

Lasso Professional 7 Setup Guide

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Second Edition: January 14, 2004

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Chapter 1

Introduction

This chapter provides an overview of the Lasso 7 product line, Lasso Professional 7 documentation, and learning resources available at Blue World.

- *The Lasso 7 Product Line* introduces the full range of Lasso 7 products and how they relate to Lasso Professional 7.
- *Lasso Professional 7 Documentation* describes all documentation included with Lasso Professional 7.
- *Lasso Professional 7 Setup Guide* describes the Lasso Professional 7 Setup Guide, which is the book you are reading now.
- *Documentation Conventions* includes information about typographic conventions used within the documentation.
- *Learning Resources* provides pointers to resources where you can learn more about using and programming Lasso Professional 7.
- *Usage Rights* includes important information about usage rights for Lasso Professional 7.

The Lasso 7 Product Line

The Lasso product line consists of authoring and serving tools that allow Web designers and Web developers to quickly build and serve powerful data-driven Web sites with maximum productivity and ease. The product line includes Lasso Professional for building, serving, and administering data-driven Web sites, and Lasso Studio™ for building and testing data-driven Web sites within a graphical editor.

Lasso's innovative architecture provides an industry first multi-platform, database-independent and open standards approach to delivering data-base-driven Web sites firmly positioning Lasso technology within the rapidly evolving server-side Web tools market. Lasso technology is used at hundreds of thousands of Web sites worldwide.

Lasso Professional 7

Lasso Professional 7 is used for building, serving, and administering data-driven Web sites. It consists of a core Lasso Service application and several Lasso Connectors which establish links to Web servers and data sources. Lasso Professional 7 is initially available for Mac OS X, Windows 2000, Windows XP Professional, and Windows Server 2003. 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** – Allows Lasso solutions to run via the built-in Apache Web server on Mac OS X.
- **Lasso Connector for IIS** – Allows Lasso solutions to run via Microsoft's Internet Information Services on Windows 2000/XP and Windows Server 2003.
- **Lasso Connector for WebSTAR V** – Allows Lasso solutions to run via 4D's WebSTAR Server Suite V on Mac OS X.
- **Lasso Connector for MySQL** – Allows Lasso to access MySQL data sources other than the embedded Lasso MySQL data source.
- **Lasso Connector for FileMaker Pro** – Allows Lasso to access FileMaker Pro 4.x, 5.x, or 6.x data sources.
- **Lasso Connector for JDBC** – Allows Lasso to access JDBC-compliant data sources.

Lasso Studio 7

Lasso Studio 7 is an optional Web development tool for Lasso Professional 7 servers for building data-driven Web sites. It consists of a single-user version of Lasso Professional 7 that serves to one IP address for development and testing, plus a set of extensions for either Macromedia Dreamweaver or Adobe GoLive that include drag-and-drop LDML objects and various builders and editors. Lasso Studio 7 has the following features.

- **Lasso Connectors for Dreamweaver and GoLive** – Allows Lasso Studio 7 to communicate with Lasso Professional 7.

- **Builders** – Construct data-driven sites, HTML forms, URLs, and inlines within a simple, dialog-driven interface.
- **Objects** – Display Lasso code as icons within the design view of the authoring program.
- **Property Inspectors** – Allow tags to be modified without typing code.
- **Syntax Checking and Conversion** – Allows you to debug pages before uploading them to your Web server and to convert pages from older syntax to the most current syntax.

Lasso Professional 7 Documentation

The documentation for Lasso Professional 7 is divided into several different references available in print and electronic formats. All documentation, with the exception of the LDML 7 Reference, is included in PDF format inside the Lasso Professional 7/Documentation folder installed on your hard drive. The following manuals and resources are included.

- **Lasso Professional 7 Setup Guide** – This is the book you are reading now, and is the first guide to the Lasso 7 product line you should read. It includes documentation of the architecture of Lasso Professional 7, installation and configuration instructions, documentation for the administration interface, and provides an introduction to building and serving Lasso solutions.
- **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. This is the core resource for learning how to build Lasso solutions.
- **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.
- **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.

Additional bound and printed copies of each manual may be purchased at <http://store.blueworld.com>.

Comments, suggestions, or corrections to the documentation are appreciated and may be sent to documentation@blueworld.com.

Lasso Professional 7 Setup Guide

This book contains the following chapters which detail how to set up, install, configure, and administer Lasso Professional 7.

- **Chapter 1: Introduction** introduces the Lasso Professional 7 Setup Guide and other documentation.
- **Chapter 2: About Lasso Professional 7** introduces the Lasso 7 product line and describes the components, features, and architecture of Lasso Professional 7.
- **Chapter 3: Configuring on Mac OS X** provides step-by-step instructions for installing and configuring Lasso Professional 7 on Mac OS X.
- **Chapter 4: Configuring on Windows** provides step-by-step instructions for installing and configuring Lasso Professional 7 on Windows operating systems.
- **Chapter 5: Using Lasso Administration** describes accessing and using the Web-based administration interface of Lasso Professional 7.
- **Chapter 6: Setting Global Preferences** provides instructions on how to set global server preferences for Lasso Professional 7.
- **Chapter 7: Setting Up Data Sources** provides instructions on how to configure MySQL, FileMaker Pro, and JDBC-compliant data sources, and contains documentation of the internal Lasso MySQL data source in Lasso Professional 7.
- **Chapter 8: Setting Up Security** contains complete documentation of the security features of Lasso Professional 7 including their theory of operation and step-by-step configuration instructions.
- **Chapter 9: Administration Utilities** describes how to use Lasso Administration utilities, including Lasso MySQL tools, email, event scheduling, and error reporting.
- **Chapter 10: Building and Browsing Databases** describes accessing and using the Lasso Database Browser, which is a LassoApp included with Lasso Professional 7. The Lasso Database Browser allows the administrator to interact with and test configured databases, as well as create new MySQL databases using a Web-based interface.
- **Chapter 11: Setting Up Lasso Solutions** provides an introduction to build custom Lasso solutions, and provides a basic tutorial for setting up and using an example Lasso-driven solution.
- **Appendix A: Glossary** contains a list of definitions for technical terms covered in this book.
- **Appendix B: License Agreement** contains the Lasso Professional 7 license agreement.

- *Appendix C: Copyright Notices* contains copyright notices for components used in Lasso Professional 7.

Documentation Conventions

This documentation uses several conventions in order to make finding information easier.

Definitions

Definitions are indicated using a bold, sans-serif type face for the defined word. This makes it easy to find defined terms within a page. Terms are defined the first time they are used.

Cross References

Cross references are indicated by an italicized, sans-serif typeface. For instance, the next section in this chapter is Customer Support. When necessary, arrows are used to define a path into a chapter such as *Chapter 1: Introduction > Learning Resources*.

Code

Code is formatted in a narrow, sans-serif font. Code includes HTML tags, LDML tags, and any text which should be typed into a format file. Code is represented within the body text (e.g., [Field] or <body>), or is specified in its own section of text as follows:

[Field: 'Company']

Code Results represent the results after code is processed. They are indicated by a black arrow, and will usually be the value that is sent to the client's Web browser. The following text could be the result of the code example above.

→ Blue World

LDML Tags always appear in code format exactly as they appear except when referring to a group of related tags. For example, -Encoding... refers to all of the encoding keywords (-EncodeNone, -EncodeHTML, etc.). Also, member tags are always referred to beginning with their data type followed by the member tag symbol. For example, the member tag for specifying a character in a text string is referred to as [String->Get].

File Paths

File Paths can be local or fully-qualified file path on either Windows, Mac OS X, or Linux, and are formatted using the same font as code. File paths are represented within the body text (e.g., Applications/Lasso Professional 7/Admin or C:\inetpub\wwwroot), or are specified in their own section of text as follows:

C:\Program Files\Blue World Communications\Lasso Professional 7

File paths in Mac OS X and Linux contain forward slashes (/), while file paths for Windows contain backward slashes (\). If a partial file path is identical on Mac OS X, Linux, and Windows, then the file path will be shown once with forward slashes (/). Users of the command line utility in Windows will need to enter backward slashes instead of forward slashes for these examples.

Procedures

The documentation assumes a task-oriented approach. The contents following a task heading will provide step-by-step instructions for the specific task.

To perform a specific task:

- 1 This is the first step of the task.
- 2 This is the second step of the task.

Notes

Note: Notes are included to call attention to items that are of particular importance or to include comments that may be of interest to select readers. Notes may begin with **Warning**, **Tip**, **Mac OS X Note**, **JDBC Note**, etc. to specify the importance and audience of the note.

Learning Resources

There are many resources available to help you when installing, administering, building or serving data-driven Web sites powered by Lasso Professional 7.

To find answers to questions about Lasso Professional 7:

- 1 **Documentation** – The Lasso documentation should always be your first resource. Check to see if the Lasso Professional 7 Setup Guide, Lasso 7

Language Guide, LDML 7 Reference, or Extending Lasso 7 Guide have the answer to your questions. Each PDF guide contains an index and table of contents, and all electronic documents are searchable.

2 Blue World Support Central – A Web resource that allows you to search for updates to the documentation, software updates, and tips about how to best utilize Lasso Professional 7.

<http://support.blueworld.com>

3 Lasso Talk Forum – A community of Lasso users who help to answer each other's questions about using Lasso products. If you can't find an answer to your question, then posting to the list will often result in an answer in a short period of time. Information about subscribing to the list and searchable list archives can be found at the following address.

<http://www.blueworld.com/blueworld/lists/lasso.html>

4 Lasso Resource Guide – An electronic guide containing information about Lasso articles, sites, training providers, downloadable Lasso solutions, and more. A printed Lasso Resource Guide is also available.

<http://www.lassoresourceguide.com>

5 Email and Phone Support – Provided by Blue World to qualified customers during normal business hours. Visit the following Web site for more information.

<http://www.blueworld.com/blueworld/support/>

Usage Rights

These are the usage rights for Lasso Professional 7. Please consult the Lasso Studio 7 User Guide User Guide for important information about the usage rights and license agreements specific to that products.

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.

2

Chapter 2

About Lasso Professional 7

Welcome to Lasso Professional 7, the premiere tool for serving and administering data-driven Web sites. This chapter introduces important concepts and information you should know before starting to use Lasso Professional 7.

- *Lasso Fundamentals* introduces the architecture and operation of Lasso Professional 7.
- *What's New in 7.0* presents the new features in Lasso Professional 7 compared to Lasso Professional 6.
- *Lasso 7 Features Overview* provides a chart of all the features of Lasso Professional 7 with the new features highlighted.

Lasso Fundamentals

Lasso Professional 7 is server-side software that adds a suite of dynamic functionality and administration to your Web server. This functionality empowers you to build and serve just about any dynamic Web application that can be built with maximum productivity and ease.

Lasso works by using a simple tag-based markup language (LDML), which can be embedded in Web pages and scripts residing on your Web server. The details of scripting and programming in LDML are covered in the Lasso 7 Language Guide also included with this product.

By default, Lasso Professional 7 is designed to run on the most prevalent modern Web server platforms with the most popular Web serving applications. In addition, Lasso's extensibility allows Web Server Connectors to be authored for any Web server for which default connectivity is not provided.

Macintosh

On Mac OS X, Lasso Professional 7 is implemented as a Darwin application which interfaces with the default Apache Web server provided with Mac OS X. Lasso Professional 7 for Mac OS X will also work with WebSTAR V from 4D Inc.

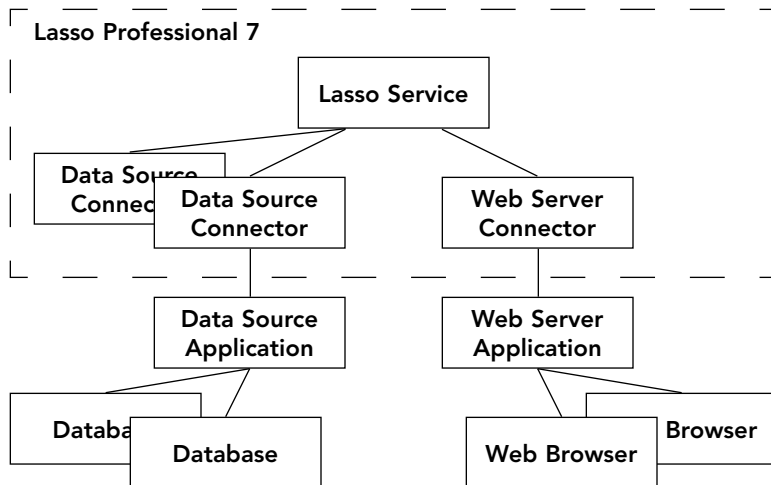
Windows

Lasso Professional 7 runs as a service on Windows 2000, Windows XP Professional, and Windows Server 2003, and interoperates with the included Internet Information Services (IIS) Web services.

Architecture

Lasso Professional 7's architecture is illustrated in *Figure 1: Lasso Professional 7 Architecture*. The core of Lasso Professional 7 is Lasso Service (e.g. the Web Data Engine). One or more Lasso data source connectors provide connectivity to data source applications which can be hosts to many databases. Likewise, a single Lasso Web server connector provides connectivity to a Web server application which serves data to many Web browsers.

Figure 1: Lasso Professional 7 Architecture



To serve a page from a data-driven Web site the following steps occur:

- 1 A request originates in a Web browser as a result of a client following a link or selecting a URL (e.g., <http://www.example.com/default.lasso>).

- 2 The request is sent to the Web server application which is configured to send all URLs that contain the `.lasso` extension to the Lasso Web server connector.
- 3 The request is sent through the Lasso Web server connector to Lasso Service along with the format file requested in the URL (e.g., `default.lasso`).
- 4 Lasso Service processes the format file, interpreting the embedded LDML tags.
- 5 If required, Lasso Service sends one or more queries through one of the Lasso data source connectors to a database hosted by a data source application.
- 6 The database query results are sent back to Lasso Service and merged with the presentation and logic elements contained in the requested format file.
- 7 The formatted results are sent back to the Web server application via Lasso Web server connector.
- 8 The Web server application sends the completed page back to the requesting Web browser.

Although this seems like a lot of steps for a simple URL request, Lasso can handle many thousands of requests per hour, each with a unique combination of concurrent database requests and programmatic functions.

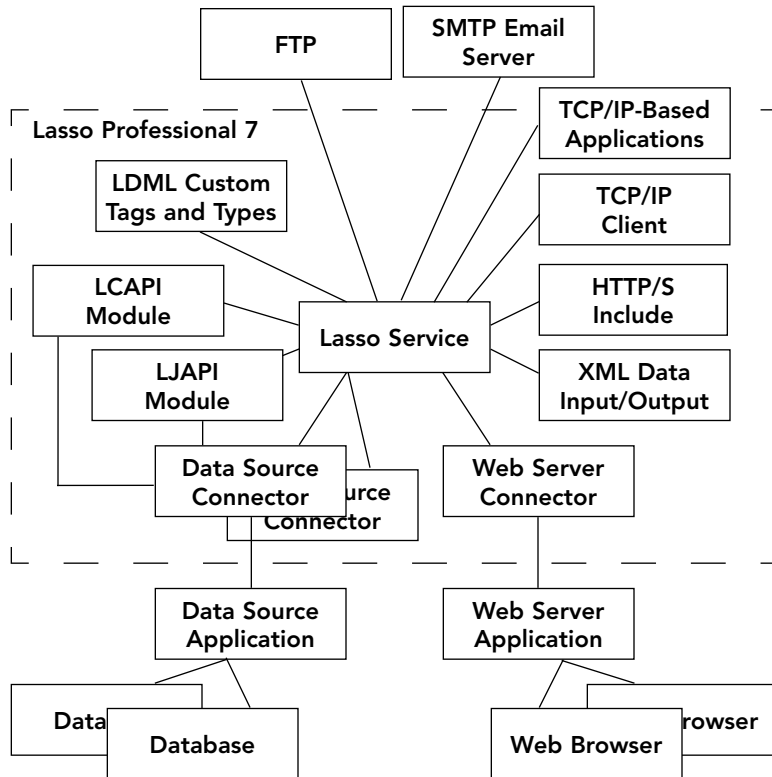
Extensibility

The full wealth of connectivity and extensibility features available in Lasso Professional 7 are shown in *Figure 2: Lasso Architecture and Extensibility*. Lasso Service is a hub that bridges the gaps between many different technologies in order to provide you with the flexibility to create whatever type of data-driven site you need.

Lasso Professional 7 can connect to other Web Servers and SMTP email servers through a built-in TCP/IP client. It can include content from other Web servers through HTTP include functionality. XML data can be both served by Lasso as well as received from other Web servers via HTTP includes and built-in XML Web services.

Lasso Professional 7 can be extended through LDML custom tags and types that can be defined within a format file or collected into a library for reuse. New tags can be created by third parties in Java and distributed as an LJAPI tag module. New tags or even new Lasso data source connectors can be created in C/C++ and distributed as LCAPI modules.

Figure 2: Lasso Architecture and Extensibility

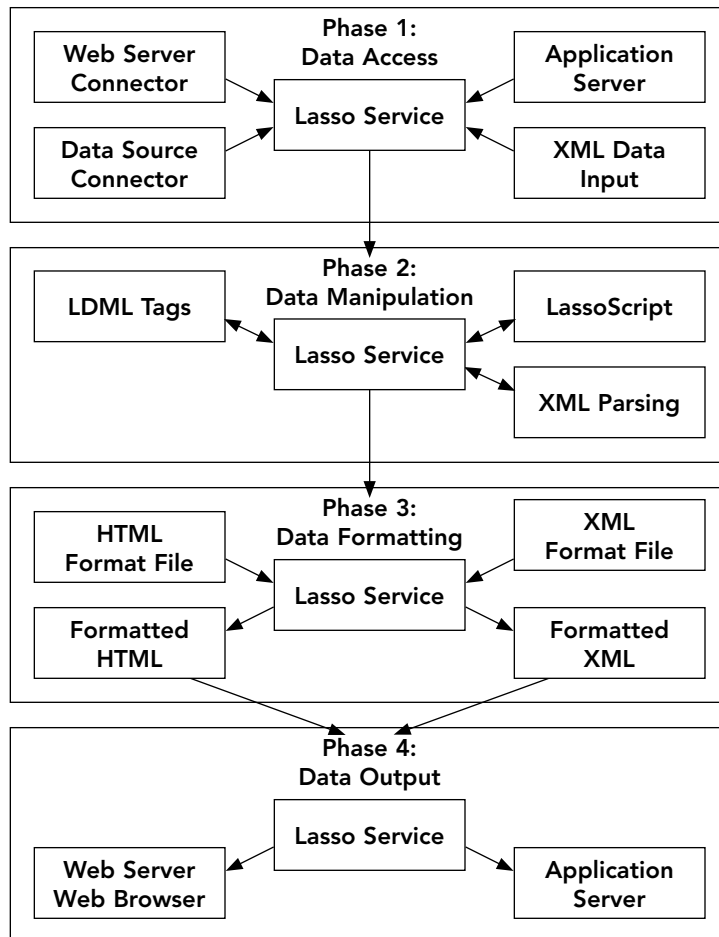


Each of the technologies in the figure are discussed in more detail in later chapters of this Lasso Professional 7 Setup Guide, in the Lasso 7 Language Guide, or in the Extending Lasso 7 Guide.

Four Phases of Operation

Lasso Professional 7 is a Web Data Engine that operates in four phases for each incoming URL or HTML form submission. These four phases are: Data Access, Data Manipulation, Data Formatting, and Data Output.

