

Lasso Professional 7 Linux User Guide

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Chapter 1

Introduction

This chapter provides an introduction to Lasso Professional 7 on the Redhat Linux platform, and describes how the documentation should be used.

- *The Lasso Professional 7* introduces Lasso Professional 7 on the Redhat Linux platform.
- *Documentation* describes the recommended usage of the documentation provided with Lasso Professional 7 for Redhat Linux.
- *Getting Started* provides an overview of the steps required to get Lasso Professional 7 up and running on Redhat Linux.
- *Usage Rights* includes important information about usage rights for Lasso Professional 7.

Lasso Professional 7

Welcome to Lasso Professional 7, the premiere tool for serving data-driven Web sites. Lasso Professional 7 allows you to serve dynamic Web pages using a simple tag-based markup language (LDML) and integrated Lasso MySQL data source.

Lasso Professional 7 is designed to run on the most prevalent modern Web server platforms with the most popular Web serving applications. For Redhat Linux, Lasso Professional 7 is implemented as a native application which interfaces with the Apache 2 Web server provided with Redhat Linux 9 servers.

Lasso Professional 7 consists of a core Lasso Service application and several Lasso Connectors which establish links to Web servers and data sources. Lasso Professional 7 has the following components.

- **Lasso Service** – The core application or Web Data Engine.
- **Lasso MySQL** – The internal data source of Lasso Professional 7.
- **Lasso Connector for Apache 2** – Allows Lasso solutions to run via the built-in Apache 2 Web server in Redhat Linux.
- **Lasso Connector for MySQL** – Allows Lasso to access MySQL data sources other than the included Lasso MySQL data source.
- **Lasso Connector for FileMaker Pro** – Allows Lasso to access FileMaker Pro 4.x, 5.x, and 6.x data sources.
- **Lasso Connector for JDBC** – Allows Lasso to access JDBC-compliant data sources, including Microsoft SQL Server, PostgreSQL, Sybase, Frontbase, and others.

For complete documentation of Lasso Professional 7 architecture and features, see *Chapter 2: Lasso Professional 7* in the Lasso Professional 7 Setup Guide.

Documentation

This section contains information about the documentation included with Lasso Professional 7 for Redhat Linux.

Lasso Professional 7 Documentation

The documentation for Lasso Professional 7 is divided into several different references available in print and electronic formats. All electronic documentation is included in PDF format in the `/usr/local/Lasso Professional 7/Documentation/` folder installed with Lasso Professional 7. The following manuals and resources are available.

- **Lasso Professional 7 Linux User Guide** – This book includes all documentation for Lasso Professional 7 that is specific to Redhat Linux. It is recommended that this guide be read first.
- **Lasso Professional 7 Setup Guide** – This book includes documentation of the architecture and features of Lasso Professional 7, the administration interface, and Lasso Security topics. It is recommended that this book be read following the guide you are reading now.
- **Lasso 7 Language Guide** – The documentation of LDML (Lasso Dynamic Markup Language), the language used to access data sources, specify programming logic, and much more.
- **LDML 7 Reference** – Provides detailed documentation of each tag in LDML 7. This is the definitive reference to the language of Lasso 7. This

reference is provided as a LassoApp installed with Lasso Professional 7, and is also available as an online resource from the Blue World Web site.

- **Extending Lasso 7 Guide** – A collection of documentation and sample projects which allow you to extend the capabilities of Lasso in C, C++, Java, TCP/IP, and LDML.

Comments, suggestions, or corrections to the documentation are appreciated and may be sent to the following email address.

documentation@blueworld.com

Lasso Professional 7 Linux User Guide

This is the book you are reading. This book contains the following chapters which detail how to install and use Lasso Professional 7 on Redhat Linux.

- *Chapter 1: Introduction* introduces Lasso Professional 7 for Redhat Linux and the documentation, and provides instructions for getting started.
- *Chapter 2: Configuring on Linux* provides step-by-step instructions for installing Lasso Professional 7 on Redhat Linux.
- *Chapter 3: Linux Tips* describes specific issues when using Lasso Professional 7 on the Redhat Linux platform.

Documentation Usage Tips

For a discussion of issues when using the Lasso Professional 7 documentation (other than this guide) with Redhat Linux, see *Chapter 3: Linux Tips*. As the documentation for Lasso Professional 7 was written before the Redhat Linux version became available, it is strongly recommended that everyone read this chapter.

Getting Started

This section provides an overview of getting started with Lasso Professional 7 for Redhat Linux, including installation, data source configuration, administration, and running an example solution.

To get started with Lasso Professional 7:

- 1 Install Lasso Professional 7 for Redhat Linux per instructions in *Chapter 2: Configuring on Linux* of this guide.

- 2 For an overview of the Lasso Administration interface, refer to *Chapter 5: Using Lasso Administration* in the Lasso Professional 7 Setup Guide.
- 3 For setting up a data source to communicate with Lasso, refer to *Chapter 7: Setting Up Data Sources* in the Lasso Professional 7 Setup Guide for data source requirements.
- 4 For a complete walk-through of setting up and running a complete example database and data-driven solution with Lasso Professional 7, refer to *Chapter 11: Setting Up Lasso Solutions* in the Lasso Professional 7 Setup Guide.

Usage Rights

This section describes the product usage rights for Lasso Professional 7.

New Purchase

Your license permits a single copy of Lasso Professional 7 to be installed and used on a single computer. While certain components of Lasso Professional 7 (e.g. Lasso Web server connectors) may be installed on a separate computer from the core of Lasso Professional 7 (e.g. Lasso Service), only a single instance of each component is permitted. The license does not permit development or deployment using non-purchased versions or evaluation versions.

