	To select network license client.
ALT+S	To select Network License Server (NetworkLS).
ALT+L	To disable remote administration for Network LS.
ALT+R	To select Central Registry License Server (CrLS).

User Tab: Use the following accelerator key in the **User** tab:

ALT+G	To select Group name.
-------	-----------------------

Accessibility Tab: Use the following accelerator keys in the **Accessibility** tab.

ALT+F	To open the Font Selection dialog.
ALT+L	To open the Color Selection dialog.

Direct Binding Tab: Use the following accelerators in the **Direct binding** tab:

ALT+S	To select the Servers list.
ALT+N	To select the Name field.
ALT+K	To select Network License Server.
ALT+C	To select Central Registry License Server.
ALT+L	To select the Network License Server port field.
ALT+P	To select the Central Registry License Server port field.
ALT+A	To add a server.
ALT+R	To remove a server.

Start Up Tab: Use the following accelerator in the **Start up** tab:

ALT+U	To start the Basic License Tool.
-------	----------------------------------

Direct Binding Ports Tab: Use the following accelerators in the **Direct Binding Ports** tab:

ALT+N	To select the Network License Server port.
ALT+C	To select the Central Registry Server port.

Log Tab: Use the following accelerators for the **Log** tab:

ALT+A	To log all events.
ALT+C	To log license check-in events.
ALT+W	To log license wait events.
ALT+T	To log license timeout events.
ALT+E	To log errors.
ALT+G	To log license grant or release events.
ALT+V	To log vendor added or deleted events.
ALT+M	To log vendor message events.
ALT+P	To log product added or deleted events.
ALT+S	To log the successful start or stop of the license server, and when the threshold on the workload is exceeded or regained.
ALT+L	To select the log file directory field.

Font Selection Dialog Accelerators

Use the following non-standard accelerators for the Font Selection dialog:

ALT+D	To reset the default font and font size.
-------	--

Color Selection Dialog Accelerators

Use the following non-standard accelerators for the Color Selection dialog:

ALT+F	To change the foreground color.
ALT+B	To change the background color.
ALT+D	To reset the default background and foreground colors.

Accelerator Keys for the Basic License Tool

You can use accelerator and command keys to navigate through License Use Management Runtime. All accelerator keys have an underlined letter. For example, F is the accelerator for the File menu. In Windows, press the ALT key, then the accelerator key to trigger an action. For example, Alt+F shows the File menu. You can show additional accelerators for bookmarks and task buttons by pressing and holding down the ALT key.

Command keys directly trigger an action and usually make use of the CTRL (Windows) keys. For example, to print, press CTRL+P.

License Use Management Runtime uses accelerator keys. The following sections list the accelerator keys used for the basic license tool. Although the accelerator keys listed are shown as they appear on the menus (both in uppercase and in lowercase), the accelerator keys are not case sensitive.

Main Window Accelerators

Use the following accelerator keys in the main window:

ALT+P	To open the Products menu.
ALT+S	To open the Selected menu.
ALT+E	To open the Report window.
ALT+R	To open the Servers menu.
ALT+V	To open the View menu.
ALT+O	To open the Options menu.
ALT+H	To open the Help menu.

File Menu: The File menu has the following accelerator keys:

I	To import a certificate.
x	To exit from the Basic License Tool.

Selected Menu: The Selected menu has the following accelerator keys:

O	To open the details window.
D	To distribute licenses.
U	To update licenses.
C	To clean up stale licenses.
R	To remove licenses.

Report Menu: The Report menu has the following accelerator keys:

p	To get a report for the selected product.
a	To get a report for all products.

Servers Menu: The Servers menu has the following accelerator keys:

A	To view active license servers.
C	To view clusters.

View Menu: The View menu has the following accelerator keys:

n	To include servers, vendors, or products.
---	---

F To refresh the view.

Options Menu: The Options menu has the following accelerator keys:

i To open the system settings dialog.
T To set the toolbar viewing mode submenu.
F To open the Font Selection dialog.
C To open the Color Selection dialog.