Figure 3: Lasso Professional 7 Four Phases of Operation



1 Data Access – The Data Access phase includes gathering data from a Lasso Web server connector (the URL request or HTML form input), Lasso data source connectors (results of database queries), and external application servers and XML data sources (through the HTTP include mechanism).

- 2 Data Manipulation** – The Data Manipulation phase is where LDML tags, LassoScripts, and XML parsing routines are used to modify the data from the previous phase.
- 3 Data Formatting** – In the Data Formatting phase, the results from the manipulated data are merged with the style and graphics in your format file template and formatted for output as HTML, XML or other formats depending upon the target client.
- 4 Data Output** – Finally, the Data Output phase is when the data is actually delivered back to the client which initiated the request. The data is sent as HTML or XML data. The Web server application typically handles follow-up requests calling on Lasso Service as needed.

What's New in 7.0

Lasso Professional 7 offers a compelling advantage in speed and power over Lasso Professional 6, and includes the following new features.

LDML Note: For a list of all new LDML tags in Lasso Professional 7, see the LDML Reference (either the included copy or hosted copy at <http://ldml.blueworld.com>) and perform a search on the LDML 7.0 tag set.

Embedded MySQL 4

Lasso MySQL is now embedded into the Lasso Service application for greatest performance, transaction support, easier installation, maintenance, and enhanced security. Developers may now take advantage of MySQL 4 features for custom Lasso MySQL solutions.

Dramatically Enhanced Performance

New byte-code compiler, embedded MySQL 4 internal data source, streamlined algorithms and architecture provide vastly improved performance over all previous versions of Lasso Professional on all platforms.

Apache 2 Support

Lasso Professional 7 provides full support for Apache 2 on Mac OS X, in addition to continued support for Apache 1.3 on Mac OS X.

Macintosh Support

Supports both Mac OS X 10.3 Panther and Mac OS X 10.2 Jaguar. Compiled using GCC 3.3 with optimized support for the PowerPC G5 processor in addition to providing support for existing G3/G4 processors.

Image Manipulation

Lasso Professional 7 now supports manipulation of image files via new [Image_...] LDML tags. Developers can now scale images, convert images from one format to another, adjust resolutions, and get information about images on the fly.

Enhanced and Simplified PDF Generation

Lasso Professional 7 allows Portable Document Format (e.g. PDF) files to be created and served via new streamlined PDF tags. Existing PDF files are now editable.

Enhanced File Manipulation

New object-oriented file tags provide greater control over file operations. Enhanced performance for repeated access to the same file.

Enhanced Network Communications

New object-oriented network communication tags provide greater control over network operations. Provides TCP and UDP support, listeners, and persistent connections. SSL support allows secure communications.

SOAP/WSDL/XML Support

Enhanced support for SOAP, WSDL, and XML in Lasso Professional 7 allows communication with Web services via XML-based standards for data exchange. A new XML implementation provides dramatic performance increase for both large and small documents while operating within a smaller memory footprint. Incoming SOAP calls are now supported so Lasso may now act as a Web services host.

SQL Transaction Support

SQL transactions are now supported via nested [Inline] ... [/Inline] tags.

Caching Tags

Searching and displaying data from slower databases is now dramatically enhanced in Lasso Professional 7 with new caching LDML tags. Database queries can now be selectively cached for faster repeated use.

Lasso Security Enhancements

Lasso developers can now programmatically create users and groups, assign permissions to groups, and check what permissions are assigned via new Lasso Security LDML tags. This allows solutions to automatically interface with Lasso Security without the need to use Lasso Administration.

Enhanced FileMaker Pro Performance

The `-ReturnField` tag can now be used to improve the performance of queries to FileMaker Pro databases when returning large found sets.

Multi-Server Support

Lasso Professional 7 servers can now share session data, allowing server administrators to set up multiple Lasso Professional 7 servers in a variety of load balancing and clustering configurations.

Lasso Administration Enhancements

Lasso Professional 7 features a streamlined administration interface with sections that focus only on administration tasks (e.g. **Setup**, **Utility**, and **Support**). Features new **LassoApp** and **Caching** sections.

Note: The **Build** and **Browse** sections formerly in Lasso 6 Administration have been moved to a new dedicated application called the Lasso Database Browser, which is described in *Chapter 10: Building and Browsing Databases*.

Database Maintenance

Lasso MySQL databases are now automatically checked and repaired each time Lasso Service starts up.

LassoApp Maintenance

Lasso Professional 7 offers greater controls over previous versions of Lasso Professional for monitoring and maintaining LassoApps. Open LassoApps are now listed within Lasso Administration for easier maintenance.

Remote Installation Support

Lasso Professional 7 now allows remote installation via the command line on Mac OS X.

Enhanced Error Reporting

More informative error reports provide information about included files. Tag and page parameters are now reported. Multiple parsing errors are reported at once.

Recursion Protection

Rogue code which includes recursive routines can affect the stability of most any Web application server. Lasso 7 introduces the ability to limit processing of recursive routines. Administrators may set recursion thresholds for [Include] and [Library] tags to control the depth to which recursion may occur. Routines exceeding said thresholds fail gracefully.

Format File Execution Limits

To protect against infinite loops caused by coding errors and lengthy or stalled requests to databases, Lasso 7 provides the ability to set format file execution timeouts at both the server level (e.g. global limit) as well as within individual solutions. This is accomplished via new settings within Lasso Administration in addition to the new [Lasso_ExecutionTimeLimit] tag. This does not affect processing of asynchronous tags.

Enhanced LCAPI Tools

New versions of LCAPI calls support Unicode strings providing enhanced performance and internationalization.

Backwards Compatibility

Virtually all LDML 6 solutions written using preferred LDML 6 syntax will run in Lasso Professional 7 without modification. See *Chapter 31: Upgrading* in the Lasso 7 Language Guide for details.

Open Source

New open source components include Lasso Connector for Apache 2 and all new built-in LDML custom tags (caching, validation, security, and link tags).

Lasso 7 Features Overview

The following provides a list of features in Lasso Professional 7. Please consult this manual, the Lasso 7 Language Guide, or the Extending Lasso 7 Guide for details on each of these features.

Table 1: Key to Chart Symbols

(7)	New Feature in Lasso Professional 7.	(E)	Enhanced from Prior Versions.
(M)	Mac OS X Only.	(T)	Available through Third Parties.
(W)	Windows Only.	(R)	Licensing Restrictions Apply.
(L)	Linux Only.	(S)	Available in Lasso Studio 7.

Upgrading Note: All LDML 6 solutions written using preferred LDML 6 syntax will operate in Lasso Professional 7. For a list of tags and features that have been altered, see *Chapter 31: Upgrading* in the Lasso 7 Language Guide PDF for more information.

Operating Systems and Web Servers

- Operates on Windows 2000 as service application. (W)
- Operates on Windows XP Professional as service application. (W)
- Operates on Windows Server 2003 as service application. (W)
- Operates on Mac OS X as native Darwin application. (M)
- Operates on Mac OS X Server as native Darwin application. (M)
- Operates on Linux. (L)
- Supports Internet Information Server (IIS) version 5 as ISAPI plug-in. (W)
- Supports Internet Information Server (IIS) version 6 as ISAPI plug-in. (W)
- Supports included Apache 1.3 on Mac OS X as Apache module. (M)
- Supports included Apache 2.0 on Mac OS X as Apache module. (7) (M)
- Supports Apache 2.0 on Windows 2000. (W)
- Supports Apache 2.0 on Linux as Apache module. (7) (L)
- Supports WebSTAR V on Mac OS X as WebSTAR API plug-in. (M)

Client Device Support

- Supports industry standard Web browsers.

- Supports industry standard wireless devices such as cell phones and Personal Digital Assistants (PDAs).

Data Source Integration

- Includes completely embedded MySQL 4 database (Lasso MySQL) for both custom solutions and internal use. (7)
- Supports external MySQL databases via Lasso Connector for MySQL.
- Supports direct connection to FileMaker Pro 4, FileMaker Pro 5, and FileMaker Pro 6 Web Companion enabled databases via Lasso Connector for FileMaker Pro.
- Includes integrated JDBC data source support to allow connections to JDBC-compatible data sources. (E)
- Support for ODBC data sources provided via third-party data source connectors. (T)
- Provide built-in SQL Query Browser for building, browsing, and editing Lasso MySQL and MySQL databases.

Authoring Tools

- Allows LDML code to be authored from within any text or HTML editor.
- Provides graphical development environment within Adobe GoLive 6 and Macromedia Dreamweaver MX for building Lasso-based sites. (S)
- Available glossary of Lasso tags for drag-and-drop insertion and context sensitive editing within Bare Bones BBEdit. (M) (T)
- Available glossary of Lasso tags for drag-and-drop insertion within Macromedia HomeSite. (W) (T)

Architecture

- Operates via a combination of Lasso Connector plug-ins for Web servers and a Lasso Service core application operating on the same machine or distributed across two machines. (R)
- Database connectivity provided via Lasso data source connector modules. (E)
- Lasso Connector Web server plug-ins available for the following Web servers: Apache (M) (L), IIS (W) and WebSTAR V (M).
- Lasso Connector data source modules available for the following data source types: MySQL, JDBC, FileMaker Pro. (E)

- Supports multiple Lasso server configurations with shared session data. (7) (R)
- Supports remote installation on Mac OS X and Linux. (7) (M) (L)
- Supports multiple Lasso server configurations with shared session data. (7) (R)

Lasso Service

- Optimized parser designed to support multiple programming languages. (E)
- Multi-threaded processing.
- Start/stop irrespective of Web server status.
- Dynamic activation/deactivation of loaded modules.
- Customizable console window for controlling what process information is displayed.
- Supports both local and remote installation procedures. (7)

Open Source

The following Lasso Connectors are provided with full source code for developer enhancement and customization and to serve as a model for the creation of third party Lasso Connectors for other Web servers and data sources.

- Lasso Connector for MySQL. (W) (M)
- Lasso Connector for JDBC. (W) (M)
- Lasso Connector for Apache 1.3. (M)
- Lasso Connector for Apache 2.0. (M) (L)
- Lasso Connector for IIS. (W)
- Lasso Connector for WebSTAR V. (M)

Languages and Methodology

- Web database connectivity and server-side programming accomplished via an HTML-like tag-based programming language called Lasso Dynamic Markup Language (LDML). (E)
- Format files containing HTML, XML, and LDML can be stored on a local or remote disk, or within a local or remote database. (E)
- Format files are easily edited within HTML editors using various LDML page builders and drag-and-drop LDML objects. (S)

- Supports multiple methods of coding LDML including LassoScript and traditional bracket syntax. (E)
- Supports multiple methods of calling Lasso including inlines, URLs, and HTML forms. (E)
- Unicode and UTF-8 encoding are used by default. (7)

Compiled Applications

- Lasso format files and images can be compiled into an encrypted LassoApp application file.
- LassoApps can be safely and easily distributed to other users of Lasso Professional 7 in order to sell or share Lasso solutions.
- Currently served LassoApps can be listed and managed from within Lasso Administration. (7)

Security

- Built-in security engine provides consistent security implementation across platforms.
- Secures data source types, databases, tables/layouts, fields/columns, and records/rows.
- Enable/disable individual tags and categories of tags.
- Provides action filters to protect, validate, or facilitate personalized access to files and data.
- Supports users and groups with unique sets of permissions.
- Allows programmatic manipulation of security via administrative LDML tags. (E)
- Encrypted storage of usernames and passwords.
- Securely processes and protects files based upon file suffix.
- Enables encrypted transmission of data.
- Import/export security settings.
- Provides built-in, configurable protection against recursion and infinite loop crashes. (7)

Administration

- Remote Web browser based administration. (E)
- Customizable administration interface via HTML files included with Lasso Administration LassoApp.

- Included SQL Query Browser with customization controls for how detail pages should be shown for each database/table.
- Email queue provides details about email which is waiting to be sent and the status of email which has been sent.
- Scheduling queue provides details about events which have been scheduled to execute.
- Enhanced error logging features with options to control what information is displayed.
- Provides scheduling features for automatic backup, analysis, repair, and optimization of MySQL databases.
- Reserves single global administrator for global control of all settings.
- LassoApp Builder allows custom applications to be compiled and encrypted for deployment with Lasso Professional 7.
- Allow recursion limits and page timeouts to be set. (7)

Programming

- Program database queries inline within format files.
- Share database connections via nested inlines. (7)
- Built-in data type support including context sensitive member tags.
- Advanced data types including Arrays, Maps, and Pairs for structured data storage and manipulation.
- Object-oriented programming features including inheritance and overloading of comparisons and assignments.
- Built-in session management allow clients to be remembered automatically. Includes support for session cookies.
- Specify math and string expressions within tag parameters.
- Perform Unicode string operations for localization or internationalization of data. (7)
- Encrypt or encode data for secure transmission. (E)
- Apply post-processing operations to the entire format file before it is served.
- Provides local custom tag variables, global page variables, and session variables.
- Advanced string manipulation functions including support for regular expressions.
- Advanced error controls including protect/fail blocks and debugging.
- Runtime error reporting for easy debugging.

- Parse XML text, generate XML data, handle XML-RPC requests. (E)
- Communicate with and provide SOAP XML Web services. (7)
- Create, serve, and edit PDF documents. (E)
- Edit and manipulate image files on the fly. (7)
- Serve images and multimedia files.
- Built-in scheduling facility to automatically trigger scheduled events.
- Send email to any SMTP server.
- Conditional logic tags dynamically represent data based upon user entered or hard-coded criteria.
- Programmatically control network connections and perform file operations via an object-oriented methodology. (7)
- File management tools allow for manipulation of local files and for remote files to be uploaded. (E)
- HTTP access to remote servers including remote form submissions and server-side includes of remote Web pages. (E)
- Automatically PUT and GET files via FTP.
- Automatically GET files via HTTP.
- Communicate with HTTPS servers via SSL.
- Name inline result sets for later retrieval.
- Encoding controls for accurate display of data in Web browsers and other clients. Specify encoding at page, section, or tag level.
- Log data to multiple customized log files or to databases. (E)
- Set HTTP headers and MIME information.
- Set and retrieve cookies.
- Use tokens and URLs to pass data from page to page.
- Advanced pipe, semaphore, and reference functions.
- Advanced integer and decimal math operations.
- Advanced date/time calculations.

Extensibility

- Custom LDML substitution tags and custom LDML data types can be defined using LDML.
- Custom LDML container tags can be defined using LDML, LJAPI, or LCAPI.
- Custom data types can be created entirely in LCAPI including support for custom member tags and symbol overloading.

- Values of any data type can be processed and returned by LCAPI-based tags.
- Lasso C Application Programming Interface (LCAPI) enables the creation of Lasso data source connector modules, LDML tags and extended functionality via the C/C++ programming language. (E)
- Lasso Java Application Programming Interface (LJAPI) enables the creation of LDML tags and extended functionality via the Java programming language. (E)
- Lasso Connector Protocol (LCP) enables the creation of Lasso Web server connectors. (E)
- Supports XML for extensibility via cross-application and cross-server data interchange. (E)
- Functions as a robust TCP/IP client for the creation of custom TCP/IP applications. (E)

Industry Standards

- CGI – Supports cross server data exchange with other Web application servers. (E)
- File Upload – Supports multi-part HTML forms and file upload. (E)
- FTP – Supports File Transfer Protocol.
- Java – Provides extensibility via Java. (E)
- JDBC – Supports JDBC-compliant databases. (E)
- HTML – Outputs data formatted in HTML for display in HTML compliant devices such as Web browsers.
- HTTP – Supports HTTP 1.1.
- HTTPS – Supports HTTPS and SSL. (E)
- ODBC – Supports ODBC-compliant databases. (T)
- PDF – Outputs data formatted in Portable Document Format for display in PDF-compliant devices. (E)
- SMTP – Supports email forwarding to SMTP email servers.
- SOAP/WSDL – Provides ability to use SOAP XML Web services. (7)
- SQL – Supports Structured Query Language.
- TCP/IP – Built-in TCP/IP client enables interoperability with SMTP email servers, remote Web servers, and other application servers. (E)
- Unicode – Provides support of internationalization and localization of data. (7)
- WAP – Interoperates with wireless devices via WAP.

- WML – Outputs data formatted in WML for display in WML compliant wireless devices.
- XML – Provides cross-application data exchange via XML. (E)
- XML-RPC – Provides ability to output XML data and handle XML-RPC requests. (E)

3

Chapter 3

Configuring on Mac OS X

This chapter contains the installation and configuration instructions for Lasso Professional 7 on Mac OS X. It also contains information on Lasso Professional 7 components and how to 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 are not supported.

- Macintosh G5, G4, G3, or compatible computer.
- 256 MB of RAM. More recommended.

- Standard installation of Mac OS X (10.2 or 10.3) or Mac OS X Server (10.2 or 10.3) with an HFS+ formatted hard drive with BSD subsystem option. UFS systems are not supported.
- Mac OS X build of Apache Web Server 1.3 (included with Mac OS X) or 2.0, or alternately the latest version of WebSTAR V.
- X11 for Mac OS X 10.3 must be installed in order for the [Image] tags in Lasso Professional 7 to function. For information on obtaining and installing X11, see <http://www.apple.com/macosx/x11/>.

Note: The [Image] tags are not supported on Mac OS X 10.2 as X11 is not officially provided or supported by Apple for Mac OS X 10.2 as of the release of this software.

- Adobe Acrobat 5.0 or higher to view the electronic documentation.
- Monitor capable of 800 x 600 resolution.

Certification Note: Lasso Professional 7 is certified to work with Mac OS X version 10.2 or better with HFS+ (Mac OS Extended format), and with default Mac OS X installations of Apache Web server. Modified versions of Apache and customized `httpd.conf` configuration files may work with Lasso Professional 7, but can not be officially supported.

Web Browser Requirements

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

- Microsoft Internet Explorer 5.0 or higher, Safari 1.0 or higher, or Netscape 6.0 or higher.
- Javascript enabled.
- Cookies enabled.
- Cascading Style Sheets support.

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 provides installation instructions for Lasso Professional 7 and its required components, describes upgrading procedures, and describes how to initialize Lasso Administration for the first run. For best results,

please perform the procedures in the following sections in the order they are presented.

- *Upgrading* describes how to upgrade older version of Lasso Professional to Lasso Professional 7.
- *Installing X11* describes how to install X11, which is required prior to installing Lasso Professional 7 on Mac OS X.
- *Installing Lasso Professional 7* describes how to install Lasso Professional 7.
- *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 5 or 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 5 or 6 will no longer be used 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 Mac OS X. 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 5 or 6 to Lasso Professional 7:

Install Lasso Professional 7 using the Lasso Professional 7 installer application. During installation, the Lasso Professional 7 installer will import any Lasso Administration settings and Lasso MySQL databases from the files in the /Applications/LassoProfessional6 folder.

Installing X11

X11 for Mac OS X must be installed in order for the image manipulation features of Lasso Professional 7 to work (implemented via the [Image] tags). X11 is a free program that can be optionally installed as part of Mac OS X 10.3.

It is recommended that X11 be installed prior to installing Lasso Professional 7. If X11 is not installed prior to Lasso Professional 7, errors will be logged to Lasso's error log whenever Lasso Service is started, and errors will be returned whenever the [Image] tags are used.

To install X11 for Mac OS X:

- 1 Download the X11 installer at the following address:
<http://www.apple.com/macosx/x11/download/>
- 2 Double-click the X11 installer application, and then follow the instructions to install X11 for Mac OS X.