Upgrade Purchase

It is standard industry practice and understood that by upgrading one's software one no longer uses the old version and the license to use and transfer said license ceases.

If you have upgraded to Lasso Professional 7 from any previous version of Lasso, you must no longer use that version. Please see the termination provisions in the accompanying license agreement for further details. Alternatively, you could purchase a new Lasso Professional 7 license and not be bound by such upgrade restrictions.

Evaluation Versions

Evaluation versions are provided for one-time 30-day evaluation and initial product testing use. Evaluation versions are not licensed for use for extended development. The documentation provided with evaluation versions is to be used strictly within the evaluation time period.

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Chapter 2

Configuring on Linux

This chapter contains the installation and configuration instructions for Lasso Professional 7 on Redhat Linux 9. It also contains information on Lasso Professional 7 components and how they can be manually installed or modified.

- *System Requirements* lists the minimum system requirements for Lasso Professional 7.
- *Installation Instructions* includes step-by-step instructions for installing Lasso Professional 7 and establishing a basic setup.
- *Running Lasso Professional 7* describes how to start and stop Lasso Service, and how to check if it is running properly.
- *Extended Configuration* describes how to manually configure Apache for Lasso Professional 7, and how to set up a Lasso Professional 7 distributed architecture.
- *Installation Contents* lists the files installed with Lasso Professional 7.
- *Uninstalling Lasso Professional 7* includes step-by-step instructions for removing Lasso Professional 7 from your system.

System Requirements

Lasso Professional 7 will run on systems which meet the minimum requirements listed below. Although Lasso Professional 7 may run on machines which do not meet these requirements, these installations will not be supported.

- 300 MHz or higher Pentium-compatible CPU.
- 256 MB of RAM. More recommended.

- Installation of Redhat Linux 9 with network support.
- Default Redhat Linux installation of Apache Web Server 2 (included with standard installations of Redhat Linux 9).
- PDF viewer application for viewing the electronic documentation.

Certification Note: Lasso Professional 7 is certified to work with Redhat Linux version 9 with default Redhat Linux installations of Apache Web server 2. Modified versions of any required components may work with Lasso Professional 7, but can not be officially supported.

Required Packages

Several packages are required in Redhat Linux 9 for all features in Lasso Professional 7 to function. Many of these packages should be installed with server installations of Redhat Linux 9 by default.

To view a list of packages that are required by the Lasso Professional 7 installer, execute the following command in the terminal. The following command assumes you are currently in the same folder as the Lasso Professional 7 installer.

```
rpm -qpR Lasso_Pro-7.0.0-1.i386.rpm
```

If a package requirement is not met, then the `Lasso_Pro-7.0.0-1.i386.rpm` file will indicate the packages that are missing upon installation. These packages may be installed from the Redhat Linux 9 installation CDs, or may be downloaded from URLs indicated in the release notes.

Web Browser Requirements

This section describes the basic Web browser requirements needed to successfully set up and administer Lasso Professional 7 in Redhat Linux.

- Netscape 6.0 or higher; Mozilla 0.9.9 or higher; or Konquerer 3.0 or higher.
- Javascript enabled.
- Cookies enabled.
- Cascading Style Sheets support.
- Monitor capable of 800 x 600 resolution.

If this criteria is not met, then a browser check dialog box will be shown when trying to access Lasso Administration. You may proceed into the interface without meeting all these criteria, however some elements may not work properly. It is highly recommended that a browser that meets the listed requirements be used.

Installation Instructions

This section discusses installation procedures for Lasso Professional 7, and initializing Lasso Administration for the first run. This section will introduce the following:

- *Upgrading* describes how to upgrade older version of Lasso Professional to Lasso Professional 7.
- *Installing Java* describes installing the Java components necessary for Lasso Professional 7 Java-based features to function properly.
- *Installing Lasso Professional 7* describes how to install Lasso Professional 7 using the auto-installation program.
- *Initialization* describes the initialization of Lasso Professional 7 for running the first time.

Upgrading

Use the following procedure to upgrade an existing installation of Lasso Professional 6 to Lasso Professional 7. If this procedure is followed, all Lasso MySQL databases and settings will be retained.

The following assumptions are being made by these upgrade instructions. If any of these assumptions are not true, then you will need to adjust the upgrade instructions for your server.

- Lasso Professional 6 will no longer be used on the Redhat Linux machine if an upgrade license to Lasso Professional 7 was purchased.
- The installation is being performed in the standard location for Apache documents as provided in a default installation of Redhat Linux. Otherwise, the instructions should be modified for how the machine is actually configured.

Important: Before upgrading, please consult *Chapter 31: Upgrading* in the Lasso 7 Language Guide for information on how any custom solutions written using a previous version of Lasso may be affected.

To upgrade from Lasso Professional 6 to Lasso Professional 7:

Install Lasso Professional 7 using the Lasso Professional 7 installer application. This can be done by executing the following command in the terminal.

```
rpm -U Lasso_Pro-7.0.0-1.i386.rpm
```

During installation, the Lasso Professional 7 installer will import any Lasso Administration settings and Lasso MySQL databases from the `/usr/local/LassoProfessional6` folder on the system.

Installing Java

This section discusses installing Sun's Java Runtime Environment (JRE) 1.4.1 for Redhat Linux. JRE 1.4.1 is required to successfully use the Java-based features available in Lasso Professional 7. These include LJAPI modules, JDBC data source connectivity, and LDML tags which are dependent upon Java. For details on which LDML tags are dependent upon Java, see the LDML 7 Reference. It is unnecessary to install Java if these features will not be used.