Help Menu: The Help menu has the following accelerator keys:

G To open general help on the Basic License Tool.
K To open this keys help.
r To open information about the product version.

Details Window Accelerators

The Details window has the following tabs:

- Product
- Compound
- Concurrent
- Concurrent Users
- Reserved
- Reservable

The **Product** tab has no accelerators.

The other tabs have the following accelerators:

L To open the Licenses menu.
S To open the Selected menu.
H To open the Help menu.

Font Selection Dialog Accelerators

Use the following non-standard accelerators for the Font Selection dialog:

ALT+D To reset the default font and font size.
ALT+F To select the font list.
ALT+S To select the sizes list
ALT+T To select the styles list.

Color Selection Dialog Accelerators

Use the following non-standard accelerators for the Color Selection dialog:

ALT+F To change the foreground color.
ALT+B To change the background color.
ALT+D To reset the default background and foreground colors.

Update Licenses Dialog Accelerators

The Update Licenses dialog has the following accelerators:

u To activate customer-managed use.

D	To disable soft stop.
g	To set High Water Mark licenses.
R	To reset High Water Mark licenses.
T	To set the threshold.
l	To select enrolled licenses.

Reserved Licenses Details Window Accelerators

The Reserved Licenses Details window has the following accelerators:

L	To select the licenses.
N	To set the name.
G	To set the group.
d	To set the node ID.
Y	To set the year of license expiration.
M	To set the month of license expiration.
a	To set the day of license expiration.
u	To set the hour of license expiration.
i	To set the minute of license expiration.

Include Dialog Accelerators

The Include dialog has the following accelerators:

ALT+A	To select the All servers radio button.
ALT+S	To select the Select servers radio button.
ALT+V	To select the Select servers button.
ALT+L	To select the All vendors radio button.
ALT+T	To select the Select vendors radio button.
ALT+N	To select the Select vendors button.
ALT+P	To select the All products radio button.
ALT+Y	To select the Currently in use radio button.
ALT+U	To select the All users radio button.
ALT+E	To select the Select users radio button.
ALT+R	To select the Select users button.

Select Users Dialog Accelerators

The Select Users dialog has the following accelerators:

l	To move to the available users box.
S	To move to the selected users box.
A	To add a user to the selected users box.
d	To add all users to the selected users box.
R	To remove a user from the selected users box.
e	To remove all user from the selected users box.

Define Cluster Members Dialog Accelerators

The Define Cluster Members dialog has the following accelerators:

A	To add a member to a cluster.
R	To remove a member from a cluster.

Active License Servers Window Accelerators

The Active License Servers window has the following accelerators:

ALT+S	To open the Selected submenu.
ALT+H	To open the general help for the Basic License Tool.

Selected Menu: The Selected menu has the following accelerators:

ALT+C	To change the threshold value.
ALT+T	To open the Tracing submenu.

Tracing Menu: The Tracing menu has the following accelerators:

N	To select the None tracing option.
i	To select the High tracing option.
L	To select the Low tracing option.
g	To select the Low & High tracing option.

Clusters Window Accelerators

The Clusters window has the following accelerators:

ALT+C	To open the Create menu.
ALT+S	To open the Selected menu.
ALT+H	To open the Help menu.

Create Menu: The Create menu has the following accelerators:

ALT+R	To open the Create Clusters dialog.
-------	-------------------------------------

Selected Menu: The Selected menu has the following accelerators:

ALT+O	To show the selected servers.
ALT+U	To update the selected licenses.
ALT+R	To remove the selected licenses.

Help Menu: The Help menu has the following accelerators:

ALT+G	To show the Basic License Tool general help.
-------	--

Server Details Window Accelerators

The Server Details window has the following accelerators:

ALT+A	To activate the selected server.
ALT+D	To deactivate the selected server.

Report Window Accelerators

The Report window has the following accelerators:

A	To select all events.
L	To select license related events.
V	To select vendor message events.
D	To select LDM modification events.