Installing Lasso Professional 7

Use the Lasso Professional 7 Installer application (Lasso Pro 7 Installer.mpkg) to ensure that all of the Lasso Professional 7 files are installed in the proper location with the proper permissions. The Lasso Professional 7 installer applications supports four different Web server configurations on Mac OS X:

- **Apache 1.3** – The default Web server included with Mac OS X. Also referred to as Web Sharing.
- **Complete Apache 2** – Popular Apache 2 binary distribution for Mac OS X. For more information, see <http://httpd.apache.org/>.
- **Mac OS X Server Apache 2** – Apache 2 distribution included as an optional installation with Mac OS X Server.
- **WebSTAR V** – WebSTAR Server Suite V. For more information, see <http://www.4D.com>.

The following procedures describe how to install Lasso Professional 7 for each of the four Web server configurations above.

To install Lasso Professional 7 for Apache 1.3:

- 1 Double-click the Lasso Pro 7 Installer.mpkg application. This launches the Lasso Professional 7 window. An authentication dialog will prompt for an administrator name and password.
- 2 Enter the username and password of a Mac OS X user on the machine who has administrative rights.
- 3 Select Continue. This will display the Lasso Professional 7 Release Notes. The release notes contain important late breaking information that might not be covered in the documentation.
- 4 After reading the release notes which describe what is included with Lasso Professional 7, select Continue. This will display the Lasso Professional 7 License Agreement.

- 5 After reading and agreeing to the terms, select the Continue and then the Agree button.
- 6 Select the drive you wish to install Lasso Professional 7 on, then select Continue.
- 7 Select the Install button. This will install Lasso Professional 7 for Apache 1.3 on your system.
- 8 Select Quit when the installer has completed. Upon quit the installer automatically restarts the Apache Web server and starts Lasso Service.

After the installers has finished, it will automatically open a Web browser window and attempt to launch the Lasso Initialization page, which is described in the following *Initialization* section.

To install Lasso Professional 7 for Complete Apache 2.0:

- 1 Double-click the Lasso Pro 7 Installer.mpkg application. This launches the Lasso Professional 7 window. An authentication dialog will prompt for an administrator name and password.
- 2 Enter the username and password of a user on the machine who has administrative rights.
- 3 Select Continue. This will display the Lasso Professional 7 Release Notes. The release notes contain important late breaking information that might not be covered in the documentation.
- 4 After reading the release notes which describe what is included with Lasso Professional 7, select Continue. This will display the Lasso Professional 7 License Agreement.
- 5 After reading and agreeing to the terms, select the Continue and then the Agree button.
- 6 Select the drive you wish to install Lasso Professional 7 on, then select Continue.
- 7 Select the Options button. This will allow you to view and select the components you wish to install.
- 8 Uncheck Lasso Connector for Apache and check Lasso Connector for Complete Apache 2.
- 9 Select the Install button. This will install Lasso Professional 7 for Complete Apache 2.0 on your system.
- 10 Select Quit when the installer has completed. Upon quit the installer automatically restarts the Apache Web server and starts Lasso Service.

After the installers has finished, it will automatically open a Web browser window and attempt to launch the Lasso Initialization page, which is described in the following *Initialization* section.

To install Lasso Professional 7 for Mac OS X Server Apache 2:

- 1 Double-click the Lasso Pro 7 Installer.mpkg application. This launches the Lasso Professional 7 window. An authentication dialog will prompt for an administrator name and password.
 - 2 Enter the username and password of a user on the machine who has administrative rights.
 - 3 Select Continue. This will display the Lasso Professional 7 Release Notes. The release notes contain important late breaking information that might not be covered in the documentation.
 - 4 After reading the release notes which describe what is included with Lasso Professional 7, select Continue. This will display the Lasso Professional 7 License Agreement.
 - 5 After reading and agreeing to the terms, select the Continue and then the Agree button.
 - 6 Select the drive you wish to install Lasso Professional 7 on, then select Continue.
 - 7 Select the Options button. This will allow you to view and select the components you wish to install.
 - 8 Uncheck Lasso Connector for Apache and check Lasso Connector for Mac OS X Server Apache 2.
 - 9 Select the Install button. This will install Lasso Professional 7 for Mac OS X Server Apache 2 on your system.
 - 10 Select Quit when the installer has completed. Upon quit the installer automatically restarts the Apache Web server and starts Lasso Service.
- After the installers has finished, it will automatically open a Web browser window and attempt to launch the Lasso Initialization page, which is described in the following *Initialization* section.

To install Lasso Professional 7 for WebSTAR V:

- 1 Double-click the Lasso Pro 7 Installer.mpkg application. This launches the Lasso Professional 7 window. An authentication dialog will prompt for an administrator name and password.
- 2 Enter the username and password of a user on the machine who has administrative rights.
- 3 Select Continue. This will display the Lasso Professional 7 Release Notes. The release notes contain important late breaking information that might not be covered in the documentation.
- 4 After reading the release notes which describe what is included with Lasso Professional 7, select Continue. This will display the Lasso Professional 7 License Agreement.

- 5 After reading and agreeing to the terms, select the Continue and then the Agree button.
- 6 Select the drive you wish to install Lasso Professional 7 on, then select Continue.
- 7 Select the Options button. This will allow you to view and select the components you wish to install.
- 8 Uncheck Lasso Connector for Apache and check Lasso Connector for WebSTAR V.
- 9 Select the Install button. This will install Lasso Professional 7 for WebSTAR V on your system.
- 10 Select Quit when the installer has completed. Upon quit the installer automatically restarts the Apache Web server and starts Lasso Service.

After the installers has finished, it will automatically open a Web browser window and attempt to launch the Lasso Initialization page, which is described in the following *Initialization* section.

Troubleshooting: If in the event that the Lasso Initialization page does not load, make sure that Lasso Service has started properly as described in the *Running Lasso Professional 7* section of this chapter. Otherwise, consult the *Extended Configuration* section to ensure that the installer has configured the Web server correctly (i.e. Apache, WebSTAR).

Initialization

The Initialize 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, make sure Lasso Service is running and visit <http://127.0.0.1/Lasso/> in a Web browser. For instructions on how to start and stop Lasso Service, see the *Running Lasso Professional 7* 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 the serial number, and setting the administrator username and password.

Figure 1: Initialize Page

Welcome to Lasso Professional 7

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.

[Request Evaluation Serial Number](#)

Enter Your Serial Number

Serial Number

Please enter the entire serial number including the prefix. For example: "LP7-MAC-123456789".

Create an Administrator Username and Password

Administrator Username

Administrator Password

Confirm Password

This username and password will be required to administer Lasso Professional 7. Be sure to keep a copy of the values you enter.

[Submit Information](#)

Lasso Professional 7 • Initialize

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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 one 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-MAC-123456789

Serial numbers are case-sensitive. Make sure that all capitalization is correct and that all letters and numbers are entered, including the LP7 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*.

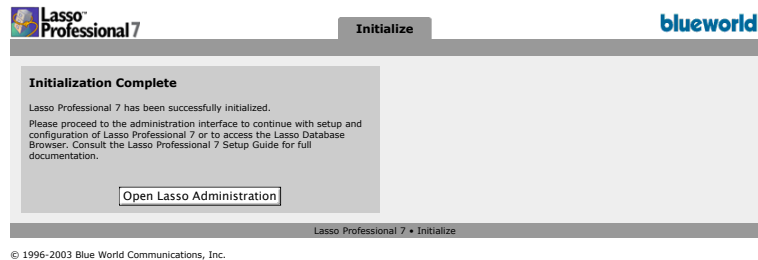
Note: The administrator username and password in Lasso Administration are independent of Mac OS X administrator usernames and passwords, and do not have to match.

- 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 login 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

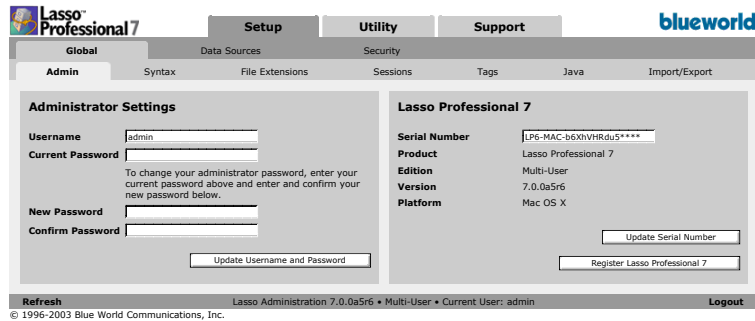


Selecting the Open Lasso Administration button will open Lasso Administration, where all options in Lasso Professional 7 can be set up and configured.

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.

For a full description of Lasso Administration and how to use it, see *Chapter 5: Using Lasso Administration*.

Figure 3: Lasso Professional 7 Administration



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*.
- For an overview of setting up Lasso Security for databases, LDML tags, files, and solutions, see *Chapter 8: Setting Up Security*.
- 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*.
- To learn how to write custom Lasso solutions using LDML code, see the Lasso 7 Language Guide.

Security Note: Lasso Professional 7 uses ports 14550 for Lasso Service. Lasso Service cannot be directly accessed by anonymous users, however, it is recommended that system administrators block this port 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 Web server. Lasso Service is started and stopped using the terminal command files provided in the `/Applications/Lasso Professional 7/Tools` folder.

To start Lasso Service:

- 1 On the Mac OS X hard drive, file browse to the /Applications/Lasso Professional 7/Tools folder.
- 2 Double-click on the startLassoService.command file. This will launch a terminal window.
- 3 When prompted, enter the password of a user with administrative privileges in Mac OS X in the terminal
- 4 Press Enter. A [Process Completed] message will appear at the bottom of the terminal window when Lasso Service has started.
- 5 Close the terminal window.

Lasso Service can also be run in console mode within the terminal. This allows the administrator to view the Lasso Professional 7 status window, which shows all Lasso Professional 7 actions that are currently being performed, as well as actions that have been performed since start up. This is useful for monitoring and troubleshooting purposes. Lasso Service should be started this way whenever startup, stability, or performance problems are encountered in Lasso Professional 7.

To start Lasso Service in console mode:

- 1 On the Mac OS X hard drive, file browse to the /Applications/Lasso Professional 7/Tools folder.
- 2 Double-click on the consoleLassoService.command file. This will launch a terminal window.
- 3 When prompted, enter the password of a user with administrative privileges in Mac OS X in the terminal
- 4 Press Enter. Lasso Service will start within the terminal window.
- 5 Leave the terminal window open. The Lasso Service application now “owns” this terminal window, and closing the window will stop Lasso Service.

To stop Lasso Service:

- 1 On the Mac OS X hard drive, file browse to the /Applications/Lasso Professional 7/Tools folder.
- 2 Double-click on the stopLassoService.command file. This will launch a terminal window.
- 3 When prompted, enter the password of a user with administrative privileges in Mac OS X in the terminal.
- 4 Press Enter. A [Process Completed] message will appear at the bottom of the terminal window when Lasso Service has stopped.
- 5 Close the terminal window.

To see if Lasso Service is running:

- 1 Start the ProcessViewer application, located in /Applications/Utilities by default.
- 2 In the Show pull-down menu, select All Processes.
- 3 In the Find field, type LassoService. If Lasso Service is running, then LassoService will be shown under the Name column.

Terminal Note: All tasks in this section may also be performed by manually typing commands into the terminal. See the [Mac_OS_X_Tips.pdf](#) file in Applications/Lasso Professional 7/Documentation/1-ReadMeFirst for instructions on how to do this.

Extended Configuration

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

- *Remote Installation* describes how to install Lasso Professional 7 on a remote server.
- *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).
- *Lasso Connector for WebSTAR* describes configuring the module that installs into WebSTAR and provides connectivity to Lasso Service
- *Remote WebSTAR Configuration* describes manually configuring Lasso Service to run on a separate machine from WebSTAR V (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.

Remote Installation

For UNIX administrators that desire it, Lasso Professional 7 can be installed remotely using ssh. This is useful if you do not have direct access to the Web server where Lasso will be installed, or if the Web server is not set up with a monitor, keyboard, or mouse.

To install Lasso Professional 7 on a remote server:

- 1 Copy the Lasso Pro 7 Installer.mpkg installer to a location on your remote server. This can be done using any remote file transfer method, such as afp, FTP, or scp.
- 2 Use the terminal to ssh into remote server using an administrative user account. An example ssh login command is shown below.
- 3 To install Lasso Professional 7, enter the following command. Replace `/path-to-installer/` with the full UNIX folder path to the Lasso Professional 7 installer.
- 4 Once the installer is finished, open your browser and access the remote server default Web page to initialize Lasso Service.

```
ssh administrator@www.example.com
```

```
sudo installer -pkg "/path-to-installer/Lasso Pro 7 Installer.mpkg" -target /
```

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

Lasso Connector for Apache

Lasso Connector for Apache is one of the default Web server connectors included with Lasso Professional 7. 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.

Apache Configuration

The Lasso Professional 7 installer creates a file named `lasso.conf`, which is automatically included in the `httpd.conf` file whenever Apache starts up. The following procedure describes viewing and editing the `lasso.conf` file, which contains all Lasso Professional 7 settings for Apache.

To view or edit changes made to Apache:

- 1 Start the Mac OS X terminal application, located in Applications/Utilities by default. Expand the terminal window to be as large as possible on the screen for best results.
- 2 Enter the following to open the `lasso.conf` file via the terminal:

```
sudo pico /etc/httpd/users/lasso.conf
```

Note: This file is locked by default, and one must be logged in as the root user to edit it. See the `Mac_OS_X_Tips.pdf` file in `Applications/Lasso Professional 7/Documentation/1-ReadMeFirst` for instructions on how to perform these tasks using the terminal.

- 3 The `lasso.conf` file contains three lines, as shown below. The last two lines tell Apache to process files with the extensions `.lasso` and `.lassoapp` with Lasso Service.

```
LoadModule lasso_module /usr/libexec/httpd/LassoConnectorforApache.so
AddHandler lasso-handler lasso
AddHandler lasso-handler lassoapp
```

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 after making any changes.
- 5 Restart Apache Web Server for any changes to take place. This is done by accessing `System Preferences/File Sharing` in Mac OS X, and then turning Web Sharing off and then on again. Alternately, one can restart Apache Web Server by entering the following command in the terminal:

```
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 Mac OS X computer from the Mac OS X Apache Web server. To do this, follow the procedure below.

To setup Lasso Connector for Apache on a remote server:

- 1 On the machine running Lasso Service, stop Lasso Service using the `stopLassoService.command` 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. `/Library/WebServer/Documents`) to the Web server root folder on the remote server.
- 4 On the machine running Lasso Service, locate the `LassoConnectorforApache.so` file and move it into the corresponding `/usr/libexec/httpd` folder on the

remote server. For instructions how to move hidden system files, see the `Mac_OS_X_Tips.pdf` document.

- 5 On the machine running Lasso Service, locate the `lasso.conf` file and move it into the corresponding `/etc/httpd/users` folder on the remote server. For instructions how to move hidden Unix files, see the `Mac_OS_X_Tips.pdf` document.
- 6 On the machine running Lasso Service, locate the `editLassoApacheconf.com` mand file in the `/Applications/Lasso Professional 7/Tools` folder, and move it to any location on the remote Web server.
- 7 On the machine running Lasso Service, locate the hidden `LassoApache.conf` file in the `/etc/lasso` folder, and copy it to the `/etc/lasso` folder on the remote Web server.
- 8 On the remote server, open the copied `LassoApache.conf` file in the Pico file editor using the following command:


```
sudo pico /etc/httpd/users/lasso.conf
```
- 9 Next to `Server`, replace `127.0.0.1` with the correct host name or IP address of the machine running Lasso Service.
- 10 Press `Ctrl-X`. This will ask you if you want to save the file.
- 11 Enter `y`. This saves and closes the file.
- 12 On the remote server, restart Apache Web Server. This is done by accessing *System Preferences > File Sharing* in Mac OS X, and then turning Web Sharing off and then on again. Alternately, one can restart Apache Web Server by entering the following command in the terminal:


```
sudo apachectl restart
```
- 13 On the machine running Lasso Service, start Lasso Service. This can be done using the `startLassoService.command` 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.

Lasso Connector for WebSTAR V

The Lasso Connector for WebSTAR V is represented by a file named `LassoConnectorforWebSTARV.so` that is installed to the WebSTAR V Plug-Ins folder. This file automatically adds all Lasso settings to WebSTAR V.

By default, Lasso Connector for WebSTAR V is configured to process `.lasso` and `.LassoApp` files only. These extensions are built into Lasso Connector for WebSTAR V and cannot be changed. If one wishes WebSTAR to process

Lasso files with alternate file extensions other than .lasso or .LassoApp, perform the procedure below.

To configure WebSTAR to process alternate file extensions with Lasso:

- 1** Launch the 4D WebSTAR Admin Client application and connect to the 4D WebSTAR Admin Server.
- 2** To make global changes to all Web sites, select the Admin option from the list of available virtual hosts. Otherwise, select DefaultSite (or another virtual host).
- 3** Select the Select button.
- 3** Select Suffix Mappings option from the Web Server section on the left panel of the Administration window.
- 4** In the Editable Suffix Mappings panel, add as many suffix mappings as necessary by specifying the filename extension, MIME type, and choosing the Lasso action from the popup menu at the bottom of the window.
- 5** When finished, select the Save button to save the changes.

Remote WebSTAR V Configuration

This section describes setting up Lasso Professional 7 in a distributed architecture where Lasso Service runs on a separate Mac OS X computer from the WebSTAR V server.

To setup Lasso Connector for WebSTAR V on a remote server:

- 1** On the machine running Lasso Service, stop Lasso Service using the stopLassoService.command file in the Lasso Professional 7/Tools folder.
- 2** On the machine running Lasso Service, stop WebSTAR V if it is running. Since the Lasso Connector for WebSTAR V 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. 4DWebSTAR/WebServer/DefaultSite) to the Web server root folder on the remote server.
- 4** On the machine running Lasso Service, locate the LassoConnectorforWebSTAR.bundle file and move it into the 4DWebSTAR/WebServer/Plug-Ins folder on the remote server.
- 5** On the machine running Lasso Service, locate the hidden LassoWebSTAR.conf file in the /etc/lasso folder, and copy it to the /etc/lasso folder on the remote Web server.

- 6 On the remote server, open the copied LassoWebSTAR.conf file in the Pico file editor using the following command:

```
sudo pico /etc/httpd/users/LassoWebSTAR.conf
```
- 7 Next to Server, replace 127.0.0.1 with the correct host name or IP address of the machine running Lasso Service.
- 8 Press Ctrl-X. This will ask you if you want to save the file.
- 9 Enter y. This saves and closes the file.
- 10 On the remote Web server, launch WebSTAR V.
- 11 On the machine running Lasso Service, start Lasso Service using the startLassoService.command file or consoleLassoService.command file, as 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*.

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 hidden Lasso user in Mac OS X 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. For more information about the Lasso user, see the *Mac_OS_X_Tips.pdf* file.

Application Files

Lasso Professional 7 installs the following files and folders in the Applications/Lasso Professional 7 folder on the Mac OS X 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 9: Administration Utilities*.

BuildLassoApps folder – Is a folder used to build LassoApps. For more information, see *Chapter 9: 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 Mac OS X. 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.

Note: While Lasso Service is running, the LassoService.sh file will temporarily place a file named LassoService.pid in the Admin folder. This file is a helper file for LassoService.sh.

- **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, License Agreement.txt, and Mac OS X Tips.pdf. Read this documentation in this folder first before proceeding to configure Lasso Professional 7.

2-SetupGuide folder – Contains Lasso Pro 7 Setup Guide.pdf and a Tutorial folder.

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

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

- **ImageMagick-5.5.7 folder** – Contains an installation of ImageMagick 5.5.7, which is used to power the [Image] tags in LDML 7. For more information, see *Chapter 26: Images and Multimedia* in the Lasso 7 Language Guide.

- **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.dylib – Data source connector module for FileMaker Pro data sources.
 - MySQLConnector.dylib – Data source connector module for external MySQL data sources.
 - JDBCConnector.jar – Data source connector module for JDBC data sources.
 - LJAPI.dylib – Implements core support for all LJAPI modules.
 - LJAPI.jar – Implements core support for all LJAPI modules.
 - NSLookup.class – Java class file for [NSLookup] tag.
 - iText.jar – Required library for the [PDF_...] tags.
 - 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 and sites folder, which are 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 Mac OS X 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.command` – 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.command` – 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.command` – Stops Lasso Service via the terminal. For instructions on how to use this file, see the *Running Lasso Professional 7* section of this chapter.

StartupItems

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

- **LassoService** – Contains the `LassoService` and `StartupParameters.plist` files which are used to auto-start Lasso Service at boot time.

Web Server Root

Lasso Professional 7 installs the following files in the Web server root directory of the Mac OS X hard drive. For Apache Web Server, this is the `/Library/WebServer/Documents` folder by default.

Lasso folder

The Lasso folder contains the following:

- **Default.html, Default.htm, Index.html** – Contains the splash screen for Lasso Professional 7.
- **Admin.LassoApp** – The Lasso Administration LassoApp. For more information, see *Chapter 5: Using Lasso Administration*.
- **DatabaseBrowser.LassoApp** – The Database Browser LassoApp for building MySQL databases and interacting with all Lasso-configured databases. For more information, see *Chapter 10: Building and Browsing Databases*.
- **GroupAdmin.LassoApp** – The Group Administration LassoApp. For more information, see *Chapter 8: Setting Up Security*.
- **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.
- **Error.lasso** – The default Lasso error page.

- **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.
- **Redirect.html** – HTML file that redirects to Admin.LassoApp.

System Files

Lasso Professional 7 installs the following files in various system locations on the Mac OS X hard drive.

Note: These files are hidden unless viewed in the terminal application, or via a file editor capable of viewing hidden system files (e.g. BBEdit).

- **LassoConnectorforApache.so** – This file is the Lasso Web server connector for Apache 1.3, which is installed in the in `/user/libexec/httpd` folder for default installations.
- **LassoConnectorforApache2.so** – This file is the Lasso Web server connector for Apache 2, which is installed in the in `/user/libexec/httpd` folder if the Apache 2 option is selected during installation.
- **LassoConnectorforWebSTAR.bundle** – This file is the Lasso Web server connector for WebSTAR V, which is installed in the WebSTAR Plug-Ins folder if the option is selected during installation.
- **lasso.conf** – Lasso Professional 7 adds an Apache configuration file to the `/etc/httpd/users` folder. This file is dynamically included in the main Apache configuration file (`httpd.conf`).
- **lassoapache.conf** – The Web server configuration file for Lasso Connector for Apache, located in the `/etc/Lasso` folder.
- **lassowebstar.conf** – The Web server configuration file for Lasso Connector for WebSTAR, located in the `/etc/Lasso` folder.
- **LassoMySQL.sock** – This file is placed in the `tmp` folder while Lasso MySQL is running.
- **ICU Libraries** – These required files are installed to the `/private/tmp/lassoicu/` folder. These are necessary for Unicode support.

Uninstalling Lasso Professional 7

Lasso Professional 7 should be uninstalled using the uninstaller application provided as part of the Lasso Professional 7 package. Following the

procedure below will ensure that all custom settings and databases will be preserved.

To uninstall Lasso Professional 7:

- 1 Perform an export of your current Lasso Administration settings using the *Setup > Global Settings > Import/Export* section of Lasso Administration. Save the exported file somewhere on your hard drive.
- 1 Double-click the Lasso Pro 7 Uninstaller.mpkg application. This launches the Lasso Professional 7 window. An authentication dialog will prompt for an administrator name and password.
- 2 Enter the username and password of a Mac OS X user on the machine who has administrative rights.
- 3 Select Continue. This will display special information about what the uninstaller will do..
- 4 Select Continue, then select the drive you wish to uninstall Lasso Professional 7 from.
- 7 Select Continue button, then select Upgrade. This will remove Lasso Professional 7 from your system.
- 8 Select Quit when the uninstaller has completed.

Files and Folders Not Removed

The uninstaller program will not remove any non-default files created after the time of install, or any default Lasso files modified since the time of install. These files include the Lasso MySQL databases, Lasso log files, Lasso setup files, and custom format files and LassoApps. 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.

- **Application folder** – The Applications/Lasso Professional 7 folder is left on the hard drive, which contains the following folders:

JDBCDrivers – Contains any JDBC drivers installed to Lasso Professional 7 by the administrator. This folder will be removed if no JDBC drivers were installed.

LassoModules – Contains data sources connectors, Java libraries, and any customized Lasso modules.

LassoMySQL – Contains all default Lasso MySQL databases, which contain serial numbers, passwords, database settings, logs, and permissions from the previous setup of Lasso Professional 7.

- **Web Server Root folder** – The Web server root folder retains all format files created or modified since the time of installation (this is the /Library/WebServer/Documents folder for default installations with Apache).

Customized format files, Web pages, and scripts will not be deleted during uninstallation

Reinstallation Note: Any files remaining on the system from a previous installation of Lasso Professional 7 will not be overwritten by installing a newer version. Therefore, all previous settings will be retained if a newer version of Lasso Professional 7 is installed over the files not removed during the uninstallation of the previous version.

4

Chapter 4

Configuring on Windows

This chapter contains the installation and configuration instructions for Lasso Professional 7 on Microsoft Windows. 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 and initializing 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 IIS for Lasso Professional 7, and how to set up a Lasso Professional 7 distributed architecture.
- *Installation Contents* lists every file 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 following minimum requirements. 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.

- Microsoft Windows 2000 Professional, Windows 2000 Server, Windows XP Professional, or Windows Advanced Server 2003.
- Microsoft Internet Information Services (IIS) 5 or 6 (included with the versions of Windows listed above), or Apache 2. See <http://support.blueworld.com/article.lasso?id=9102003620> for details on Apache 2 support.
- ImageMagick 5.5.7. For information on obtaining and installing ImageMagick, see the *Installation Instructions* section.
- Java Virtual Machine compatible with Sun's JRE 1.4 (Java 2). This is required for the use of LJAPI modules, JDBC data sources, and all LDML tags which are dependent upon Java. For details on which LDML tags are dependent upon Java, see the LDML 7 Reference. For more information on LJAPI, see the Extending Lasso 7 Guide.
- Adobe Acrobat 5.0 or higher to view the electronic documentation.
- Monitor capable of 800 x 600 resolution.

Web Browser Requirements

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

- Microsoft Internet Explorer 5.0 or higher, or Netscape 6.0 or higher.
- Javascript enabled.
- Cookies enabled.
- Cascading Style Sheets support.

If these criteria are 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 ImageMagick* describes how to install ImageMagick, which is required for running Lasso Professional 7 on Windows operating systems.
- *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 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.

- The previous version of Lasso Professional will no longer be active once the procedure is complete.
- The installation is being performed on the C drive. Otherwise, the instructions should be modified for whatever drive Windows is installed on.
- If you are upgrading from Lasso Web Data Engine 3.x or earlier, you must uninstall Lasso Web Data Engine, do a clean install of Lasso Professional 7, and reconfigure your settings using Lasso Administration.

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 to Lasso Professional 7:

- 1 Uninstall the existing version of Lasso Professional. Do this by using the Uninstall option in the Lasso Professional installer application, or by using Add/Remove Programs in the Windows Control Panel. After uninstallation, leave the remaining files on the system.
- 2 Rename the remaining Lasso Professional 6 folder as Lasso Professional 7 in C:\Program Files\Blue World Communications\ folder. This will allow the Lasso Professional 7 installer to install to and use the old files in this folder.
- 3 Inside the Lasso Professional 7/LassoMySQL folder, change the name of the data folder to databases.

- 4 Install and initialize Lasso Professional 7 as described in the following *Installing Lasso Professional 7* and *Initialization* sections.

Installing ImageMagick

An installation of ImageMagick 5.5.7 is required for the [Image] tags in Lasso Professional 7 to function properly. ImageMagick 5.5.7 is a free program that can be downloaded and installed using the procedure below. It is recommended that ImageMagick 5.5.7 be installed prior to installing Lasso Professional 7. If ImageMagick 5.5.7 is not installed prior to Lasso Professional 7, errors will be displayed during the installation of Lasso Professional 7, and errors will be logged to Lasso's error log whenever Lasso Service is started.

To install ImageMagick 5.5.7:

- 1 Download the ImageMagick 5.5.7 installer at the following address:

<ftp://ftp.imagemagick.org/pub/ImageMagick/ImageMagick-5.5.7-10.zip>

Note: If this address is unavailable, see <http://www.imagemagick.com/www/archives.html> for alternate download sites.

- 2 Double-click the ImageMagick installer application, and then follow the instructions to install ImageMagick 5.5.7.

Installing Java

This section discusses installing Sun's Java Runtime Environment (JRE) 1.4 for Windows. JRE 1.4 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 at the following address:

<http://java.sun.com/j2se/1.4/>

- 2 Double-click the JRE installer application, and then follow the instructions to install JRE 1.4.

- 3 Restart your system for the changes to take effect.

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 6: Setting Global Preferences > Java* for more information.

Installing Lasso Professional 7

Use the Lasso Professional 7 Installer to ensure that all of the Lasso Professional 7 files are installed in the proper location. The following procedure assumes IIS will be used as the Web server.

For information on configuring Lasso Professional 7 to work with Apache 2, please see the following support central article:

<http://support.blueworld.com/article.lasso?id=9102003620>

To install Lasso Professional 7 for IIS:

- 1 From the installation CD or the electronic download, double-click the Lasso Pro 7 Installer.msi application. This launches the Lasso Professional 7 Setup window.
- 2 Select Next. This will display the license agreement.
- 3 After reading and agreeing to the terms, select the I accept the license agreement radio button, and select Next. This will display the Lasso Professional 7 Release Notes. The release notes contain important late-breaking information that might not be covered in the documentation.
- 4 After reading the release notes, select Next.
- 5 Select the drive and destination folder to which Lasso Professional 7 will be installed. This is C:\Program Files\Blue World Communications\Lasso Professional 7\ by default. To ensure all features in Lasso Professional 7 to work properly, it is strongly recommended that the names of the \Program Files\Blue World Communications\Lasso Professional 7\ folders not be changed.
- 6 Select Next.
- 7 A message will be displayed stating that Lasso Professional 7 is ready to be installed. Select the Back button to check or modify any of the previous steps. Select Next to install Lasso Professional 7.
- 8 Select Finish when the installer has completed. Lasso Service and Lasso MySQL will automatically start after the installer has finished.

After Lasso Service has started, a Web browser window will automatically open to the Lasso Initialization page, which is described in the next section.

Troubleshooting: If in the event that 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 the installer was able to successfully configure IIS as described in the *Extended Configuration > Lasso Connector for IIS*

section of this chapter. Also, make sure that the IIS Admin Service, World Wide Web Publishing Service, and any related services in use (e.g. SMTP, FTP, etc.) have restarted properly.

Initialization

The Initialize page is launched in a Web browser after Lasso Professional 7 Installer has completed. The Initialize page is where the administrator enters the Lasso Professional 7 serial number, and sets the global administrator username and password for the first time. If this page does not launch automatically, then make sure Lasso Service is running and visit <http://127.0.0.1/Lasso/> in a Web browser. For instructions on how to start and stop Lasso Service, see the *Running Lasso Professional 7* 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 the serial number, and setting the administrator username and password.

Figure 1: Initialize Page

Lasso Professional 7 blueworld

Initialize

Welcome to Lasso Professional 7

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.

[Request Evaluation Serial Number](#)

Enter Your Serial Number

Serial Number

Please enter the entire serial number including the prefix. For example: "LP7-MAC-123456789".

Create an Administrator Username and Password

Administrator Username

Administrator Password

Confirm Password

This username and password will be required to administer Lasso Professional 7. Be sure to keep a copy of the values you enter.

[Submit Information](#)

Lasso Professional 7 • Initialize

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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 one 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:

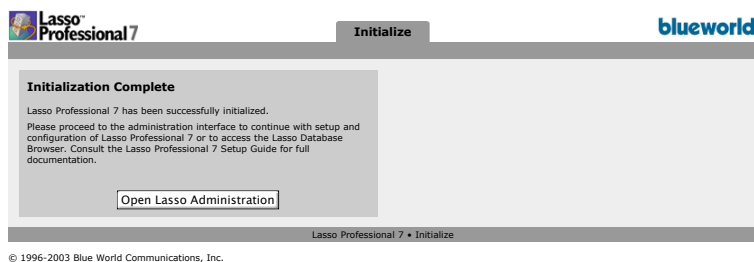
- 1 Enter the Lasso Professional 7 serial number in the Serial Number field. This must be entered exactly as it appears in your Blue World invoice using the following format:
LP7-WIN-123456789

Serial numbers are case-sensitive. Make sure that all capitalization is correct and that all letters and numbers are entered, including the LP7 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*.
- 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 exactly as entered in step 3.
- 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



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 be used. 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.

For a full description of Lasso Administration and how to use it, see *Chapter 5: Using Lasso Administration*.

Figure 3: Lasso Professional 7 Administration



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*.
- For an overview of setting up Lasso Security for databases, LDML tags, files, and solutions, see *Chapter 8: Setting Up Security*.
- 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*.
- 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 Web server. Lasso Service can be started and stopped within the Services menu in Windows.

To start or stop Lasso Service:

- 1 From the Windows Task Bar, select *Start > Settings > Control Panel > Administrative Tools > Services*.
- 2 Right click on Lasso Service, then select Start to start Lasso Service, or Stop to stop Lasso Service.

In Windows, one also has the ability to start Lasso Service in console mode. This allows one to view the Lasso Professional 7 status window, which shows all Lasso Professional 7 actions that are currently being performed, as well as actions that have been performed since start up. This is useful for monitoring and troubleshooting purposes.

To start Lasso Service in console mode:

- 1 Stop Lasso Service if it is running.
- 2 Browse to the Program Files\Blue World Communications\Lasso Professional 7 folder on your hard drive.
- 3 Double-click on LassoService.exe.

Extended Configuration

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

- *Lasso Connector for IIS* describes configuring the module that installs into Microsoft IIS and provides connectivity to Lasso Service.
- *Remote IIS Configuration* describes manually configuring Lasso Service to run on a separate machine from the Windows Web server with IIS (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 IIS

Lasso Connector for IIS is one of the default Web server connectors included with Lasso Professional 7. This section describes what settings Lasso Professional 7 adds to Microsoft IIS, and how to manually perform these setting changes. Lasso Professional 7 adds the following settings to Microsoft IIS:

- Adds LassoFilter to ISAPI filters for Web server.
- Configures the .Lasso and .LassoApp extensions in WWW Service Application Configuration.

All files required to use Lasso Connector for IIS are located in the Windows\System32 and InetPub\wwwroot folders, as described earlier in this chapter. Do not remove any of these files as doing so will cause Lasso Connector for IIS not to work. Always check the Lasso Professional 7 release notes for the most current configuration information.

Certification Note: Lasso Professional 7 is certified to work only with default Windows installations of IIS. Altered versions of IIS may work with Lasso Professional 7, but are not officially supported.

Adding the ISAPI Filter