To install JRE 1.4:

1 Download Sun's JRE installer for Linux at the following URL:

<http://java.sun.com/j2se/1.4.1/download.html>

2 Follow the instructions at the following URL to install JRE 1.4.1:

<http://java.sun.com/j2se/1.4.1/jre/install.html>

The Java components needed to run the Java-based features in Lasso Professional 7 are now installed. The Java-based features of Lasso Professional 7 can be set up, enabled, and tested within Lasso Administration. See *Chapter 7: Setting Global Preferences > Java* for more information.

Alternate JRE Versions

If a different version of the Java Runtime Environment is installed other than 1.4.1, it is possible to port this version to Lasso by creating a `j2re1.4.1` symlink to the current version.

To port a different JRE version to Lasso Professional 7:

Execute the command below in the console. Replace `<version>` with the JRE version folder currently installed.

```
ln -s /usr/java/j2re<version> /usr/java/j2re1.4.1
```

Certification Note: While versions of Java other than JRE 1.4.1 may work with Lasso Professional 7, not all can be officially supported.

Installing Lasso Professional 7

The Lasso Professional 7 Installer for Redhat Linux is an RPM file, which must be installed from the Redhat Linux command line or console application. The installer will install all required files for Lasso Professional 7, and will automatically start Lasso Service, Lasso MySQL, and Apache upon completion.

To install Lasso Professional 7:

- 1 Copy `Lasso_Pro-7.0.0-1.i386.rpm` to the Redhat Linux hard drive. This file is unpacked from the `Lasso_Pro_7_Linux.tar.gz` archive along with the release notes.
- 2 Log in as the root user of the Redhat Linux machine. This is done by entering `su` in the command prompt, then entering the root password.
- 3 Enter the following command to install Lasso Professional 7. This will display a series of messages during the installation process.


```
rpm -i Lasso_Pro-7.0.0-1.i386.rpm
```

After Lasso Professional 7 is installed and Lasso Service is successfully started, a message will appear with a URL address for initializing Lasso Professional 7 in a Web browser. This is described in the next section.

Initialization

The Initialize Web page is where the administrator enters the Lasso Professional 7 serial number, and sets the global administrator username and password for the first time.

To launch the Initialize page:

- 1 Launch a Web browser application. See the *System Requirements* section earlier in this chapter for Web browser requirements in Redhat Linux.

Web Browser Note: Because Lasso Administration is Web-based, initialization and administration of Lasso Professional 7 can be performed from a separate machine and operating system from the installation.

- 2 If on the same machine as the Lasso Professional 7 installation, go to the following URL.

```
http://127.0.0.1/Lasso/
```

If on a different machine from the Lasso Professional 7 installation, go to the following URL. Replace `www.example.com` with the domain name or IP address of the server running Lasso Professional 7.

```
http://www.example.com/Lasso/
```

Troubleshooting: In the event the Lasso Initialization page does not load, make sure that Lasso Service and Lasso MySQL have started properly as described in the *Running Lasso Professional 7* section of this chapter. Otherwise, make sure that Apache is running, and that the installer was able to successfully edit the Apache configuration file (`httpd.conf`) as described in the *Extended Configuration > Lasso Connector for Apache* section of this chapter.

Initializing Lasso Professional 7

The Welcome to Lasso Professional 7 panel displays a message listing the steps required to initialize Lasso. This involves entering a serial number, and setting the administrator username and password.

Figure 1: Initialize Page

The screenshot shows the 'Initialize' page for Lasso Professional 7. The page has a header with the Lasso Professional 7 logo on the left and the blueworld logo on the right. The main content area is divided into two columns. The left column is titled 'Welcome to Lasso Professional 7' and contains the following text: 'Before operating Lasso Professional 7, it needs to be initialized for use by completing the following steps: 1. Enter your serial number. 2. Create an administrator username and password. After these steps are completed you can access the administration interface to complete the setup and configuration and begin using Lasso Professional 7. Where to Find Your Serial Number: A serial number is required to run Lasso Professional 7. Your serial number can be found printed in boxed versions of Lasso Professional 7 and in the order confirmation email for electronic versions of Lasso Professional 7. If you do not have a serial number, select the button below to request a free 30-day evaluation serial number.' Below this text is a button labeled 'Request Evaluation Serial Number'. The right column is titled 'Enter Your Serial Number' and contains a text input field for the serial number. Below the input field is the text: 'Please enter the entire serial number including the prefix. For example: "LP7-MAC-123456789".' Below this is a section titled 'Create an Administrator Username and Password' which contains three input fields: 'Administrator Username', 'Administrator Password', and 'Confirm Password'. Below these fields is the text: 'This username and password will be required to administer Lasso Professional 7. Be sure to keep a copy of the values you enter.' and a 'Submit Information' button. At the bottom of the page, there is a footer that reads 'Lasso Professional 7 • Initialize' and '© 1996-2003 Blue World Communications, Inc.'

For evaluation versions of Lasso Professional 7, an evaluation serial number is required to complete initialization. To request an evaluation serial number, select the Request Evaluation Serial Number button. This will take you to the Blue World Web site, where an evaluation serial number can be obtained.

Once a serial number is obtained, Lasso Professional 7 can be initialized by following the procedure below.