E	To select error events.
p	To select server start and stop events.
F	To select fatal error events.
t	To set the date range for the report.
S	To select a standard report format.
r	To select a license request by product report format.
q	To select a license request by user report format.
y	To select a license use by product report format.
u	To select a license use by user report format.
m	To select a customer-managed user audit report format.

Settings Dialog Accelerators

The Settings dialog has the following accelerators:

D	To set the default threshold default level.
A	To set the automatic refresh option.
F	To set the automatic refresh time in minutes.
R	To select the Refresh now button.
E	To enable threshold logging.

Update Offline Period Dialog Accelerators

The Update Offline Period dialog has the following accelerators:

ALT+M	To set the maximum offline period.
-------	------------------------------------

Authorizations Dialog Accelerators

The Authorizations dialog has the following accelerators:

ALT+L	To modify the default authorization to All allowed.
ALT+N	To modify the default authorization to All not allowed.
ALT+R	To modify the default authorization to All concurrent allowed.
ALT+E	To modify the password of the default authorization.
ALT+A	To add a new authorization.
ALT+M	To modify an authorization.
ALT+D	To delete an authorization.

Add/Modify Authorization Dialog Accelerators

The Add/Modify Authorization dialog has the following accelerators:

ALT+U	To set the user name.
ALT+G	To set the user group name.
ALT+P	To set the password for the authorized user.
ALT+T	To set the target ID of the machine.
ALT+A	To authorize the use of the license as concurrent-offline.
ALT+N	To deny the use of the license.
ALT+R	To authorize the use of the license as concurrent.

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Glossary

A

ACID. A transaction involving multiple resource managers using the two-phase commit process to ensure atomic, consistent, isolated, and durable (ACID) properties.

administrator. In License Use Management, a person responsible for administrative tasks setting up the License Use Management Runtime such as access authorization, installing and configuring network license servers, network license clients, and the central registry. For more information see “License Use Management Vendor Perspective” on page 1.

application client. A computer that runs a software product and plays the role of the client in the traditional client-server model.

application client identifier.

In the License Use Management, the unique identifier of the application client. When a license is granted to a client, the ACID of the client is recorded in the central registry, which is checked at any new license request. This avoids granting a license twice to the same application client.

application server.

A program in a distributed network that provides the execution environment for an application program. In LUM, the application server is the LUM client. It requests the licenses for all its application clients.

authorization. The mode that is used to grant a concurrent or concurrent offline license to a user, group or target ID. The mode can be one of:

- For a concurrent license:
allowed or not allowed
- For a concurrent-offline license:
allowed, not allowed, or concurrent allowed

B

Basic License Tool. In License Use Management, the administration tool included in License Use Management Runtime, which enables the administrator to add or delete licenses from the server database, display the licenses installed, distribute the licenses among the servers available on the network, and generate reports on license usage and server events.

binding. In License Use Management, the method by which a network license client can locate a server in order to request a license.

C

C language. A language used to develop software applications in compact, efficient code that can be run on different types of computers with minimal change.

C++ language. An object-oriented high-level language that evolved from the C language. C++ takes advantage of the benefits of object-oriented technology such as code modularity, portability, and reuse.

capacity type. In License Use Management, a number that specifies the type of unit that a license applies to. The type of unit can be defined by IBM or chosen by the vendor. If no capacity type is specified by the vendor, the license applies to users.

central registry. A component of the License Use Management network topology. A server’s database which logs requests for licenses, upgrades for licenses, and journals all license activity in a tamper-proof auditable file.

check period. In License Use Management, a time period during which a product holding a concurrent or unreserved reservable license must check in with the network license server. If the product does not check in during this period, the network license server assumes that the product is not running, and might release a granted license to another user.

cluster. In License Use Management, a group of network license servers that jointly serve vendor-managed concurrent licenses that are tied to the cluster rather than to an individual server. While some servers in the cluster are serving licenses, one or more servers remain in reserve, ready to take over should an active server fail.

compound password. In License Use Management, a password from which it is possible to extract multiple simple passwords, each representing one or more licenses.