The LassoConnectorforIIS.dll file is the ISAPI filter that allows Microsoft IIS to recognize Lasso actions. Follow the procedure below to add or verify the ISAPI filter in the Internet Services Manager, located in *Start > Settings > Control Panel > Administrative Tools* from the Windows Task Bar.

- 1 Using the Internet Services Manager, right-click on the local computer name and select Properties in Windows 2000, or right-click on the Web Sites folder and select Properties in Windows XP.
- 2 Select the Edit button to edit the WWW Services Master properties.
- 3 Select the ISAPI Filters tab.
- 4 If LassoFilter does not appear in the list, click the Add button.
- 5 Enter LassoFilter in the Filter Name field.
- 6 Select the Browse button and browse to the Windows\System32 directory, and select LassoConnectorforIIS.dll.
- 7 Select the OK button on all open dialogs to apply the changes.
- 8 Right-click on the computer name in the Internet Services Manager and select Restart IIS.

Configuring the .Lasso and .LassoApp Extensions

The .Lasso and .LassoApp extensions must be added to the Microsoft IIS Application Configuration screen in order to process Lasso pages.

- 1 Using the Internet Services Manager, right-click on the local computer name and select Properties from the pop-up menu.
- 2 Select the Edit button to edit the WWW Services Master properties.
- 3 Select the Home Directory tab.
- 4 Under Application Settings, select the Configuration... button.
- 5 In the Application Configuration window, select the App Mappings tab.
- 6 If the .Lasso extension does not appear under Application Mappings, select the Add button.
- 7 Next to the Executable field, select the Browse button and navigate to the Windows\System32 directory, then select LassoConnectorforIIS.dll.
- 8 Enter .Lasso in the Extension field.
- 9 Under Verbs, select the All Verbs radio button.
- 10 Check the Scripts engine check box.
- 11 Select OK to apply the changes.
- 12 Repeat steps 6 through 11 for the .LassoApp extension.
- 13 Right-click on the computer name in the Internet Services Manager and select Restart IIS.

File Extensions Note: Lasso can be configured to process file extensions other than .Lasso or .LassoApp by entering a different extension name in step 6. However, the .Lasso and .LassoApp extension must be configured, as not doing so will prevent access to required files for Lasso Professional 7, such as the administration LassoApp.

Remote IIS Configuration

This section describes setting up Lasso Professional 7 for a distributed architecture where Lasso Service runs on a separate Windows computer from the IIS Web server. The first step in setting up a distributed architecture is copying the necessary files to the remote Web server, and disabling the Lasso Web server connector on the local machine. To do this, follow the procedure below.

To setup Lasso Connector for IIS on a remote IIS Web server:

- 1 On the machine running Lasso Service, stop Lasso Service using the Services menu in Windows.

- 2 On the machine running Lasso Service, stop IIS using the Services menu in Windows. Since the Lasso Connector for IIS 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, locate the `Inetpub\wwwroot\Lasso` folder and move it to the `Inetpub\wwwroot` folder on the remote IIS server.
- 4 On the machine running Lasso Service, locate the `LassoConnectorforIIS.dll` file, located in the `Windows\System32` folder or `WinNT\System32` folder (depending on the system), and move it to the `Windows\System32` folder or `WinNT\System32` folder on the remote IIS Web server.
- 5 On the machine running Lasso Service, locate the `Lasso7ISAPI.conf` file, located in the `Windows\System32` folder or `WinNT\System32` folder (depending on the system), and move it to the `Windows\System32` folder or `WinNT\System32` folder on the remote IIS Web server.
- 6 On the remote IIS server, configure IIS for Lasso Professional 7 as specified in the previous *Lasso Connector for IIS* section.
- 7 On the remote server, open the `Lasso7ISAPI.conf` file located in the `Windows\System32` folder or `WinNT\System32` folder in a plain text editor.
- 8 Next to `Server`, replace `127.0.0.1` with the correct host name or IP address of the computer running Lasso Service.
- 9 On the machine running Lasso Service, start Lasso Service using the Services menu.
- 10 On the remote Web server, restart IIS using the Services menu.

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*.

Installation Contents

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

System User Note: The Lasso Professional 7 installer automatically configures Lasso Service under the **System** user account in Windows. The privileges of this user are invoked whenever Lasso needs to read, write, execute, or create files or folders on the hard drive.

Start Menu

Lasso Professional 7 installs the Uninstaller application in the Start Menu\Blue World Communications\Lasso Professional 7 folder in the Windows hard drive. The Uninstaller application allows one to make changes to an existing installation of Lasso Professional 7, or remove Lasso Professional 7 from the system.

Program Files

Lasso Professional 7 installs the following files and folders in the Program Files\Blue World Communications\Lasso Professional 7 folder in the Windows 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 9: Administration Utilities*.

BuildLassoApps folder – Is a folder used to build LassoApps. For more information, see *Chapter 9: Administration Utilities*.

- **Documentation folder** – Contains all Lasso Professional 7 documentation in PDF format, which can be viewed with Adobe Acrobat Reader. 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 and a Tutorial folder.

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

4-ExtendingLasso folder – Contains Extending Lasso 7 Guide.pdf and the LassoApps, LCP, LCAPL, 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.dll – Data source connector module for FileMaker Pro data sources.
 MySQLConnector.dll – 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.dll – Implements support for LJAPI modules.
 NSLookup.class – Java class file for [NSLookup] tag.
 iText.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 data source 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. For more information, see *Chapter 7: Setting Up Data Sources*.
- **LassoService.exe** – 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 and sites folder, which are 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.

Web Server Root

Lasso Professional 7 installs the following files in the `InetPub\wwwroot` folder of the Windows hard drive.

Lasso folder

The Lasso folder contains the following:

- **Default.html, Default.htm** – Contains the splash screen for Lasso Professional 7.
- **Admin.LassoApp** – The Lasso Administration LassoApp. For more information, see *Chapter 5: Using Lasso Administration*.
- **DatabaseBrowser.LassoApp** – The Database Browser LassoApp for building MySQL databases and interacting with all Lasso-configured databases. For more information, see *Chapter 10: Building and Browsing Databases*.
- **LDMLReference.LassoApp** – The LDML 7 Reference LassoApp. For more information, see *Chapter 5: LDML Reference* in the Lasso 7 Language Guide.
- **GroupAdmin.LassoApp** – The Group Administration LassoApp. For more information, see *Chapter 8: Setting Up Security*.
- **RPC.LassoApp** – The XML-RPC LassoApp. For more information, see *Chapter 29: XML* in the Lasso 7 Language Guide.
- **Error.lasso** – The default Lasso error page.
- **Images folder** – Contains images files for the HTML pages in the Lasso folder.
- **Initialize.lasso** – The Lasso initialization page.
- **Install.html** – The installation splash screen for Lasso Professional 7.
- **LassoAdmin.html** – The Lasso Administration splash page.
- **Logout.lasso** – The default Lasso logout page.

Windows System Files

Lasso Professional 7 installs the following files in the `Windows\System32` directory of the Windows hard drive. The files installed in this folder allow Lasso Professional 7 to function properly. Lasso Web server connectors are also located here by default.

- **LassoConnectorforIIS.dll** – The ISAPI filter that allows Lasso Service to communicate with Microsoft IIS version 5 and 6.
- **LassoMySQL.dll** – A Windows library file for Lasso MySQL.

- **Lasso7ISAPI.conf** – The Web server configuration file for Lasso Connector for IIS.

Uninstalling Lasso Professional 7

Lasso Professional 7 can be uninstalled using the uninstaller program provided in the Lasso Professional 7 folder. Using the uninstaller program will automatically remove all core program and system files, and is the only recommended way to uninstall Lasso Professional 7.

Note: The uninstaller program will not remove any non-default files created after the time of install. See the following section for more information.

To uninstall Lasso Professional 7:

- 1 Select the Uninstall program, located in *Program Files > Blue World Communications > Lasso Professional 7* in the Windows Start Menu. This launches the Lasso Professional 7 Setup window.
- 2 Select the Remove radio button, and then select Next. Lasso Professional 7 Setup displays a confirmation message for removing the application
- 3 Select Next in the confirmation screen. This will automatically uninstall Lasso Professional 7.
- 4 Select Finish when the uninstaller has completed.

Files and Folders Not Removed

The uninstaller program will not remove any non-default files created after the time of install, or any default Lasso files modified since the time of install. These files include the Lasso MySQL databases, Lasso log files, Lasso setups, and custom format files and LassoApps. 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.

- **Application folder** – The Program Files\Blue World Communications\Lasso Professional 7 folder is left on the Windows hard drive, which contains the following folders:

Admin – Contains exported Lasso setup information, backup table data, exported text data, and LassoApp build files from Lasso Administration.

JDBCDrivers – Contains any JDBC drivers installed to Lasso Professional 7 by the administrator. This folder will be removed if no JDBC drivers were installed.

LassoModules – Contains data sources connectors, Java libraries, and any customized Lasso modules.

LassoMySQL – Contains all default Lasso MySQL databases, which contain serial numbers, passwords, database settings, logs, and permissions from the previous setup of Lasso Professional 7.

- **Web Server Root folder** – The Web server root folder retains all format files created or modified since the time of installation (this is the `Inetpub\wwwroot` folder by default). Customized format files, Web pages, and scripts will not be deleted during uninstallation.

Reinstallation Note: Any files remaining on the system from a previous installation of Lasso Professional 7 will not be overwritten by installing a newer version. Therefore, all previous settings will be retained if a newer version of Lasso Professional 7 is installed over the files not removed during the uninstallation of the previous version.

5

Chapter 5

Using Lasso Administration

Lasso Professional 7 provides a convenient, Web-based interface for configuring Lasso global settings, managing and maintaining databases, configuring Lasso Security, monitoring events, and much more. This interface is referred to as Lasso Administration.

This chapter provides an overview of Lasso Administration, and is divided into the following sections.

- *Accessing Lasso Administration* describes how to connect to Lasso Administration.
- *Exploring Lasso Administration* describes the three main sections of Lasso Administration.
- *Interface Elements* describes the interface elements and conventions used in Lasso Administration.
- *Lasso Internal Databases* provides an overview of the internal Lasso MySQL databases that power Lasso Administration and Lasso Professional 7.

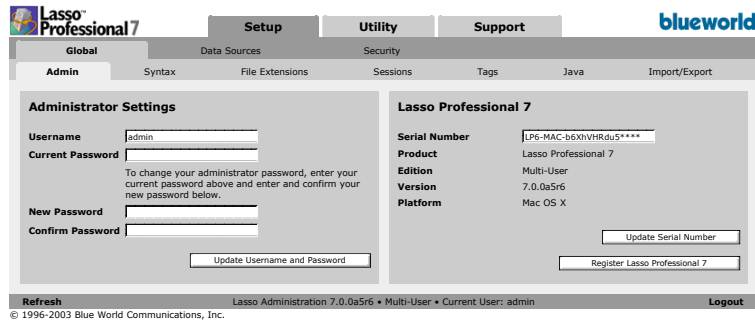
Accessing Lasso Administration

Lasso Administration consists of the Admin.LassoApp file located in the Lasso folder of the Web server root. Lasso Administration is a LassoApp file, which is accessed via a Web browser similar to a standard HTML page.

Lasso Administration can be accessed in any Web browser that meets the Web browser requirements listed in the installation chapters in this guide.

To access Lasso Administration:

In a Web browser, visit <http://www.example.com/Lasso/Admin.LassoApp>. Replace www.example.com with your domain name, IP address, or 127.0.0.1 if on a local machine. If an error is displayed, make sure Lasso Service is running as described in the installation chapters of this guide.

Figure 1: Lasso Administration**Global Administrator Account**

Only a person with the global administrator username and password may access Lasso Administration. The global administrator account is one of the first things that is set up after installing Lasso Professional 7, and is critical to the operation and administration of Lasso.

If for any reason the global administrator username and password is forgotten or lost, they can be reset using the procedure below. The Lasso Professional 7 serial number is required in order to do this.

To reset a lost administrator username and password:

- 1 Stop Lasso Service. Instructions for doing this can be found in the installation chapters of this guide.
- 2 Delete the following three files from the hard drive where Lasso Professional 7 is installed.

Lasso Professional 7/LassoMySQL/Data/lasso_internal/serial_numbers.frm
 Lasso Professional 7/LassoMySQL/Data/lasso_internal/serial_numbers.myd
 Lasso Professional 7/LassoMySQL/Data/lasso_internal/serial_numbers.myi

Note: The Lasso Professional 7 folder can be found in the Applications folder on Mac OS X, the Program Files\Blue World Communications folder on Windows.

- 3 Start Lasso Service. Instructions for doing this can be found in the installation chapters of this guide.

- 3 Access Lasso Administration in a Web browser. This should cause the initialization screen to appear.

`http://127.0.0.1/Lasso/Admin.LassoApp`

- 4 Enter your Lasso Professional 7 serial number, desired username, and desired password in the initialization screen.
- 5 Click the Submit Information button.

The Lasso global administrator username and password have been successfully reset, and Lasso Administration may now be accessed normally.

Exploring Lasso Administration

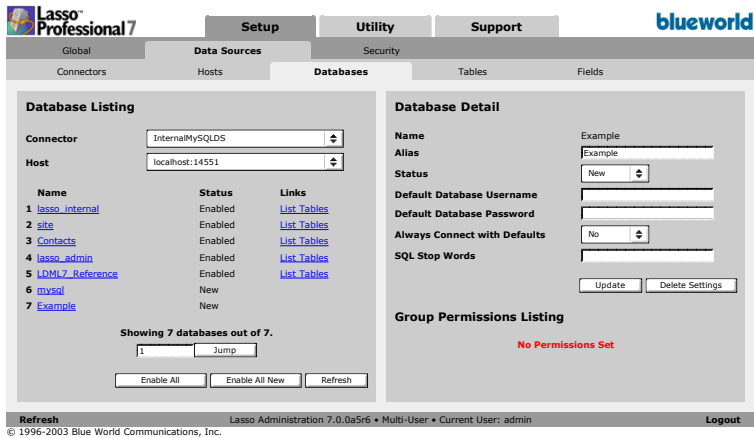
This section describes the three main sections of the Lasso Administration interface, which are navigable via tabs at the top of the interface. These sections are described below.

Note: The **Build** and **Browse** sections formerly in Lasso 6 Administration have been moved to a new dedicated application called the Lasso Database Browser, which is described in *Chapter 10: Building and Browsing Databases*.

Setup

The **Setup** section allows the administrator to set up data sources, enable and disable LDML tags, set up Lasso security groups and users, import and export settings, and set global options for Lasso Professional 7.

Figure 2: Setup Section



The functionality of the Setup section is described throughout this guide in *Chapter 6: Global Preferences*, *Chapter 7: Setting Up Data Sources*, and *Chapter 8: Setting Up Security*.

Utility

The Utility section provides the administrator various tools for maintaining the Lasso Professional 7 server. This includes tools for performing MySQL maintenance tasks, executing SQL statements, building LassoApps, monitoring URL event and email queues, monitoring errors, and more.

Figure 3: Utility Section

The screenshot shows the Lasso Professional 7 interface with the 'Utility' tab selected. The 'SQL Query Browser' section is active, displaying a form for entering a SQL query. The form includes fields for Connector (InternalMySQLDS), Host (localhost:14551), Database (Contacts), and History. The SQL Statement field contains the query: 'select * from people where ID < 5'. Below the form are controls for 'Show Fields' (All Fields), 'Max Records' (50 Records), and 'Max Field Lines' (4 Lines). At the bottom of the form are buttons for 'Issue SQL Statement' and 'Select'.

ID	First_Name	Last_Name	Company	Phone_Number	Title	Sex	Jobs
1	John	Doe	Blue World	555-1212	Mr.	Male	Sales Representative , Technical Support Representative
2	Jane	Doe	Blue World	555-1212	Mrs.	Female	Sales Representative , Technical Support Representative
3	Bob	Surname	Blue World	555-1212	Mr.	Male	Sales Representative , Technical Support Representative
4	Jane	Surname	Blue World	555-1212	Mrs.	Female	Product Manager , Sales Manager , Administration

4 records returned
8 fields returned.

The functionality of the Utility section is described primarily in *Chapter 9: Administration Utilities*.

Support

The Support section provides a launch pad for the LDML Reference included with Lasso Professional 7, and provides links to various Blue World and third-party support resources.

Figure 4: Support Section

The screenshot shows the Lasso Professional 7 interface with the 'Support' tab selected. The 'Local LDML Reference' section is active, displaying a text area with the following content:

Local LDML Reference

The LDML Reference is an online database which documents every tag in Lasso Dynamic Markup Language (LDML).

The LDML Reference is provided as a LassoApp and a local Lasso MySQL database. It will open in a new browser window.

Below the text area is a button labeled 'Open LDML Reference'.

At the bottom of the interface, there is a footer bar containing the following information:

Refresh Lasso Administration 7.0.0a5r6 • Multi-User • Current User: admin Logout
© 1996-2003 Blue World Communications, Inc.

The LDML Reference is described in *Chapter 5: LDML 7 Reference* of the Lasso 7 Language Guide, which is separate from this guide.

Interface Elements

This section describes the basics of using and customizing the Lasso Administration interface.

Tab Navigation

Navigation occurs by selecting the text portion of a tab. Doing so will display a subset of tabs with a page below. Each page generally contains two panels. The left panel generally provides a summary and listing of options and specified values. The right panel generally provides details for any selected list item. If a tab is dithered (i.e. does not link to a page upon selection), then one must fulfill a requirement such as selecting an option or button on a previous page before that page can be accessed.

Information Input And Display

All input within the interface is accomplished in the same manner as standard Web pages: by selecting HTML buttons, pull-down menus, check and boxes, and by entering information into text fields. A button name that ends in an ellipses (e.g. Databases...) means that the button will take the user to another page in Lasso Administration. Feedback after performing an action within Lasso Administration occurs via a dialog box or bold-style text within a panel. Error messages are always in a red font.

Navigating Found Sets

Navigation within extended lists occurs via **Prev** and **Next** buttons, which are located under the last result in the page. Listings are always displayed in groups of ten, where selecting the **Prev** and **Next** buttons will display the previous or next ten results.

Status Bar

The status bar at the bottom of the screen shows the current version of Lasso Professional 7, as well as the date, time, IP address, and current user of Lasso Administration. If it is an evaluation copy, it will also show the number of days remaining in the evaluation period and a **Buy Now** link, which takes one to the Blue World online store. A **Logout** link is also

provided allowing the current user to log out of Lasso Administration. Selecting the Logout link will display a dialog box instructing one to quit and restart the Web browser on order to log in with a new username and password. This is useful in the event the administrator desires to test pages as a general user. The date and time of the last update is always shown in the lower right corner of each page or panel.

Logout Note: Selecting Logout removes the current Lasso Administration session cookie from your Web browser. It is recommended that you select Logout before quitting your Web browser to properly end a Lasso Administration session.

Customization

The source code for Lasso Administration is supplied with Lasso Professional 7 making it possible for developers to further customize the administration interface based on the administrator's needs. For more information on customizing Lasso Administration, see *Chapter 2: LassoApps* in the Extending Lasso 7 Guide.