To initialize Lasso Professional 7:

1 Enter the Lasso Professional 7 serial number in the Serial Number field. This must be entered exactly as it appears in your Blue World invoice using the following format:

```
LP7-LIN-123456789
```

Serial numbers are case-sensitive. Make sure that all capitalization is correct and that all letters and numbers are entered, including the LP6 prefix.

2 Enter an administrator username in the Administrator Username field. This username will be used by the Lasso Professional 7 global administrator to log in to the administration interface, as discussed in *Chapter 5: Using Lasso Administration* in the Lasso Professional 7 Setup Guide.

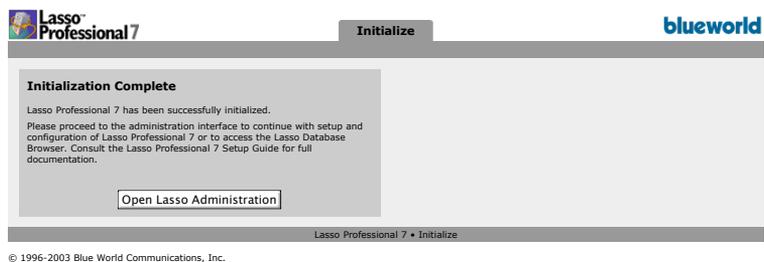
Note: The administrator username and password in Lasso Administration are independent of Redhat Linux administrator usernames and passwords, and do not have to match.

- 3 Enter an administrator password in the Administrator Password field. This password will be used by the Lasso Professional 7 global administrator with the administrator username to log in to the administration interface.
- 4 Re-enter an administrator password in the Confirm Password field.
- 5 Select Submit Information.

Note: Only a person with the administrator username and password will be able to log in to Lasso Administration, and has full privileges to make changes therein. Make sure this information is kept secure.

Not entering one or any of the required fields before selecting the Submit button will return an error. After the initialization information has been successfully submitted, an Initialization Complete panel is displayed stating that Lasso Professional 7 has been successfully initialized.

Figure 2: Initialization Complete Panel



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Selecting the Open Lasso Administration button will open Lasso Administration, where all options in Lasso Professional 7 can be set up and configured.

At this point, Lasso Professional 7 has been initialized and is ready to use. Lasso Professional 7 provides a convenient, Web-based interface for configuring Lasso global settings, instantly managing and editing databases, configuring Lasso Security, monitoring events, and much more. It is within this interface that all Lasso settings and databases are set up and configured.

Figure 3: Lasso Professional 7 Administration



For a full description of Lasso Administration and how to use it, see *Chapter 5: Using Lasso Administration* in the Lasso Professional 7 Setup Guide.

The following describes where to go for more information on setting up and testing external data sources, and starting development.

- Setting up existing FileMaker Pro, MySQL, and JDBC data sources for use with Lasso Professional 7 is described in *Chapter 7: Setting Up Data Sources* in the Lasso Professional 7 Setup Guide.
- For an overview of setting up Lasso Security for databases, LDML tags, files, and solutions, see *Chapter 8: Setting Up Security* in the Lasso Professional 7 Setup Guide.
- For a walk-through on how to set up a custom Lasso solution for FileMaker Pro or MySQL data sources, see *Chapter 11: Setting Up Lasso Solutions* in the Lasso Professional 7 Setup Guide.
- To learn how to write custom Lasso solutions using LDML code, see the Lasso 7 Language Guide.

Security Note: Lasso Professional 7 uses port 14550 for Lasso Service. Lasso Service cannot be accessed by anonymous users, however, to protect Lasso Service it is recommended that system administrators block these ports from incoming requests from IP addresses other than the IP address of the Web server using Lasso Professional 7.

Running Lasso Professional 7

Lasso Service is the core executable of Lasso Professional 7. It is implemented as a service application which can be started and stopped independently from the Apache Web server. Lasso Service is started and stopped

using the terminal command files provided in the `/usr/local/Lasso Professional 7/Tools` folder.

To start Lasso Service:

1 Log in as the root user of the Redhat Linux machine. This is done by entering `su` in the command prompt, then entering the root password.

2 At the command prompt, enter the following to go to the Tools folder.
`cd "/usr/local/Lasso Professional 7/Tools"`

3 Enter the following command to start Lasso Service.
`./startLassoService.sh`

4 A Lasso Service has been successfully started message will appear in the console window when Lasso Service has started.

Lasso Service can also be run in verbose mode from within the console. This allows Lasso Professional 7 status messages to be viewed, including all actions that are currently being performed and all actions that have been performed since start up. This is useful for monitoring and troubleshooting purposes. Lasso Service should be started this way whenever any problem is encountered in Lasso Professional 7.

To start Lasso Service in console mode:

1 Log in as the root user of the Redhat Linux machine. This is done by entering `su` in the command prompt, then entering the root password.

2 At the command prompt, enter the following to go to the Tools folder.
`cd "/usr/local/Lasso Professional 7/Tools"`

3 Enter the following command to start Lasso Service in console mode.
`./consoleLassoService.sh`

4 Lasso Service messages will now appear in the console. Lasso Service now “owns” the console, and quitting the console will effectively quit Lasso Service.

To stop Lasso Service:

1 Log in as the root user of the Redhat Linux machine. This is done by entering `su` in the command prompt, then entering the root password.

2 At the command prompt, enter the following to go to the Tools folder.
`cd "/usr/local/Lasso Professional 7/Tools"`

3 Enter the following command to stop Lasso Service.
`./stopLassoService.sh`

4 A Lasso Service has been successfully stopped message will appear in the console window when Lasso Service has stopped.