Enabled applications cannot use the compound password directly.

concurrent license. In License Use Management, a type of license, administered by the network license server, that can be used by different users from any node that is connected to a network license server. Concurrent licenses enable as many users to use a particular software product concurrently as there are licenses.

concurrent offline license. In License Use Management, the concurrent offline license allows

authorized users to reserve a concurrent license for a certain number of days and to use it on a portable computer disconnected from the network. See also concurrent or concurrent-offline license. Only authorized users can 'use' this feature.

country usage. Identifies the country where the license will be used.

custom configuration. In License Use Management, a selected combination of products tailored by a vendor to the needs of one or more users. Each custom configuration is identified by unique serial number, which is incorporated into the custom configuration. See *license*.

custom configuration licenses. In License Use Management, a special case of a concurrent, concurrent-offline and nodelock license that contains a unique serial number identifying a custom configuration.

customer-managed use control. In License Use Management, a level of password use control in which the customer manages compliance with the terms of the software product acquisition. It is the customer's responsibility to set the upper limit on the number of licenses that can be extracted and distributed, based on the terms of the software product acquisition.

customer site. A site that enables the user to identify the customer who owns the license.

D

direct binding. In License Use Management, a type of binding between network license servers and clients in which client applications locate license servers by means of a local text file that contains network addresses of the license servers.

direct binding servers list. In License Use Management, a set of network license servers and a central registry license server that collectively serve a set of network license clients.

dynamic nodelocking. In License Use Management, the automated licensing of multiple nodes through the use of compound passwords.

E

elevated mode. In Windows Vista User Account Control (UAC), a feature which allows you to stay logged on a User and do Administrator things in a secure environment.

enrollment certificate. In License Use Management, a document, usually in the form of electronic file, that enables licenses to be distributed to users. The

document contains all the information that is related to the licenses acquired for a license-enabled product.

F

features. In License Use Management, a label that, when combined with the product identity and product version, uniquely identifies the product. The label string is optional.

G

gdb server. See *central registry*.

H

hard stop. In License Use Management, a policy according to which, if the end user starts the product and there are no licenses available, the product does not start.

high-availability licensing. In License Use Management, an option that makes it possible for a cluster of network license servers to jointly serve concurrent licenses, with one or more servers in reserve in case a server goes down. The independent software vendor must create passwords to be enrolled on the cluster rather than on an individual server.

high-water mark. In License Use Management, the maximum number of soft stop licenses that have been granted for a given product, over the number of licenses enrolled for that product. It is updated when the soft stop policy is set. In hard stop policy no updating of the high-water mark occurs, since it is assumed that the product stops its execution if no licenses are available.

I

initial key. In License Use Management, the initial key license for a custom configuration license generated when using the Upgrade flag. It is an encrypted character string that specifies some terms of the acquisition of the selected combination of software products in a customer initial custom configuration. Contrast with replacement key. See *replacement key*.

internet. In TCP/IP, a collection of interconnected networks that function as a single, large network.

License Use Management Runtime supports the UDP/IP protocol.

J

Java. An object-oriented programming language for portable interpretive code that supports interaction among remote objects. Java was developed and specified by Sun Microsystems, Incorporated.

Java Development Kit (JDK). The name of the software development kit that Sun Microsystems provides for the Java platform.

K

key. See *password*.

L

license. An instance of permission to use a licensed software product or service. Sometimes, a user needs more than one license to use a product.

The term *license* as used in the context of License Use Management does not refer to the license agreement that governs use of and rights to a product.

license annotation. A string that the vendor can use to modify the use of a license.

license database. In License Use Management, the database of licenses that a license server maintains.

license-enabled product. A product that is enabled for License Use Management.