Note: Blue World does not provide technical support for customized versions of Lasso Administration. Please use caution when customizing LassoApps and other features that are crucial to the operation and administration of Lasso Professional 7.

Lasso Internal Databases

Lasso Professional 7 uses several internal Lasso MySQL databases in which to store data and settings. These databases will appear in the Setup section of Lasso Administration with the status Enabled, and are required for Lasso Professional 7 to function properly. This section describes the function for each of these databases.

- **Lasso_Internal** – This is the database where all data that is input by an administrator into Lasso Administration is stored. This includes data source information, group and user information, tag security information, serial numbers, and global preferences defined in Lasso Administration.
- **Lasso_Site** – Stores all site preferences, user data, queued email messages, scheduled events, and logged errors. These types of data are obtained via tags such [Session...], [Log...], [Email...], and [Event...], which are described in the Lasso 7 Language Guide.

- **Lasso_Admin** – This database is used by Lasso Professional 7 to store information about custom LDML tags, as well as core tags that have LDML-based implementations (e.g. [Email_Send]). This database is required for these tags to work properly. For more information on custom tags, see *Chapter 3: Custom Tags* in the Extending Lasso 7 Guide.

Due to the nature of the data in these databases, it is critical that these databases not be disabled. Making changes to these internal Lasso MySQL databases can have a severe negative effect on the performance and functionality of Lasso Professional 7.

Internal Database Maintenance

It is important that the internal databases be maintained to prevent corruption. The best tactics for maintaining a healthy Lasso Professional 7 server are described below.

To maintain Lasso's security and site databases:

The following maintenance regimen should be established for the Lasso_Internal, Lasso_Admin, and Lasso_Site databases.

- Periodically check the databases for damage using the CHECK TABLE SQL statement documented in the *Maintaining Databases* section of *Chapter 9: Administration Utilities*. Any damage found can be repaired using REPAIR TABLE.
- After a crash, all tables should be checked using CHECK TABLE, and any damage should be repaired using REPAIR TABLE before the server is put back into operation. *Chapter 9: Administration Utilities* has information about how to execute scheduled maintenance routines every time Lasso Service is started.
- The Lasso_Internal, Lasso_Admin, and Lasso_Site databases should be backed up regularly using the procedures described in the *Backing Up Databases* section of *Chapter 9: Administration Utilities*. Depending on how busy the machine with Lasso Service is, backups may need to be performed weekly or even more frequently.
- The *Setup > Global Settings > Import/Export* section of Lasso Administration can be used to output the current preferences and security settings for Lasso Professional 7. It is recommended that an export be made and stored in a secure location so that the settings can be restored to a stable state if it is ever necessary to re-install Lasso Professional 7. See *Chapter 6: Setting Global Preferences* for more information.

6

Chapter 6

Setting Global Preferences

This chapter describes how to set global preferences for Lasso Professional 7. The *Setup > Global Settings* section in Lasso Administration allows the Lasso global administrator to set server-wide preferences for the Lasso Professional 7 server. These settings cannot be overridden by any lower level security settings or via LDML.

- *Administrator Settings* covers password and serial number settings.
- *Syntax Settings* describes how to change global settings for LDML syntax, Lasso file extensions, and LassoApps.
- *File Extension Settings* describes how to change global settings for file extensions.
- *Session Settings* describes how to set global options for the [Session...] tags in Lasso Professional 7.
- *Tag Settings* describes how to enable and disable LDML tags for the Lasso Professional 7 server.
- *Java Settings* describes how to configure Lasso to work with Java.
- *Import/Export Settings* describes how to import and export Lasso 7 settings files.

Administrator Settings

The administrator username and password is established when Lasso Professional 7 is installed and initialized. Only the administrator has the privileges to change Lasso's configuration or security settings, as described in the previous chapter.

The Admin page is where the global administrator username and password can be changed, and Lasso Professional 7 can be registered. The global administrator username and password are initially set during the initialize step of installation, as described in the installation chapters in this guide.

Figure 1: Admin Page

Updating the Global Administrator Password

The Administrator Settings panel allows the administrator username and password to be updated. The password is not shown, but can be changed by entering the current password with a new password and confirmation.

Lost Password Note: If the global administrator password is lost, please see the instructions at the beginning of *Chapter 5: Using Lasso Administration* for resetting the password.

To change the global administrator username and password:

- 1 Enter an administrator username in the Username field. The username is Administrator by default.
- 2 Enter the current administrator password in the Current Password field.
- 3 Enter a new password in the New Password field.
- 4 Enter the same password exactly as it was entered in the New Password field in the Confirm New Password field.
- 5 Select the Update Settings button.

During administrator login, the administrator will be prompted to supply the administrator username and password specified in the Administrator Settings panel.

Updating the Lasso Professional 7 Serial Number

The Lasso Professional 7 panel allows the initialized serial number to be updated, and displays information about the current serial number and

software version. The Purchase Lasso Professional 7 button is visible only if an evaluation serial number is entered. The Register Lasso Professional 7 button is visible if a purchased serial number is entered, but the software is not registered. The date and time of the last serial number update is always shown in the lower right corner of the Lasso Professional 7 panel.

To update the Lasso Professional 7 serial number:

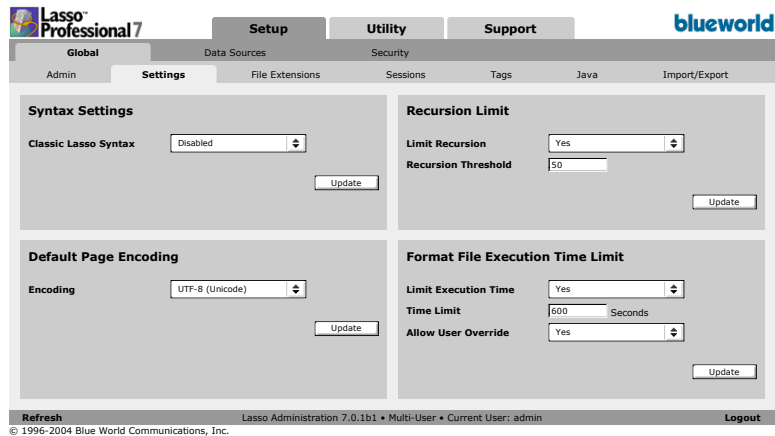
- 1 Enter or edit the serial number in the Serial Number field.
- 2 Select the Update Serial Number button.

Evaluation Note: If Lasso Professional 7 is first initialized using an evaluation serial number and then you later purchase Lasso Professional 7, simply enter the purchased serial number into this form and select **Update Serial Number**. The **Days Remaining** message on the lower message bar will disappear after a valid purchased serial number is entered.

Syntax and Debug Settings

The Settings page in Lasso Administration allows the administrator to control how Lasso Professional 7 processes certain types of LDML syntax, and how it handles cases where certain types of code can adversely affect Lasso Service.

Figure 2: Settings Page



Syntax Settings

The Syntax Settings panel allows Classic LDML syntax to be globally enabled or disabled. Classic LDML syntax is described below.

- **Classic Lasso Syntax** – Classic Lasso syntax is a deprecated programming method which provides LDML database commands within URLs or HTML forms. These commands are passed from the page in which they are specified to a response page which formats the results of the commands. Classic Lasso syntax is enabled by default to ensure compatibility with solutions built using earlier versions of Lasso.

If Classic Lasso syntax is disabled, then older Lasso solutions using the Classic Lasso database methodology will not work. Disabling Classic Lasso enhances the security of a Lasso powered Web site by allowing database schema to be hidden and preventing site visitors from manufacturing URLs that perform different database actions than those explicitly programmed into the Web site.

To set global syntax options:

- 1 Select Enabled or Disabled from the Classic Lasso Syntax pull-down menu.
- 2 Select the Update button.

Default Page Encoding

The Default Page Encoding panel allows the administrator to specify the default character set that Lasso Service should assume when interpreting data sent via client browsers (such as HTML form data). This can be UTF-8 (Unicode) or Latin-1 (ISO-8859-1). Unicode is used by default.

To set the default character set:

- 1 Select UTF-8 (Unicode) or Latin-1 (ISO-8859-1) from the Encoding pull-down menu.
- 2 Select the Update button.

Recursion Settings

The Recursion Limit panel allows the administrator to set a limit as to how many times a Lasso page may call itself using an [Include] or [Library] tag. A recursion limit will eliminate cases where a page has been programmed to recurse infinitely, and would otherwise adversely affect the operation of Lasso Service.

To set a recursion limit:

- 1 Select Yes from the Limit Recursion pull-down menu (default). Selecting No removes the recursion limit, which is not recommended.

- 2 Enter the number of times (positive integer) you want to allow a page to recurse before being stopped in the Recursion Threshold field (50 by default).
- 3 Select the Update button.

Execution Time Settings

The Format File Execution Time panel allows the administrator to set a time limit as to how many seconds a format file (Lasso page) may run before timing out. A format file execution time limit can help eliminate cases where a page has been programmed to perform endless operations that may otherwise adversely affect the operation of Lasso Service.

Important: The format file execution time limit controls the amount of time Lasso waits before timing out a true Lasso operation. This does not include nor factor in any timeout thresholds present in third-party components, such as data sources, Web servers, and Web browsers.

To set a format file execution time limit:

- 1 Select Yes or No from the Limit Execution Time pull-down menu to enable or disable page timeouts for the entire server (Yes by default).
- 2 Enter the number of seconds (positive integer) you want to allow a page to run before being timed out (600 by default). The format value time limit can not be set to a value below 60 (one minute).
- 3 Select Yes or No from the Allow User Override pull-down menu to enable or disable developers' abilities to set custom timeouts for individual pages using the [Lasso_ExecutionTimeLimit] tag (No by default).
- 4 Select the Update button.

File Extension Settings

The Format File Settings page in Lasso Administration allows the administrator to control what format file extensions are allowed for use with Lasso.

Figure 3: File Extensions Page



Adding a format file extension to this page does not cause the files with that extension to be processed by Lasso, but rather grants permission for the use of files with that extension within Lasso. The difference between format file settings in Lasso Administration and format file settings in the Web server is described below.

- **Format File Extension Security in Lasso Administration** – Allows the administrator to specify what format files extensions are allowed for use with Lasso. By default, the list will include .lasso, .LassoApp, .uld, .htm, .html, .xml, .inc, .text, .txt, .pdf, .jpg, .gif, .png, .bmp, .psd, .tif, .rbg, and .cmyk. This applies to all format files which are served via Lasso or referenced within an LDML tag (e.g. [Include], [Image]). Files with extensions not listed here cannot be processed or included by Lasso.
- **Format File Settings in the Web Server** – Configuring what format file extensions are actually processed by Lasso is handled in the Web Server. A file extension must be added in Lasso Administration and configured in the Web server before the Web server can invoke Lasso to process files. Only the .Lasso and .LassoApp extension are configured in the Web server by default after installation. See the *Extended Configuration* section of the installation chapters in this guide for instructions on how to configure additional format file extensions in the Web server.

To add a format file extension in Lasso Administration:

- 1 Enter the extension to be allowed in the Add Extension field. All extensions must be preceded by a period (.).

2 Select the Add Extension button.

To remove a format file extension in Lasso Administration:

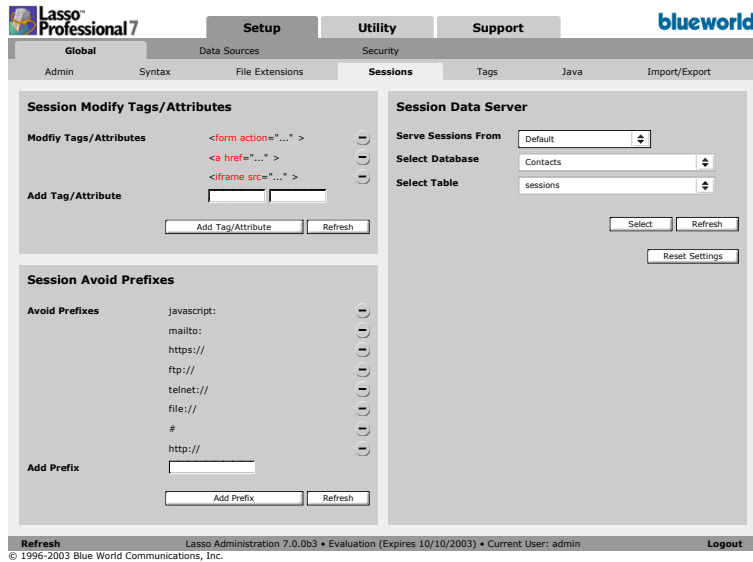
Select the Minus (-) button next to the extension to be removed.

Note: The .Lasso, .LassoApp, and .uld extensions cannot be removed as they are required for the basic operation of Lasso. The .uld extension is used by Lasso to temporarily identify files uploaded via the Web, and is necessary if files will be uploaded via a Web interface.

Session Settings

The Sessions page allows the administrator to set global preferences for the [Sessions_...] tags in Lasso Professional 7, including setting the MySQL table where all session data for the server is stored.

Figure 4: Sessions Page



Session Tag Preferences

The Session Tag panel allows the administrator to set global preferences for the [Sessions_...] tags. These preferences govern how sessions will propagate through HTML pages, and are described below. For information on the [Session_...] tags, see *Chapter 19: Sessions* in the Lasso 7 Language Guide.

Modify Tags/Attributes

The Modify Tags/Attributes field allows the administrator to specify what HTML tags and attributes the [Session_...] tags will append token values to. When using sessions, these token values allow variables for a user to stay consistent from page to page. All HTML tag and attributes involved in linking a user from one page to another should be listed here. When invoked, session URL data will be added to the attributes of the tags specified, which should be set to valid paths to files. The `action` attribute of the `<form>` tag and the `href` attribute of the `<a>` tag are listed by default.

To add a new tag/attribute pair:

- 1 Next to Add Tag/Attribute, enter the name of an HTML tag in the left-most field. The `<` and `>` HTML characters should not be included as part of the tag or attribute names.
- 2 Next to Add Tag/Attribute, enter the name of the attribute of the tag to which session data will be appended in the right-most field.
- 3 Select the Add Tag/Attribute button.

To remove an existing tag/attribute pair:

Next to Modify Tag/Attributes, select the Minus (-) button next to the tag/attribute pair you wish to delete..

Avoid Prefixes

The Avoid Prefixes field allows the administrator to specify URL prefixes that should be avoided by the [Session_...] tags, meaning that no session information will be appended to links with the specified prefixes. Because session data may only be interpreted by Lasso format files, any prefix that takes a user to a page on a different server or initiates a protocol that cannot be parsed by Lasso (e.g. `telnet://`, `file://`, `mailto:`) should be listed here.

To add a prefix to be avoided:

- 1 Enter the URL prefix to be avoided in the Add Prefix field. Any URLs that begin with the value entered here will be avoided.
- 2 Select the Add Prefix button.

To remove a prefix:

Next to Avoid Prefixes, select the Minus (-) button next to the prefix you wish to remove.

Multi-Server Session Support

Lasso Professional 7 provides the ability to share session data with other Lasso Professional 7 servers so that Lasso sessions can persist within load-balancing and redundant server configurations with multiple Lasso Professional 7 servers.

Session sharing is achieved by designating a single external MySQL host to serve all Lasso session data, and then configuring each Lasso Professional 7 server to store all session data on this host.

Configuring an External Session Host

The Session Data Server panel allows the administrator to set the MySQL host that will be used to store all session data for the current Lasso Professional 7 server.

Warning: Configuring Lasso to store all session data on an external MySQL host creates a dependency on that external host in order for sessions to work. It is strongly recommended that the MySQL server be on the same network as the Lasso Professional 7 servers.

To create and use an external sessions table:

- 1 In the Serve Sessions From pull-down menu, select External Database. This specifies that a session table other than the default `site.sessions` table will be used.
- 2 Next to Select Database, select the database where to want a sessions table to be created. This menu contains a list of all enabled MySQL databases in the *Setup > Data Sources > Databases* section of Lasso Administration.
- 3 Select the Create Sessions Table... button. A warning will be displayed indicating that the current Lasso Professional 7 server must rely on the newly created sessions table in the database specified for sessions to work.
- 4 Click the OK button. This table will be used to store all session data until the host is manually switched again.

To select and use an existing external sessions table:

- 1 In the Server Sessions From pull-down menu, select External Database. This specifies that a session table other than the default `site.sessions` table will be used.
- 2 Next to Select Database, select the database that contains the sessions table you wish to use. This menu contains a list of all enabled MySQL databases in the *Setup > Data Sources > Databases* section of Lasso Administration.

- 3 Select the Select button. A warning will be displayed indicating that the current Lasso Professional 7 server must now rely on the specified sessions table for sessions to work.
- 4 Click the OK button. This table will be used to store all session data until the host is manually switched again.

Tag Settings

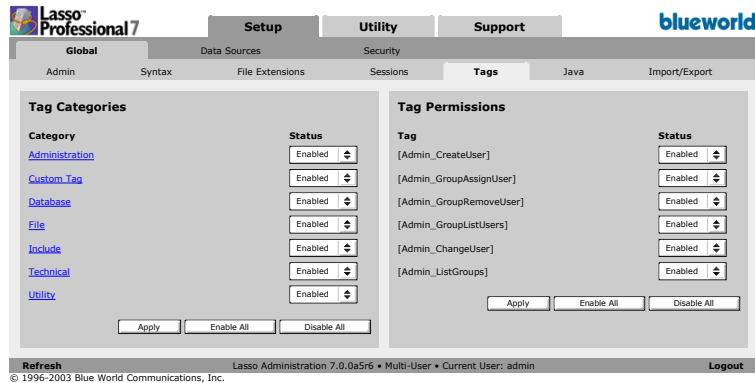
Lasso Professional 7 provides administrators the ability to restrict individual LDML tags or tag categories from functioning. Tag-level security is useful in that it allows administrators to control what tags can and cannot be used based on individual needs. If a tag has been disabled, then an error will be displayed when it is called from within a format file.

There are seven relevant tag categories that may be restricted globally at the tag level. For more information on these tags, see the Lasso 7 Language Guide.

- **Administration** – This category includes tags which return information about the environment of Lasso and allow security settings to be examined and changed.
- **Database** – Tags in this category allow the schema of Lasso MySQL and other MySQL databases to be altered, and can be disabled.
- **File** – Tags in this category allow files on the local hard drive to be manipulated. Disabling this category will prevent Lasso from modifying any files on the local hard drive. It is recommended that you disable the [File_...] tags unless you are actively using them.
- **Include** – Tags in this category allow format files to be included in the current processing format files and for data from remote Web servers to be included and processed.
- **Technical** – The [TCP_...] tags in this category can be disabled in order to disallow low-level connections with remote Web servers and other applications which are available over the Internet.
- **Utility** – The [Email_Send] and [Event_Schedule] tags can be disabled in order to prevent developers from sending email from Lasso or scheduling events for future execution.

The Tags page in Lasso Administration allows the administrator to enable or disable LDML tags on the Lasso Professional 7 server. Tags that are disabled will not be available to any format files that are served through Lasso.

Figure 5: Tags List Page



Tag Categories

The Tag Categories Listing panel shows a listing of the seven tag categories in LDML that contain tags that can be enabled or disabled. Tags defined in individual format files will not be listed here. A *Mixed* status indicates that a selected tag category contains both Enabled and Disabled tags. Selecting Enable All or Disable All will enable or disable all tags in each category shown.