To see if Lasso Service is running:

At the command prompt, enter the following command. This will display all LassoService processes currently running.

```
ps -ax | grep LassoService
```

Note: More than one LassoService process will be shown due to the fact that Lasso Service is multi-threaded. Once Lasso Service is stopped using the stopLassoService.sh file, all LassoService threads are killed.

Extended Configuration

This section discusses the changes the Lasso Professional 7 installer makes to the Apache configuration file, and how to configure Lasso Professional 7 for a distributed architecture with Apache. This section describes the following:

- *Lasso Connector for Apache* describes configuring the module that installs into Apache and provides connectivity to Lasso Service.
- *Remote Apache Configuration* describes manually configuring Lasso Service to run on a separate machine from Apache Web server (distributed architecture).
- *Setting Up Redundant Lasso Professional 7 Servers* provides tips for setting up multiple Lasso Professional 7 servers in a RAIC.

Important: It is not required that the instructions in this section be followed as part of a default installation or configuration process. The installer will configure a basic installation of Lasso Professional 7 properly without any additional modification. This section is intended as an extended configuration reference for experienced administrators.

Lasso Connector for Apache

Lasso Connector for Apache is the default Web server connector included with Lasso Professional 7 for Redhat Linux. This section describes what settings Lasso Professional 7 adds to the Apache configuration file (httpd.conf), and how to view or manually change these settings changes.

The Lasso Professional 7 installer will automatically perform all necessary changes to the /etc/httpd/conf/httpd.conf file via an included lasso.conf file. After the altering the httpd.conf file to include the lasso.conf file, the installer makes a backup of the original file named httpd.conf.lassobackup. The following

procedure describes viewing the changes the Lasso Professional 7 installer makes to the Apache configuration file.

To view changes made to the Apache configuration file:

- 1 Log in as the root user of the Redhat Linux machine. This is done by entering `su` in the command prompt, then entering the root password.
- 2 At the command prompt, enter the following to open the `lasso.conf` file in the VI text editor.

```
sudo vi /etc/httpd/conf/lasso.conf
```

- 3 This file should contain the following lines:

```
LoadModule lasso_module modules/LassoConnectorforApache2.so
AddHandler lasso-handler lasso
AddHandler lasso-handler lassoapp
```

The `AddHandler` lines tell Apache to process files with the extensions `.lasso` and `.lassoapp` with Lasso Service.

File Extensions Note: Apache can be set up to process alternate file extensions with Lasso Service by adding additional lines using the following format: `AddHandler lasso-handler extension`. Replace `extension` with the file extension you wish to be processed by Lasso Service (e.g. `htm`, `html`, etc.).

- 4 Save the `lasso.conf` file.
- 5 Restart Apache Web Server for any changes to take place. This is done by entering the following at the command prompt:

```
sudo apachectl restart
```

Remote Apache Configuration

This section describes setting up Lasso Professional 7 in a distributed architecture where Lasso Service runs on a separate Redhat Linux machine from the Redhat Linux Apache Web server. To do this, follow the procedure below.

To set up Lasso Connector for Apache on a remote server:

- 1 On the machine running Lasso Service, stop Lasso Service using the `stopLassoService.sh` file.
- 2 On the machine running Lasso Service, stop Apache if it is running. Since the Lasso Connector for Apache is being moved to a remote machine, all Lasso format files and LassoApps (including Lasso Administration) should no longer be served from this machine.

- 3 On the machine running Lasso Service, move the Lasso folder from the Web server root folder (e.g. `/usr/www/html`) to the Web server root folder on the remote server.
- 4 On the machine running Lasso Service, locate the `/etc/httpd/conf/lasso.conf` file and move it into the `/etc/httpd/conf` folder on the remote server.
- 5 On the machine running Lasso Service, locate the `/etc/httpd/modules/LassoConnectorforApache2.so` file and move it into the `/etc/httpd/modules` folder on the remote server.
- 6 On the machine running Lasso Service, locate the `/etc/lasso/lassoapache.conf` file and move it into the `/etc/lasso` folder on the remote server.
- 7 On the remote Web server, log in as the `root` user of the Redhat Linux machine. This is done by entering `su` in the command prompt, then entering the root password.
- 8 At the command prompt, enter the following to open the `httpd.conf` file in the VI text editor:

```
sudo vi /etc/httpd/conf/httpd.conf
```
- 9 Add the following line to the end of the Apache configuration file (`httpd.conf`):

```
Include /etc/httpd/conf/lasso.conf
```
- 10 Save and close the `httpd.conf` file.
- 11 At the command prompt, enter the following to open the `lassoapache.conf` file in the VI text editor:

```
sudo vi /etc/lasso/lassoapache.conf
```
- 12 Next to `Server`, replace `127.0.0.1` with the correct host name or IP address of the machine running Lasso Service.
- 13 Save and close the `lassoapache.conf` file.
- 14 On the remote server, restart Apache Web Server. This is done by entering the following command in the terminal:

```
sudo apachectl restart
```
- 15 On the machine running Lasso Service, start Lasso Service. This can be done using the `startLassoService.sh` file described in the *Running Lasso Professional 7* section of this chapter.

Note: In Lasso Professional 7, only one Web server may connect to the machine running Lasso Service at a time.

Setting Up Redundant Lasso Professional 7 Servers

For load balancing purposes, multiple Web servers running Lasso Professional 7 may be set up in a RAIC (Redundant Array of Independent Components) in the same manner as other Web servers. There are a variety of ways to do this depending on the networking hardware and software available, and instructions for setting up a RAIC are beyond the scope of this guide.