A vendor provides a license-enabled product together with a password that authorizes use of the product. The password contains an encryption of certain terms of the acquisition of the product (such as how many licenses the customer can use, the expiration date of the licenses, and the type of license).

license information. In License Use Management, a data string that modifies the use of a license in a manner defined by the vendor of the software product.

license key. See *password*.

license password. See *password*.

license server. A program that provides the license services, administering licenses for software products.

licensed product. See *license-enabled product*.

log file. The text log file that records messages and errors from the license server, and sometimes from licensed products.

M

multiuse rules. In License Use Management, rules that define the conditions under which multiple invocations of a product require only a single license. These rules are applicable only to concurrent licenses. The vendor of the product defines multiuse rules.

N

NCS. A set of software components, developed by Apollo Computer Inc., that conform to the Network Computing Architecture. These components include the Remote Procedure Call (RPC) runtime library and the Location Brokers.

network. In data communication, a configuration in which two or more locations are physically connected for the purpose of exchanging data.

network license. In License Use Management, a license that is maintained on a network license server for use upon request by a License Use Management Runtime client.

network license client. In License Use Management, a node configured to make use of licenses by requesting them from a network license server.

network licensed product. In License Use Management, a licensed product that is enabled such that the licenses are maintained on a server for use upon request by a License Use Management Runtime client.

network license server. In License Use Management, a node in the network on which network licenses are stored for use by License Use Management Runtime clients.

node. A workstation in the network. In License Use Management, it can be configured as a network license client, a network license server, the central registry license server, or a combination.

nodelocked license. In License Use Management, a type of license locked to a specific node, so that the product can be used only at that node. The nodelocked license is installed on the workstation for which it was created.

non-runtime-based enablement. In License Use Management, a type of license enablement for a product with simple nodelocked licenses that does not make use of License Use Management Runtime on the end user's workstation. The password is stored in a special directory when the enabled product is installed. When the enabled product is started, it checks the directory to ensure that there is a valid license.

O

object. In the Network Computing System, an entity that is manipulated by well-defined operation; for example, a disk, a file, a printer. Every object has a type and is accessed through an interface.

offline-nodelocked license. In License Use Management, an offline-nodelocked license is the copy of the concurrent-offline license that has been installed

on a portable computer that is disconnected from the network. There cannot be more than one offline-nodelocked license for the same product, same product version, same product features, and same nodelock directory on the same machine (same target ID). There can be several nodelock directories on the same machine. The offline-nodelocked license is local to the portable computer where the application has been installed.

offline period. The maximum number of days that a user can reserve a concurrent-offline license.

P

password. In computer and network security, a specific string of characters used by a program, computer operator, or user to access the system and the information stored within it.

password use control level. In License Use Management, a level of control of compliance with the terms of the acquisition of a license-enabled product. The password use control levels are:

- customer-managed use control
- vendor-managed use control

per-seat license. In License Use Management, a license used to enable client/server applications that are constructed for multiple-server solutions. Assignment of a per-seat license to an application client is permanent. Unused application client licenses are kept in a central repository, which all the application servers share. They also share a central list of application clients that have an assigned license. If an application client connects to multiple application servers, only one license is assigned to it.

product ID. In License Use Management, an integer that identifies a vendor's licensed software product; by means of product IDs, the license server can distinguish among products of the same vendor.

R

(RDK) Release Dependent Key . In License Use Management, features which can offer the capability to use the same license for different versions of the product.

Remote Procedure Call. A protocol that allows a program on a client computer to run a program on a server.

replacement key. A license key for a custom configuration license generated using the Upgrade flag. It is an encrypted character string that specifies some terms of the acquisition of the selected combination of software products in a customer upgraded custom configuration. Contrast *initial key*.

report. A summary of events that describes the information related to the licenses that are installed on the selected servers, filtered as the administrator specifies. Examples of events from a report are requests for licenses for a product in a given interval of time; and start up of a server.

reservable license. In License Use Management, a network license that the administrator can reserve for the exclusive use of a user, a group, and a node. The reservation is for a specified time period.

reservation. In License Use Management, a concurrent-offline license that is reserved (for a defined offline period) for use as an offline-nodelocked license.

reserved license. In License Use Management, a license that the administrator has reserved for the exclusive use of a user, a group, and a node.