However, there is one setting in Lasso Professional 7 that must be adjusted in order for Lasso sessions to persist across a RAIC, and that is to point each instance of Lasso Professional 7 to a single MySQL sessions server. For instructions on how to do this, please see *Chapter 6: Setting Global Preferences* in the Lasso Professional 7 Setup Guide.

Installation Contents

This section contains a list of all files and folders that are installed during Lasso Professional 7 installation.

Lasso User Note: The Lasso Professional 7 installer creates a `lasso` (lower-case) user and group account in Redhat Linux that is used to read, write, and execute files related to Lasso Professional 7. This user is installed automatically, and no configuration for this user is required. Do not attempt to configure or change the settings for this user as it will affect the functionality of Lasso Professional 7.

Application Files

Lasso Professional 7 installs the following files and folders in the `/usr/local/Lasso Professional 7` folder on the Redhat Linux hard drive.

- **Admin folder** – Contains files and folders used for administering Lasso Professional 7.

Backup folder – Is the destination folder for all Lasso MySQL table backups using the *Utility > Lasso MySQL > Maintenance* section of Lasso Administration. For more information, see *Chapter 10: Administration Utilities*.

BuildLassoApps folder – Is a folder used to build LassoApps. For more information, see *Chapter 10: Administration Utilities*.

LassoService.sh – This is the “watchdog” script for Lasso Professional 7. This file continuously queries Lasso Service to make sure that it is running when it is supposed to be, and automatically restarts Lasso Service if it inadvertently quits. When it does this, a log entry is added

to the standard system log file (traditionally `/var/log/system.log`) in Redhat Linux. If the number of restarts exceeds 20 per hour, the script stops attempting to start Lasso Service until the problem is fixed manually and the machine is rebooted.

- **Documentation folder** – Contains all Lasso Professional 7 documentation in PDF format. The following files and folders are contained in this folder. It is highly recommended that the documentation be read in this order.

1-ReadMeFirst folder – Contains `Release Notes.txt` and `License Agreement.txt`. Read this documentation in this folder first before proceeding to configure Lasso Professional 7.

2-SetupGuide folder – Contains `Lasso Pro 7 Setup Guide.pdf`.

3-LanguageGuide folder – Contains `Lasso 7 Language Guide.pdf`, `examples`.

4-ExtendingLasso folder – Contains `Extending Lasso 7 Guide.pdf` and the `LassoApps`, `LCAPI`, and `LJAPI` folders.

- **JDBCDrivers folder** – Drivers for JDBC data sources are placed here (empty by default). For instructions on how to use this folder while configuring JDBC data sources, see *Chapter 7: Setting Up Data Sources*.

- **LassoModules folder** – Contains all default Lasso modules included with Lasso Professional 7 as listed below. All data source connectors (including third-party connectors) and tag modules should go here.

`FMPCConnector.so` – Data source connector module for FileMaker Pro data sources.

`MySQLConnector.so` – Data source connector module for external MySQL data sources.

`JDBCConnector.jar` – Data source connector module for JDBC data sources.

`LJAPI.jar` – Implements core support for all LJAPI modules.

`LJAPI.so` – Implements support for LJAPI modules.

`NSLookup.class` – Java class file for [NSLookup] tag.

`PDF.jar` – Required library for the [PDF_...] tags.

`PDFTag.class` – Java class file for the [PDF_...] tags.

Note: There is no separate module for the Lasso Connector for Lasso MySQL. This is built into the core Lasso Service code.

- **LassoMySQL folder** – Contains a standard installation of Lasso MySQL. Lasso MySQL is the internal MySQL database provided with Lasso Professional 7. Lasso MySQL is required to store Lasso Professional 7

settings and preferences, and can also be used to store data in place of, or in concert with, external databases.

- **LassoService** – Lasso Service is the core executable of Lasso Professional 7. It is implemented as a service application which can be started and stopped independently from the Web server. Lasso Service is the Lasso Web Data Engine.
- **LassoStartup folder** – Contains the `Startup.LassoApp` file, which is used by Lasso Service during startup. All Lasso format files and LassoApps which need to be launched during startup should be placed here. For information on how to use the LassoStartup folder, see *Chapter 3: Format Files* of the Lasso 7 Language Guide. For additional discussion of the LassoStartup folder, see the *Extending Lasso 7 Guide*.
- **Tools folder** – Contains Redhat Linux terminal command files for performing various tasks with Lasso Professional 7. These command files allow users to perform tasks using the terminal by simply double-clicking on the command files.

`consoleLassoService.sh` – Starts Lasso Service as an application in the terminal. Useful for viewing the startup log and troubleshooting. For instructions on how to use this file, see the *Running Lasso Professional 7* section of this chapter.

`startLassoService.sh` – Starts Lasso Service via the terminal. For instructions on how to use this file, see the *Running Lasso Professional 7* section of this chapter.

`stopLassoService.sh` – Stops Lasso Service via the terminal. For instructions on how to use this file, see the *Running Lasso Professional 7* section of this chapter.

Startup Files

The `/usr/sbin/` folder contains files that are used to auto-start Lasso Service at boot time.

- **lassoctl** – Auto-starts Lasso Service at boot time. A symbolic link to this file is also placed in `/etc/rc.d/init.d/`.
- **lassomysqlctl** – Auto-starts Lasso MySQL at boot time. A symbolic link to this file is also placed in `/etc/rc.d/init.d/`.

Web Server Files

Lasso Professional 7 installs the following files in the Web server root folder of the Redhat Linux hard drive. For Apache Web Server, this is the `/var/www/html/` folder.

Lasso folder

The Lasso folder contains the following:

- **default.html, default.htm, index.html, index.htm** – Contains the splash screen for Lasso Professional 7.
- **Admin.LassoApp** – The Lasso Administration LassoApp. For more information, see *Chapter 5: Using Lasso Administration* in the Lasso Professional 7 Setup Guide.
- **GroupAdmin.LassoApp** – The Group Administration LassoApp. For more information, see *Chapter 8: Setting Up Security* in the Lasso Professional 7 Setup Guide.
- **DatabaseBrowser.LassoApp** – The Database Browser LassoApp. For more information, see *Chapter 10: Building and Browsing Databases* in the Lasso Professional 7 Setup Guide.
- **LDMLReference.LassoApp** – The LDML 7 Reference LassoApp. For more information, see *Chapter 5: LDML Reference* in the Lasso 7 Language Guide.
- **RPC.LassoApp** – The XML-RPC LassoApp. For more information, see *Chapter 29: XML* in the Lasso 7 Language Guide.
- **images folder** – Contains images files for the HTML pages in the Lasso folder.
- **initialize.lasso** – The initialization page for Lasso Professional 7.
- **install.html** – The installation splash screen for Lasso Professional 7.
- **logout.lasso** – The default Lasso logout page.

Linux Files

Lasso Professional 7 installs the following files in various locations in Redhat Linux.

- **httpd.conf** – Lasso Professional 7 modifies the Apache configuration file (`httpd.conf`) located in the `/etc/httpd/conf` folder.
- **lassoapache.conf** – The Web server configuration file for Lasso Connector for Apache, located in the `/etc/lasso` folder.
- **LassoConnectorforApache2.so** – This file is the Lasso Web server connector for Apache, located in `/etc/httpd/modules` folder.
- **LassoMySQL.sock** – This file is placed in the `/tmp` folder while Lasso MySQL is running.
- **LassoService.pid** – This file is placed in the `/tmp` folder while Lasso Service is running.

Uninstalling Lasso Professional 7

Lasso Professional 7 can be uninstalled using the procedure below. This will automatically remove all core program and system files, and is the only recommended way to uninstall Lasso Professional 7.

Warning: The RPM will remove all files installed by the RPM, including the `lasso_internal` database which stores all Lasso Administration settings. For preservation of settings, it is recommended that a Lasso Administration export be performed before uninstalling. See *Chapter 6: Setting Global Preferences* in the Lasso Professional 7 Setup Guide for more information.

To uninstall Lasso Professional 7:

- 1 Stop Lasso Service using the `stopLassoService.sh` file, as described in the *Running Lasso Professional 7* section of this chapter.
- 2 Stop Lasso MySQL using the `stopLassoMySQL.sh` file, as described in the *Running Lasso Professional 7* section of this chapter.
- 3 Log in as the `root` user of the Redhat Linux machine. This is done by entering `su` in the command prompt, then entering the root password.
- 4 Enter the following command to uninstall Lasso Professional 7.

```
rpm -e Lasso_Pro-7.0.0-1
```

Files and Folders Not Removed

The RPM will not remove any non-default files created after the time of install. These files include new Lasso MySQL databases, Lasso log files, Lasso setups, and custom format files and LassoApps. These files remain in the following locations:

- **Applications folder** – The `/usr/local/Lasso Professional 7` folder is left on the Redhat Linux hard drive, which contains the following folders:
 - Admin – Contains exported Lasso setup information, MySQL backup tables, exported text data, and LassoApp build files from Lasso Administration.
 - JDBCDrivers – Contains any JDBC drivers installed to Lasso Professional 7 by the administrator.
 - LassoModules – Contains data sources connectors, Java libraries, and any customized Lasso modules.
 - LassoMySQL – Contains any new Lasso MySQL databases created since the original installation.
- **Web Server Root folder** – The `/var/www/html/` folder retains all format files created or modified since the time of installation. Customized

format files, Web pages, and scripts will not be deleted during uninstal-
lation.

- **Linux folders** – The `/etc/lasso` folder remains on the Redhat Linux hard drive.

These files and folders may be backed up for preservation, or may be deleted to completely remove Lasso Professional 7 and all settings from the system.

Reinstallation Note: Any non-default files remaining on the system from a previous installation of Lasso Professional 7 will not be overwritten by installing a newer installation. Therefore, any exported Lasso Administration settings and Lasso MySQL databases from a previous installation may be imported and used in a newer installation of Lasso Professional 7 without having to move files.

3

Chapter 3

Linux Tips

This chapter provides tips specific to running Lasso Professional 7 on Redhat Linux versus other operating systems. Issues are described in the categories listed below.

- *Documentation* describes guidelines to follow when using the Lasso Professional 7 documentation with Redhat Linux.
- *Lasso Administration* describes issues specific to Lasso Administration in Lasso Professional 7 for Redhat Linux.
- *Lasso MySQL* describes issues specific to Lasso MySQL in Lasso Professional 7 for Redhat Linux.
- *LDML Coding* describes issues specific to writing LDML code in Lasso Professional 7 for Redhat Linux.
- *Extending Lasso* describes issues specific to using LCAPI and LJAPI with Lasso Professional 7 for Redhat Linux.

Documentation

This section describes issues in the current Lasso Professional 7 documentation when used with the Redhat Linux version. The sub-sections below describe guidelines that should be followed when consulting the Lasso Professional 7 documentation (other than this guide) for Lasso Professional 7 on Redhat Linux.