RPC. See *remote procedure call*.

runtime-based enablement. In License Use Management, a type of license enablement for a product with nodelocked licenses that use License Use Management Runtime on the end user's workstation to manage the licenses.

S

selected servers. In License Use Management, the servers that the administrator is working with through the Basic License Tool. All the products whose licenses are installed on the selected servers are displayed in the Basic License Tool main window.

serial number. In License Use Management, a unique number that identifies a specific custom configuration.

subserial number. In License Use Management, a unique number that identifies ≤ the subserial number in the license that is currently enrolled.

simple nodelocked license. In License Use Management, a nodelocked license that allows an unlimited number of simultaneous uses of the licensed application on the local workstation.

simple password. In License Use Management, a password that, once enrolled on a license server, represents one or more licenses.

Enabled applications can use the simple password directly.

soft stop. A policy according to which, if the end user starts the product and there are no licenses available, the product starts.

T

target. In License Use Management, the node at which a password is to be installed. If the password specifies a nodelocked license, the target is the node where the licensed product is run. If the password specifies multiple nodelocked license (that is, a compound password for nodelocked licenses) or network licenses, the target is a node at which the network license server (LUMlmd) is running.

target ID. In License Use Management, a unique identifier of a node. A vendor can generate a password that can be installed only on a node that has a specific target ID. The target ID can be based on hardware or generated by License Use Management Runtime.

threshold. In License Use Management, a percentage of licenses; if more than this percentage of licenses for a product are in use, messages about the level of use are logged.

time stamp. In License Use Management, the value of an object that indicates the system time at some critical point in the object's history.

trace. A record of the processing of a computer program or transaction. The information collected from a trace can be used to assess problems and performance.

try-and-buy license. In License Use Management, a nodelocked license that has a fixed duration and a start date equal to the date when the license is enrolled. A try-and-buy license is made available for purposes of evaluating the application, and can be replaced by a production license after evaluation.

U

Universally Unique Identifier (UDI). The 128-bit numerical identifier that is used to ensure that two components do not have the same identifier.

User Datagram Protocol (UDP). An Internet protocol that provides unreliable, connectionless datagram service. It enables an application program on one machine or process to send a datagram to an application program on another machine or process.

upgrade index. In License Use Management, a unique number which identifies a specific license in the upgrade set. It is always less than or equal to the upgrade count.

upgrade count. In License Use Management, a total number which identifies licenses in the set.

use-once license. In License Use Management, a type of license, administered by the license server, that is effective for only a single instance of starting a product

or using a service. The license server decrements the number of available use-once licenses each time the product or service is used.

user. Any individual, organization, process, device, program, protocol, or system that uses the services of a computing system.

User Datagram Protocol (UDP). In the Internet suite of protocols, a protocol that provides unreliable, connectionless datagram service. It enables an application program on one machine or process to send a datagram to an application program on another machine or process. UDP uses the Internet Protocol (IP) to deliver datagrams.

V

value units policy. A policy vendors use to price their products by introducing a common unit of measurement known as a value unit. Vendors can combine usage count, different system capacity measurements, and other product-specific indicators into the same license certificate. Vendors can also define the relative weights and rules for the translation of the basic metric units into value units.

vendor ID. In License Use Management, the identifier for a vendor of licensed products which IDs are a License Use Management Runtime specific usage of NCS Universal Unique Identifiers (UUIDs).

vendor definition file. In License Use Management, a plain text file that contains all information relevant to License Use Management for one vendor.

vendor-managed use control. In License Use Management, a level of password use control in which the vendor manages compliance with the terms of the software product acquisition.

The customer of a vendor-managed use product supplies a unique identifier (target ID) of each workstation where product licenses are to be installed. The vendor uses this information to create the password, which is tied to the target workstation and cannot be used on another workstation.

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