Letter Case

File and folder names in the Redhat Linux version of Lasso Professional 7 may differ from those in the documentation in terms of letter case. The

Redhat Linux operating system is strictly case-sensitive, and certain file and folder names may not work when requested due to improper case. Use the following guidelines when using file and folder names in the documentation in Redhat Linux.

- The Lasso Professional 7 folder begins with uppercase characters, and should be typed as Lasso Professional 7. All files and folders within the Lasso Professional 7 folder also begin with uppercase characters.
- The Lasso folder in the Web server root folder begins with an upper-case character.
- All MySQL database and table names should be typed with the same letter case as their files exist on disk.
- The `lasso` user created in Redhat Linux is lowercase, and should be typed as `lasso` when executing commands at the command prompt.

File Paths

File paths presented in the documentation for Mac OS X should be used for the Linux version as they both use forward slashes (`/`). All Mac OS X file paths within the Lasso Professional 7 folder will be identical to the Linux version.

The fully-qualified path to the Lasso Professional 7 folder in Redhat Linux is as follows, and should be used whenever a fully-qualified path from the hard drive root is referenced.

```
/usr/local/Lasso Professional 7/
```

The fully-qualified path to the Lasso folder in the Web server root folder in Redhat Linux is as follows, and should be used whenever a fully-qualified path from the hard drive root is referenced.

```
/var/www/html/
```

Installation Contents

All installation instructions as well as the correct names and paths to the files installed are described in *Chapter 2: Configuring on Linux* of this guide.

Lasso Administration

This section describes differences in Lasso Administration in Redhat Linux installations of Lasso Professional 7 from other operating systems (e.g. Mac OS X and Windows 2000/XP).

Java Page

Once JRE 1.4 is installed on the Redhat Linux machine, the *Setup > Global Settings > Java* page does not require class path and library path information to be entered. The operation of Java in Redhat Linux with Lasso Professional 7 is similar to Mac OS X in this regard.

LDML Coding

This section describes issues when writing LDML code in Lasso Professional 7 for Redhat Linux.

Case Sensitivity

The Redhat Linux operating system is strictly case-sensitive, and certain file and folder names may not work when requested in LDML code due to improper case. Use the following guidelines when typing names in Redhat Linux.

- All file and folder names referenced in LDML code (such as in an `[include]` tag) must be coded in the same case as they exist on disk.
- All database and table names must be coded in the same case as they exist on disk for Linux installations of MySQL and Lasso MySQL.

File Creation and Permissions

Refer to the following guidelines when using LDML file creation tags in Redhat Linux. File creation tags include the `[File]`, `[Log]`, `[HTTP]`, `[FTP]`, `[Image]`, and `[PDF]` LDML tag sets. For more information on these, see the Lasso 7 Language Guide.

- When creating new files using LDML tags, the `lasso` user in Redhat Linux must have sufficient Linux file permissions to manipulate the folder that is being written to. To grant the `lasso` user ownership of a folder in Redhat Linux, enter the following command in the command prompt.

```
chown lasso foldername
```
- When manipulating existing files using LDML tags, the `lasso` user in Redhat Linux must have sufficient Linux file permissions to manipulate the file that is being used. To grant the `lasso` user ownership of a file in Redhat Linux, enter the following command in the command prompt.

```
chown lasso filename
```

- When creating new files using LDML, files will be created on the Redhat Linux hard drive that have the Redhat Linux file permissions of the lasso group and user.

Line Ending Characters

Line ending characters in Redhat Linux are the same as those in Mac OS X (`\n`), and should be used whenever a line-ending character is needed. Line ending characters are often used to specify a carriage return in a text string.

Extending Lasso

This section describes issues specific to using LCAPI (Lasso C++ API), LJAPI (Lasso Java API), and LCP (Lasso Connector Protocol) with Lasso Professional 7 for Redhat Linux, as covered in the Extending Lasso Guide.

LCAPI

When developing in LCAPI with Lasso Professional 7 for Redhat Linux, refer to the following guidelines.

- Refer to the Mac OS X procedures in the *Getting Started* and *Debugging* sections of *Chapter 6: Lasso C/C++ API 6* in the Extending Lasso Guide (as opposed to the Windows procedures) when using Redhat Linux. These procedures involve using the GNU C++ compiler.
- Change any fully-qualified Mac OS X file paths to Redhat Linux paths as described in the *Documentation* section of this chapter.
- All `.command` files for starting and stopping Lasso Service are now `.sh` files.

LJAPI

When developing in LJAPI with Lasso Professional 7 for Redhat Linux, refer to the following guidelines.

- Refer to the Mac OS X procedures in the *Getting Started* and *Debugging* sections of *Chapter 8: Lasso Java API 6* in the Extending Lasso Guide (as opposed to the Windows procedures) when using Redhat Linux. These procedures involve using the `<javac>` compiler.
- Change any fully-qualified Mac OS X file paths to Redhat Linux paths as described in the *Documentation* section of this chapter.
- All `.command` files for starting and stopping Lasso Service are now `.sh` files.

LCP

When developing in LCP with Lasso Professional 7 for Redhat Linux, refer to the following guidelines.

- Refer to the Mac OS X procedures in the *Getting Started* and *Debugging* sections of *Chapter 7: Lasso Connector Protocol* in the Extending Lasso Guide (as opposed to the Windows procedures) when using Redhat Linux. These procedures involve using the GNU C++ compiler.
- Change any fully-qualified Mac OS X file paths to Redhat Linux paths as described in the *Documentation* section of this chapter.
- All `.command` files for starting and stopping Lasso Service are now `.sh` files.



Appendix A

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