Custom Tags Note: Third party tags cannot be enabled or disabled within Lasso Administration. Third party tags can only be disabled by removing the corresponding third party tag modules from the **Lasso Modules** folder, or by removing corresponding custom tag libraries from the **Startup.LassoApp** source and recompiling. A restart of Lasso Service is required for changes to take effect.

Updating Tags

When a category is selected in the Tag Categories Listing panel, it shows all tags in that category in the Tags Listing panel, which appears to the right. Prev and Next buttons appear for navigation if there are more than ten tags in a selected category. Each tag can be individually enabled or disabled by selecting Enabled or Disabled from the Status pull-down menu, and then selecting Update. All tags shown in the Tags Listing panel can also be enabled or disabled by selecting Enable All or Disable All.

Tag Dependencies

Some LDML tags have dependencies on other tags to function properly. If a tag has been disabled that has dependencies with other tags, then those tags will not function correctly. For example, if [TCP_...] tags are disabled, it will cause tags such as [Email_Send] not to work, which relies on the use

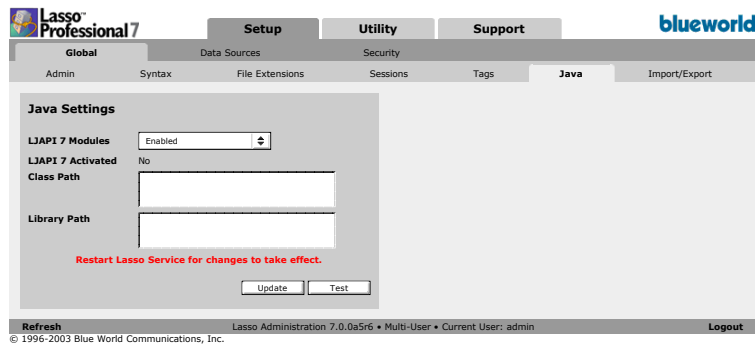
of the [TCP_...] tags. To see whether or not a tag has any dependencies, consult the LDML Reference and check to see if there are any tags listed in the Required field in the Detail view for any tag.

Java Settings

The Java page is where the administrator can set up Lasso Professional to work with Java, so that Lasso's Java-based components may be used. This includes JDBC data source connectivity, third-party LJAPI modules, and LDML tags which have Java-based implementations. Consult the LDML 7 Reference for information on whether or not an LDML tag requires Java.

The Java Settings panel allows the administrator to globally enable or disable Java-based components, and to set the Class Path and Library Path for third-party Java module class files. The Class Path and Library Path for all default Java modules installed with Lasso Professional 7 is the Lasso Professional 7/LassoModules folder, which cannot be changed. Altering the Class Path and Library Path fields in the Java Settings panel will not affect how the default Java modules operate.

Figure 6: Java Page



LJAPI allows Java programmers to develop new tags and functionality in Lasso Professional 7. For more information on LJAPI, see *Chapter 8: Lasso Java API* in the Extending Lasso 7 Guide.

To update Java settings:

- 1 Select Enabled or Disabled from the LJAPI Modules pull-down menu to enable or disable LJAPI (Enabled by default). This includes all core Java functionality in Lasso Professional 7 as well as third-party LJAPI modules.

2 Enter the file path to the Java class folder in the **Class Path** field.

Note: Multiple **Class Paths** or **Library Paths** can be specified by entering a semi-colon ; (Windows) or colon : (Mac OS X/Linux) after a path, and then entering the next full path immediately after the semi-colon or colon. There should be no spaces or carriage returns in or between any specified path(s) per JRE syntax requirements.

3 Enter the file path to the Java library folder in the **Library Path** field.

Windows/Linux Note: The default **Class Path** and **Library Path** may not be correct depending on the version of JRE installed. It is necessary to confirm the actual path to the **lib** folder in Windows or Linux before selecting **Update**.

Mac OS X Note: The **Class Path** and **Library Path** fields are unnecessary for Mac OS X installations, and are blank by default.

4 Select **Update**. A dialog box will appear informing one to double-check the **Class Path** and **Library Path** in the hard drive to ensure they are correct, and to restart Lasso Service after selecting **OK**.

5 Select **OK**.

6 Restart Lasso Service for the changes to take effect.

7 Return to the **Setup > Global Settings > Java** page in Lasso Administration.

8 Select the **Test** button.

If the **Activated** field now displays **Yes**, then LJAPI has been successfully enabled. Otherwise, an error will be displayed informing you to double-check the **Class Path** and **Library Path** fields against the actual file path to the **lib** folder on the hard drive, and to make sure that Java has been installed properly. For instruction on properly installing Java, see the installation chapters in this guide.

LJAPI is checked to ensure it is operational via an internal check for an LJAPI-based tag (e.g. [NS_Lookup]). If this tag is functioning as expected, Lasso will then change the value in the **Activated** field to **Yes**.

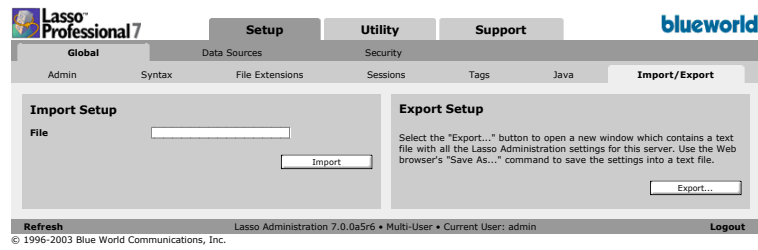
Import and Export Settings

The **Import/Export** page in Lasso Administration provides the ability to export the complete state of Lasso's configuration and security settings. Importing and exporting setup files is useful for backing up a particular Lasso Professional 7 configuration, or setting up a new installation with the same configuration as another copy of Lasso Professional 7.

A Lasso setup file is an XML file that contains all custom administration settings entered in Lasso Administration. The information in a Lasso setup file corresponds to the options selected in Lasso Administration in the Global Settings, Data Sources, and Security pages.

Care should be taken with the setup files that are exported, as these files contain all of the security settings of Lasso Professional 7. Lasso stores passwords for users encrypted using MD5, but passwords for data sources may be stored in plain text. Export files which have been modified by an untrusted third-party should never be imported into Lasso Administration without careful review of the settings within the file.

Figure 7: Import/Export Page



Exporting Lasso Setup Files

The Export Setup panel allows the current Lasso Professional 7 configuration to be exported as a text setup file to be preserved for future use.

To export a Lasso setup:

- 1 In the Export Setup panel, select the Export Setup button. This will open a new window that contains the contents of your Lasso Professional 7 setup file.
- 2 Save the resulting pop-up window as a plain text file on your hard drive. Or, copy and paste the entire contents of the window, and save as a text file on your hard drive.

Importing Lasso Setups

The Import Setup panel allows Lasso setup files to be imported. Only setup files exported using Lasso Professional 7 may be imported.

To import a Lasso setup:

- 1 In the Import Setup panel, select the Browse button, and choose the Lasso setup file on your hard drive you wish to import.

- 2 Select the Import Setup button. A warning informs the administrator that importing a setup will overwrite all existing installation settings with the settings being imported.
- 3 Select the OK button. This will overwrite all current settings with those stored in the imported setup file.

After importing a setup, the Import Setup panel changes to the Import Setup Results panel, where feedback is displayed about what data was imported successfully.

Note: While all current settings will be overwritten in an import, the settings provided during initialization (global administrator username and password, serial number, and registration information) will not be overwritten.

7

Chapter 7

Setting Up Data Sources

This chapter describes how to configure data sources for use with Lasso Professional 7, and is divided into the following sections.

- *Overview* provides an overview of data source connectors in Lasso Professional 7.
- *Lasso MySQL Data Sources* describes the Lasso MySQL data source built into Lasso Professional 7.
- *External MySQL Data Sources* provides instructions for setting up a MySQL data source other than Lasso MySQL for use with Lasso Professional 7.
- *FileMaker Pro Data Sources* provides instructions for setting up FileMaker Pro data sources for use with Lasso Professional 7.
- *JDBC Data Sources* provides instructions for setting up JDBC data sources for use with Lasso Professional 7, such as Microsoft SQL Server, Frontbase, Interbase, and Sybase.
- *Setting Databases Preferences* describes how to set database-level preferences in Lasso Professional 7.
- *Setting Table Preferences* describes how to set table-level preferences in Lasso Professional 7, including Unicode-encoding preferences.
- *Setting Field Preferences* describes how to set field-level preferences in Lasso Professional 7.

Overview

Lasso Professional 7 communicates with data sources using Lasso data source connectors, which are modular components configured using the

Setup > Data Sources section of Lasso Administration. Lasso Professional 7 provides built-in connectors for MySQL and Filemaker Pro data sources by default, and provides connectivity for JDBC-compliant data sources provided that the JDBC drivers for the desired data sources are installed to the Lasso Professional 7/JDBCDrivers folder.

FileMaker Pro, MySQL, and JDBC data sources can be configured to run on the same machine as Lasso Professional 7, or on a remote machine. Whether or not a JDBC-compliant data source can communicate with Lasso on a separate machine depends on whether or not the JDBC data source can communicate via TCP/IP.

Custom data source connectors for other data sources can also be created for use with Lasso Professional 7. Information about creating and using third-party data source connectors can be found in the Extending Lasso 7 Guide.

Using Lasso Data Source Connectors

Data source connectors allow database actions to be performed via Lasso Web pages and format files. Database actions can be used in Lasso to search for records in a database that match specific criteria, to navigate through the found set from a database search, to add, update, or delete a record in a database, to fetch schema information about a database, and more. In addition, database actions can be used to execute SQL statements in SQL-compliant databases.

Interacting with data sources via Lasso Professional 7 involves four steps:

- 1 Configuring the data source application or service to accept connections from Lasso Professional 7. This is done in the data source itself, outside of Lasso Administration. This chapter describes configuring MySQL, FileMaker Pro, and JDBC-compliant data sources to accept connections from Lasso Professional 7.
- 2 Configure Lasso Professional 7 to communicate with a data source host. This involves adding the data source connection information in the **Setup > Data Sources > Hosts** section, and enabling the desired databases in the **Setup > Data Sources > Databases** section. This chapter describes creating connections with MySQL, FileMaker Pro, and JDBC-compliant data sources.
- 3 Set up Lasso Security for the data source via the **Setup > Security** section of Lasso Administration. This typically involves setting database and table permissions for the AnyUser group, and then creating custom groups and users if password-protected user access is desired. This is described in *Chapter 8: Setting Up Security*.

4 Write LDML code to interact with the data source. This is covered in chapters 6-10 of the Lasso 7 Language Guide.

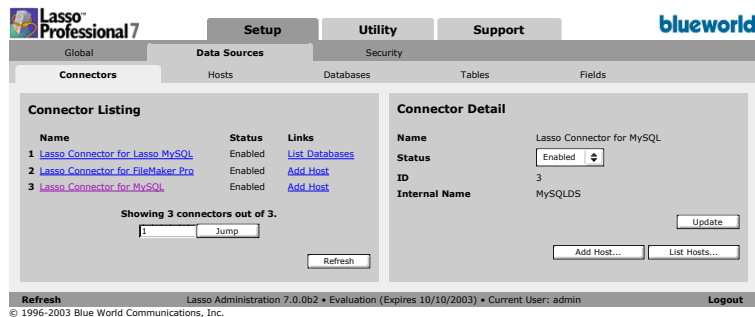
Note: For a quick-start tutorial on how to set up an example database to communicate with a set of example Lasso pages, see *Chapter 11: Setting Up Lasso Solutions*.

Viewing Lasso Data Source Connectors

The *Setup > Data Sources > Connectors* page in Lasso Administration is where all data source connectors can be listed, viewed, enabled, or disabled. The Connector Listing panel shows all connectors currently installed to Lasso Professional 7, the status of each connector, and links to the Hosts page for each connector.

Lasso MySQL Note: Lasso MySQL cannot be disabled as it is required for Lasso Professional 7 to function properly, nor can the Lasso MySQL host be configured. Because there can be only one Lasso MySQL host, a *List Databases* link is provided instead of a *List Hosts* link.

Figure 1: Connectors Page



Updating Data Source Connectors

Selecting a data source connector from the Connectors Listing panel will show the Connector Detail panel to the right. The Connector Detail panel displays the name of the selected data source connector, its status, and the internal name for the connector as it appears in the Lasso Service console. Data source connectors may be enabled or disabled using this panel.

To update details for a selected connector:

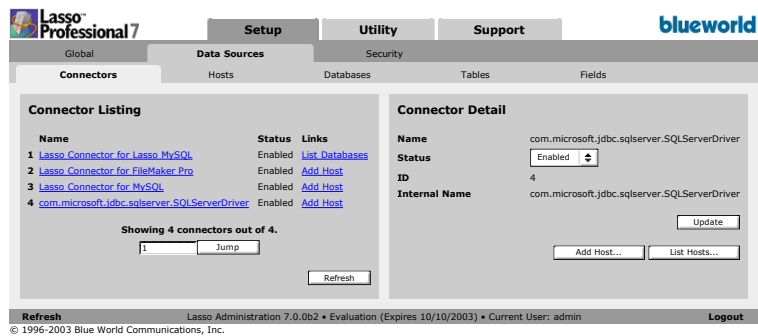
- 1 Select Enabled or Disabled from the Status pull-down menu to enable or disable the connector.
- 2 Select the Update button.

Adding JDBC Data Source Connectors

No JDBC data source connectors will be shown unless JDBC drivers are installed to the Lasso Professional 7/JDBCDrivers folder. LJAPI must also be enabled in the *Setup > Global Settings > Java* page in Lasso Administration before JDBC data sources can be used.

Once a JDBC driver is installed, a connector for the driver will appear in the Connector Listing panel. The initial connector name will appear as the internal name for the driver (e.g. `com.microsoft.jdbc.sqlserver.SQLServerDriver` for Microsoft SQL Server 2000).

Figure 2: JDBC Connector Page



Selecting the name of the JDBC connector shows the Connector Detail panel to the right. Here, the name shown for the connector may be updated to be more descriptive (e.g. Lasso JDBC Connector for MS SQL Server) in addition to updating the status.

Lasso MySQL Data Source

Lasso Professional 7 comes with an embedded high-performance data source called Lasso MySQL. This data source is used to store Lasso's internal site preferences and security settings, but can also be used to host custom databases for custom solutions. Lasso MySQL can be used as the primary data source for Lasso Professional 7, or can be used in concert with FileMaker Pro, an external installation of MySQL, JDBC-compliant data sources, or other third-party data sources.

Lasso MySQL is installed, enabled, and pre-configured within Lasso Professional 7 by default. No further setup or installation of Lasso MySQL is required.

Differences From Standard MySQL Installations

Lasso MySQL has the following differences from a standard MySQL installation. These differences ensure that you can install a second copy of MySQL on the same machine as that hosting Lasso Professional 7 so there will be no conflicts.

Other than the differences described below, the version of Lasso MySQL included with Lasso Professional 7 is identical to a standard installation of MySQL version 4.01.27

- **Embedded Operation** – The Lasso MySQL service is embedded into Lasso Service, and is started and stopped as part of Lasso Service.
- **Dedicated Connection** – Lasso MySQL is installed with secure settings and may only accept connections through Lasso Professional 7. All administration for Lasso MySQL is handled exclusively through Lasso Administration and other LDML-based utilities. If third-party MySQL utilities are desired, then a separate instance of MySQL may be installed on the same or different machine from Lasso MySQL.
- **Working Directory** – Lasso MySQL is installed inside the Lasso Professional 7 folder in a folder named LassoMySQL. The structure of a standard MySQL installation is replicated inside this folder.

Important: If MySQL is to be installed on the same machine as Lasso Professional 7, make sure that it is in a separate directory from Lasso MySQL. Lasso Professional 7 will not function properly if Lasso MySQL is overwritten by another version of MySQL.

Using Lasso MySQL Databases

Lasso MySQL databases are stored in the Lasso Professional 7/LassoMySQL/Databases folder. By default this folder contains databases that are required for Lasso Professional 7 to function, as documented in *Chapter 5: Using Lasso Administration*.

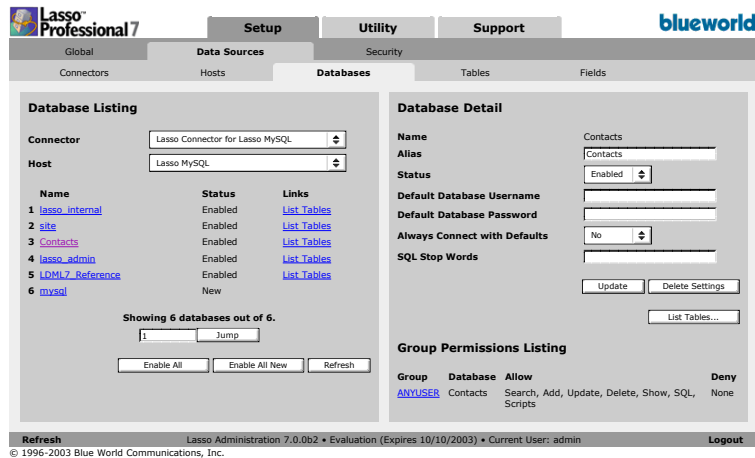
Custom databases may be created and added to this folder three different ways:

- Creating custom Lasso MySQL databases using DatabaseBrowser.lassoapp, which is described in *Chapter 10: Building and Browsing Databases*.
- Issuing SQL statements via the *Utility > SQL* section of Lasso Administration. For more information on issuing SQL statements, see *Chapter 9: Administration Utilities*.
- Creating MySQL databases using a third-party tool and moving them into the Lasso Professional 7/LassoMySQL/Databases folder..

Enabling Custom Lasso MySQL Databases

Once custom MySQL databases are created or moved to the Lasso Professional 7/LassoMySQL/Databases folder, they may be enabled in Lasso Administration and then used in LDML code.

Figure 3: Lasso MySQL Databases Page



To enable custom Lasso MySQL databases:

- 1 In Lasso Administration, go to **Setup > Data Sources > Databases**.
- 2 Select Lasso MySQL from the Connector pull-down menu. This will display a list of databases for Lasso MySQL below.
- 3 Select the database you wish to enable in the Databases Listing panel. This will show the Database Detail panel to the right. If your custom database does not appear in the Databases Listing panel immediately after it has been set up, then try selecting the Refresh button.
- 4 In the Database Detail panel, select Enabled from the Status pull-down menu to enable the database.
- 5 Leave the Default Database Username and Default Database Password fields blank, and leave Always Connect with Defaults set to No.
- 6 Leave the SQL Stop Words field blank initially unless you are familiar with and need SQL stop word operation. This is described in the **Database Preferences** section of this chapter.
- 7 Select the Update button. This enables the Lasso MySQL database and all tables within.

Once databases are enabled in Lasso Administration, the Lasso global administrator may test them using the Browse section of the

DatabaseBrowser.LassoApp tool, then set preferences and permissions for them so they may be used in LDML code.

For information on setting up required Lasso data source permissions for users, see *Chapter 8: Setting Up Security*. For information on setting database, table, and field preferences, see the remaining sections in this chapter.

External MySQL Data Sources

This section provides instructions for setting up a MySQL data source for use with Lasso Professional 7 via Lasso Connector for MySQL. A MySQL service running on a host machine is able to communicate with Lasso Professional 7 via a TCP/IP port. This can be on the same machine as Lasso Professional 7, or on a separate machine. Since Lasso Professional 7 comes with a version of MySQL (Lasso MySQL) installed, it may be desirable to only set up separate versions of MySQL on remote machines. For more information on MySQL, see the following URL:

<http://www.mysql.com>

Requirements

Lasso Professional 7 is certified to work with default installations of MySQL 3.23 and MySQL 4.01 (release versions for Windows, Mac OS X, or Linux). Newer versions or modified versions of MySQL may work with Lasso Professional 7, but are not officially supported.

For Lasso Professional 7 to successfully communicate with a MySQL host, the following requirements must be met.

- The MySQL service must be running.
- MySQL must be assigned a port with no conflicts in which to communicate. For standard versions of MySQL, this is port 3306 by default.
- Access privileges must be assigned in MySQL to the machine running Lasso Professional 7 for any or all levels (database-level, table-level, column-level, etc.) of security.

Configuring MySQL Hosts For Use With Lasso

MySQL is operated via a command-line interface application, which is normally located in the Bin directory of the MySQL installation on the client machine. For information on how to use this, consult the MySQL documentation.

Security for MySQL data sources can be set at any level (MySQL-level, database-level, table-level, etc.). All permissions for all levels of security need to be given to Lasso Professional 7 for unrestricted operation. This involves setting a new user and password for Lasso Professional 7 in MySQL, then entering the username and password in Lasso Administration. Follow the procedure below for granting all permissions to Lasso Professional 7 in MySQL using the MySQL command line utility.

To grant all permissions to Lasso Professional 7 in MySQL:

- 1 In the command line utility, log in to MySQL as the root user by entering the following command:

```
mysql -u root -p your_password;
```

Replace `your_password` with the root password for MySQL specified during the MySQL installation. For instructions on how to set or change the MySQL root password, see the MySQL documentation.

- 2 Enter the following to assign a username and password for Lasso Professional 7 to gain access to all levels of security in MySQL.

```
GRANT ALL ON *.* TO Username@Hostname IDENTIFIED BY "Password";
```

Replace `Username` and `Password` with the username and password values you wish to assign to Lasso Professional 7. These will be used in the **Setup > Data Sources > Databases** section in Lasso Administration, as described in *Chapter 7: Setting Up Data Sources*. Replace `Hostname` with the host name or IP address of the machine on which Lasso Professional 7 is installed. This will restrict the access of this username and password to the machine running Lasso Professional 7 for added security. `ALL` represents all MySQL action permissions (e.g. `INSERT`, `SELECT`, `DELETE`, etc.), and the `*.*` characters represent all levels of security in MySQL (e.g. database-level, table-level, etc.).

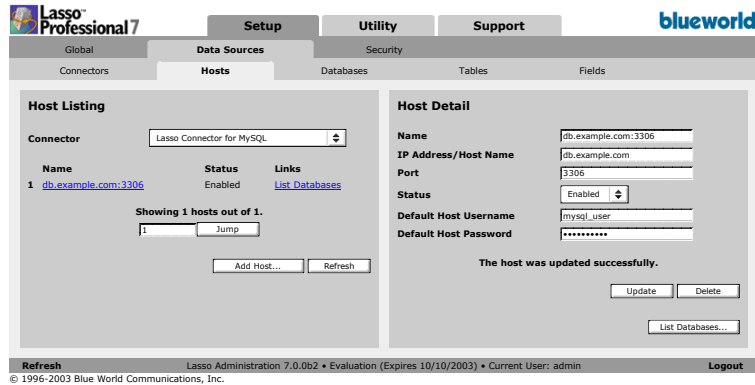
Lasso Professional 7 now has all appropriate permissions to communicate with MySQL, and the MySQL host may now be configured in the **Setup** section of Lasso Administration. See *Chapter 7: Setting Up Data Sources* for more information.

Note: It is possible to assign limited privileges to Lasso Professional 7 one at a time by replacing `ALL` with an individual permission (e.g. `INSERT`, `SELECT`, `DELETE`), and replacing `*.*` with a specific database or table name. This will restrict the functionality of Lasso Professional 7 to the privileges that are assigned to it. For example, giving Lasso Professional 7 only the `SELECT` privilege will allow a MySQL database to be searched using Lasso, but records cannot be added, updated, or deleted using Lasso.

Creating Connections to External MySQL Hosts

The *Setup > Data Sources > Hosts* page in Lasso Administration displays all data source hosts for a selected data source connector, and allows the administrator to add new hosts. A host is a computer that serves the databases with which Lasso Professional 7 communicates.

Figure 4: MySQL Hosts Page



The Host Listing panel shows a listing of all the hosts available for the current connector. Selecting **Enable All** will enable all hosts for the selected connector, while selecting **Disable All** will disable all data source hosts for the selected connector.

Adding MySQL Hosts

Selecting the **Add Host** button shows the **Add Host** panel to the right. The **Add Host** page allows the administrator to add a new MySQL data source host to a selected data source connector.

To add a new MySQL host:

- 1 In the **Add Host** panel, enter a name for the host in the **Name** field. This will be displayed in the **Hosts Listing** panel for the host, and can be as descriptive as desired.
- 2 Enter the IP address or domain name of the host in the **IP Address/Host Name** field. This is the address of the machine running the data source application.
- 3 Enter the TCP/IP port of the data source application or service of the host in the **Port** field. This is commonly 3306 for MySQL data sources.
- 4 Select **Enabled** from the **Status** pull-down menu to enable the host.

- 5 Enter a default username for the host in the Default Host Username field. Lasso Professional 7 will connect to the data source and all databases therein using this username by default. If the host does not require a username, then leave this field blank.
- 6 Enter a default password for the host in the Default Host Password field. Lasso Professional 7 will connect to the data source and all databases therein using this password by default. If the host does not require a password, then leave this field blank.
- 7 Select the Add Host button.

Once the host is added, the new host appears in the Hosts Listing panel to the left. There, one can select the List Databases link, or select the Databases tab to view the databases in the specified host.

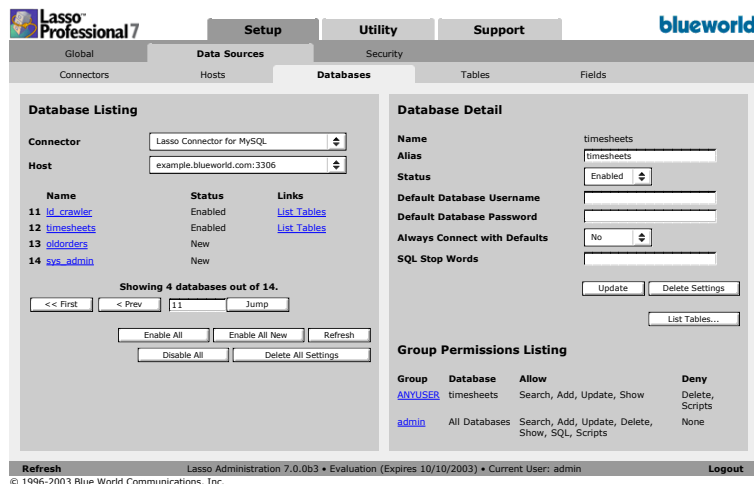
Updating and Deleting Host Settings

Selecting the name of a host shows its details in the Host Detail panel, which appears to the right. In the Host Detail panel, the administrator can update or delete the selected host by selecting the Update or Delete button.

Enabling MySQL Databases

The last required step in configuring a MySQL connection is to enable the newly-connected MySQL databases in Lasso Administration. This provides a method for the Lasso global administrator to designate what MySQL databases can and cannot be used with Lasso.

Figure 5: MySQL Databases Page



To enable MySQL databases for use with Lasso:

- 1 In the *Setup > Data Sources > Hosts* section of Lasso Administration, select **List Databases** next to the host that was just added. This will show a list of available databases in the MySQL host with the status **New**. If databases do not appear in the subsequent **Databases Listing** panel immediately, then try selecting the **Refresh** button.
- 2 Select a database you want to enable in the **Databases Listing** panel. This will show the **Database Detail** panel to the right.
- 3 In the **Database Detail** panel, select **Enabled** from the **Status** pull-down menu to enable the database.
- 4 In the **Default Database Username** field, enter the MySQL username required to connect to the database. If the database does not require a username, then leave this field blank.
- 5 In the **Default Database Password** field, enter the MySQL password required to connect to the database. If the database does not require a password, then leave this field blank.
- 6 Selecting **No** from the **Always Connect with Defaults** pull-down menu specifies that Lasso will connect to the database with the password specified in the **Databases** page as opposed to the **Hosts** page in Lasso Administration. Selecting **Yes** uses the username and password in the previous **Hosts** page.

Note: If a single password is used for all MySQL databases, then selecting **Yes** is recommended provided that the correct password is set in the **Hosts** page. If the password for the database is different than the password in the **Hosts** page, then selecting **No** and entering the correct password in the **Databases** page is required.
- 7 Leave the **SQL Stop Words** field blank initially unless you are familiar with and need SQL stop word operation. This is described in the **Database Preferences** section of this chapter.
- 8 Select **Update**. This enables the database and all tables within for use with Lasso.

The selected database is now enabled for use with Lasso Professional 6 and may be connected to using LDML code. Repeat the procedure above for all databases you intend to use with Lasso. The **Enable All New** button in the **Database Listing** panel may also be used to quickly enable all new databases in the specified host.

For information on setting additional database, table, and field preferences, see the corresponding sections in this chapter. For information on setting up required Lasso data source permissions for users, see *Chapter 8: Setting Up Security*.

FileMaker Pro Data Sources

Lasso Professional 7 communicates with FileMaker Pro only via the Web Companion, which is the built-in Web-publisher for FileMaker Pro. Using Web Companion, FileMaker Pro may be set up to run on the same machine as Lasso Professional 7, or on a separate machine. This section discusses setting up Web Companion and Lasso Professional 7 to communicate with each other.

FileMaker Server Note: FileMaker Server does not provide the means for interoperability with other applications. Consequently, Lasso Professional 7 cannot communicate directly with FileMaker Server. However, databases hosted by FileMaker Server can still be Web-enabled with Lasso Professional 7 via a FileMaker Pro client application logged into FileMaker Server.

Requirements

FileMaker Pro 4.x, FileMaker Pro 5.x Unlimited, or FileMaker Pro 6.0 Unlimited for Windows or Mac OS X with the latest version of Web Companion activated and configured. See the table below for all versions of FileMaker Pro's Web Companion certified to work with Lasso Professional 7.

Table 1: Supported Versions of FileMaker Pro's Web Companion

FileMaker Pro Version	Web Companion Version
FileMaker Pro 4.x	4.0v3
FileMaker Pro Unlimited 5.0v3	5.0v6
FileMaker Pro Unlimited 5.5v2	5.5v4
FileMaker Pro Unlimited 6.0v4	6.0v2

The latest versions of FileMaker Pro's Web Companion can be downloaded from FileMaker, Inc.'s Web site at:

<http://www.FileMaker.com>

FileMaker Licensing Note: In accordance with the FileMaker Pro license agreement, only FileMaker Pro Unlimited may be used with Lasso Professional 7. However, The regular version of FileMaker Pro may be used with Lasso Studio. For more information on the FileMaker Pro license agreement, see FileMaker's Web site at <http://www.filemaker.com>.

Configuring FileMaker for Use With Lasso

This section describes setting up FileMaker Pro Web Companion for use with Lasso Professional 7.

To configure FileMaker Pro Web Companion:

- 1 In FileMaker Pro, select *Edit > Preferences > Application* from the menu bar (*FileMaker Pro > Preferences > Application* in Mac OS X versions).
- 2 Select the Plug-Ins tab.
- 3 Under Enabled Plug-Ins, check the box next to Web Companion. This makes the *Configure...* button appear at the bottom of the window.
- 4 Select the *Configure...* button.
- 5 Enter the TCP/IP port through which Web Companion will communicate with Lasso Professional 7 in the TCP/IP field.

Security Note: Communication with the Web Companion in FileMaker Pro 5.x and 6.x can be limited to a single IP address via checking the **Restrict access to IP address(es)** box and entering the IP address of the machine that is running Lasso Professional 7. This is highly recommended for maximum data source security.

- 6 Select OK.

Web Companion is now configured to communicate from the FileMaker Pro application via the TCP/IP port specified. Sharing via Web Companion also needs to be enabled for each FileMaker Pro database that is to be used with Lasso Professional 7.

To enable databases to be shared via Web Companion:

- 1 In FileMaker Pro, open the database to be used with Lasso Professional 7.
- 2 Select *File > Sharing* from the menu bar.
- 3 Check the box next to Web Companion.
- 4 Select OK. The FileMaker Pro database is now ready for use with Lasso Professional 7.

For proper performance, database-level security must be aligned between FileMaker Pro and Lasso Professional 7. This involves setting a master password for a FileMaker Pro database, and then entering the password in Lasso Administration. Follow the procedure below for setting a master password for a FileMaker Pro database, which is then provided to Lasso Professional 7.

To set a master password for a FileMaker Pro database:

- 1 In FileMaker Pro, select *File > Access Privileges > Passwords* from the menu bar.
- 2 Under Privileges, check Access the entire file.
- 3 In the Available commands pull-down menu, select Normal.
- 4 Enter a password in the Password field.
- 5 Select Create.
- 6 Select Done.

The above steps will prevent any user from accessing a FileMaker Pro database directly without knowing the correct password. The FileMaker Pro host may now be configured in the *Setup* section of Lasso Administration.

FileMaker Pro Configuration Guidelines

For proper performance, adhere to the following guidelines.

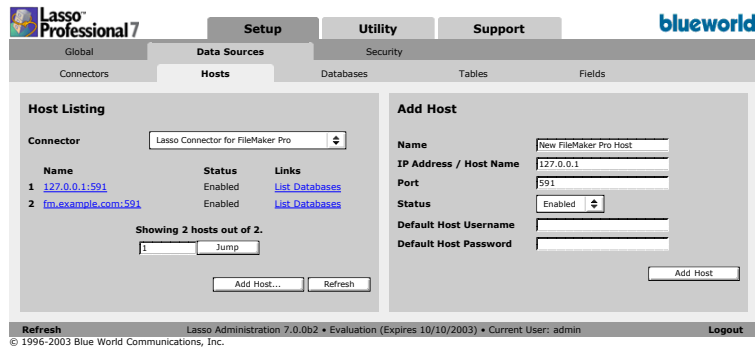
- All Lasso-enabled FileMaker Pro databases must be open in FileMaker Pro before a Lasso action can be performed on the database.
- All Lasso-enabled FileMaker Pro databases must be in *Browse* mode.
- All Lasso-enabled FileMaker Pro databases may be in either single-user or multi-user mode in FileMaker Pro.
- All Lasso-enabled FileMaker Pro databases should be opened with the master password if passwords have been established, specifically so that all necessary fields, layouts, scripts, and functions (browsing, printing, exporting, creating records, etc.) are available.
- FileMaker Pro database security in Lasso Professional 7 is only as secure as the Web Companion setup. It is possible for Web browsers to communicate directly with the Web Companion, which circumvents Lasso security. It is strongly recommended that database-level restrictions be enabled within FileMaker Pro, and user-level security be controlled by Lasso Professional 7 security. Additionally, it is strongly recommended that only a single IP address is permitted to access Web Companion which represents the machine on which Lasso Professional 7 operates.
- For tips on optimizing performance for FileMaker Pro databases, see *Chapter 10: FileMaker Pro Data Sources* in the Lasso 7 Language Guide.

Creating Connections to FileMaker Pro Hosts

The *Setup > Data Sources > Hosts* page in Lasso Administration displays all data source hosts for a selected data source connector, and allows the

administrator to add new hosts. A host is a computer that serves the databases with which Lasso Professional 7 communicates.

Figure 6: FileMaker Hosts Page



The Host Listing panel shows a listing of all the hosts available for the current connector. Selecting **Enable All** will enable all hosts for the selected connector, while selecting **Disable All** will disable all data source hosts for the selected connector.

Adding Data Source Hosts

Selecting the **Add Host** button shows the Add Host panel to the right. The Add Host page allows the administrator to add a new FileMaker data source host to a selected data source connector.

To add a new FileMaker Pro host:

- 1 In the Add Host panel, enter a name for the host in the Name field. This will be displayed in the Hosts Listing panel for the host, and can be as descriptive as desired.
- 2 Enter the IP address or domain name of the host in the IP Address/Host Name field. This is the address of the machine running the data source application.
- 3 Enter the TCP/IP port of the data source application or service of the host in the Port field. See the FileMaker Pro documentation for information on where to find or set this in the data source. This is commonly 591 for the FileMaker Pro Web Companion.
- 4 Select **Enabled** from the Status pull-down menu to enable the host.
- 5 Enter a default username for the host in the Default Host Username field. Lasso Professional 7 will connect to the data source and all databases therein using this username by default. If the host does not require a username, then leave this field blank.

Note: No username should be entered for a FileMaker Pro host if FileMaker Pro Access Privileges is used as the security method for the FileMaker Pro data source.

- 6 Enter a default password for the host in the Default Host Password field. Lasso Professional 7 will connect to the data source and all databases therein using this password by default. If the host does not require a password, then leave this field blank.
- 7 Select the Add Host button.

Once the host is added, the new host appears in the Hosts Listing panel to the left. There, one can select the List Databases link, or select the Databases tab to view the databases in the specified host.

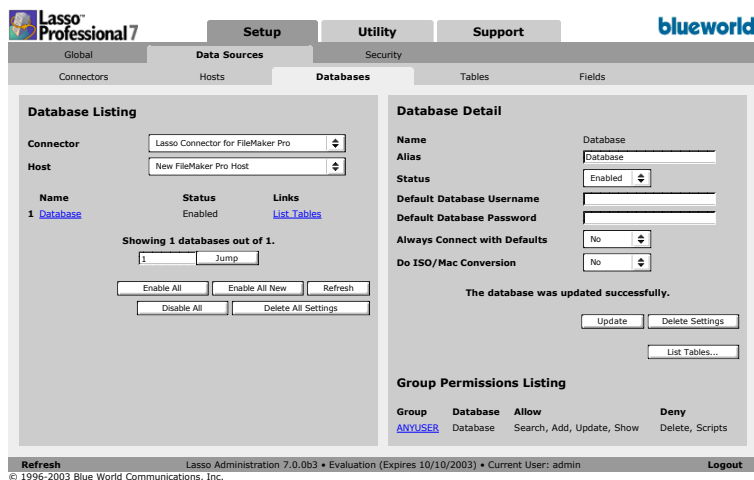
Updating and Deleting Host Settings

Selecting the name of a host shows its details in the Host Detail panel, which appears to the right. In the Host Detail panel, the administrator can update or delete the selected host by selecting the Update or Delete button.

Enabling FileMaker Pro Databases

The last required step in configuring a FileMaker Pro connection is to enable the newly-connected FileMaker Pro databases in Lasso Administration. This provides a method for the Lasso global administrator to designate what FileMaker Pro databases can and cannot be used with Lasso.

Figure 7: FileMaker Pro Databases Page



To enable FileMaker Pro databases for use with Lasso:

- 1 In the *Setup > Data Sources > Hosts* section of Lasso Administration, select **List Databases** next to the host that was just added. This will show a list of available databases in the FileMaker Pro host with the status **New**. If databases do not appear in the subsequent **Databases Listing** panel immediately, then try selecting the **Refresh** button
- 2 Select a database you want to enable in the **Databases Listing** panel. This will show the **Database Detail** panel to the right.
- 3 In the **Database Detail** panel, select **Enabled** from the **Status** pull-down menu to enable the database.
- 4 In the **Default Database Username** field, enter the FileMaker username required to connect to the database. If the database does not require a username, then leave this field blank.

Note: No username should be entered for a FileMaker Pro host if **FileMaker Pro Access Privileges** is used as the security method for the FileMaker Pro data source.

- 5 In the **Default Database Password** field, enter the FileMaker password required to connect to the database. If the database does not require a password, then leave this field blank.
- 6 Selecting **No** from the **Always Connect with Defaults** pull-down menu specifies that Lasso will connect to the database with the password specified in the **Databases** page as opposed to the **Hosts** page in Lasso Administration. Selecting **Yes** uses the username and password in the previous **Hosts** page.

Note: If a single password is used for all FileMaker databases, then selecting **Yes** is recommended provided that the correct password is set in the **Hosts** page. If the password for the database is different than the password in the **Hosts** page, then selecting **No** and entering the correct password in the **Databases** page is required.

- 7 Select **No** from the **Do ISO/Mac Conversion** pull-down menu unless Lasso Service and FileMaker Pro are on different operating systems.
- 8 Select **Update**. This enables the database and all layouts within for use with Lasso.

The selected database is now enabled for use with Lasso Professional 7 and may be connected to using LDML code. Repeat the procedure above for all databases you intend to use with Lasso. The **Enable All New** button in the **Database Listing** panel may also be used to quickly enable all Filemaker Pro databases in the specified host.

For information on setting additional database, table, and field preferences, see the corresponding sections at the end of this chapter. For informa-

tion on setting up required Lasso data source permissions for users, see *Chapter 8: Setting Up Security*.

JDBC Data Sources

Lasso Professional 7 communicates with JDBC data sources via JDBC drivers, which are made available for a data source either by the manufacturer or by a third party. In order for a data source to be JDBC-compliant, JDBC connectivity must be featured in the data source, and a JDBC driver must be available. Popular JDBC-compliant data sources include Microsoft SQL Server, SyBase, DB2, and Frontbase, as well as many others. For more information on JDBC connectivity for a particular data source, see the data source documentation or contact the data source manufacturer.

Lasso Professional 7 functions as its own JDBC driver manager. Once JDBC connectivity is installed or is available for a data source, the JDBC driver is loaded in Lasso Professional 7 to allow Lasso to connect. Lasso Professional 7 uses the JDBC 1.0 industry-standard API, and can connect to any databases using drivers that are certified as JDBC 1.0 compatible or better.

JRE Version Note: Lasso Professional 7 can use JDBC drivers that are version 2.0 or higher provided that the JRE installed to the operating system also supports them. Java 1.4.x standard installations or greater on all operating systems instantly support JDBC 2.0.

Requirements

The following requirements must be fulfilled in order for a data source to communicate with Lasso Professional 7 via JDBC:

- Installation of JDBC-compatible data source with any required patches or components for JDBC connectivity to a machine accessible by Lasso Professional 7.
- JDBC driver compatible with data source.
- Documentation for JDBC driver. This should contain information on what kind of connection URL information is required for Lasso Professional 7 to connect via JDBC. This information varies from data source to data source.
- Installation of JRE 1.4 on the machine running Lasso Professional 7 (Windows and Linux only). See *Chapter 4: Configuring on Windows* for more information.

Setting Up JDBC Data Sources

The following procedure describes setting up a generic JDBC data source for use with Lasso Professional 7. These procedures may vary depending on the data source, and not every data source will require additional component installations to use JDBC. The documentation for the JDBC driver is important in determining what connection information is needed to allow Lasso to connect to the JDBC-compliant data source using that JDBC driver.

Important: To ease the process of setting up specific JDBC data sources, Blue World Support Central articles are available that provide instructions on how to set up specific JDBC data sources to communicate with Lasso Professional 7. These articles are available at <http://support.blueworld.com>.

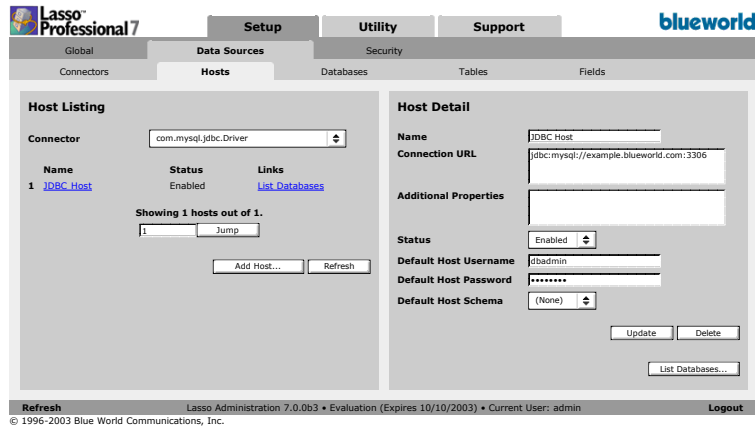
To set up a data source to communicate with Lasso Professional 7 via JDBC:

- 1 Install any patches or components required for JDBC connectivity to the data source. See the data source documentation or contact the data source manufacturer for more information.
- 2 Start the data source application or service. The data source must be running to be accessed by Lasso Professional 7.
- 3 Lasso Professional 7 will require access privileges to the data source for any or all levels of security (database-level, table-level, field-level, etc.). This can be achieved by creating a new user in the data source for use by Lasso, or by allowing Lasso to use an existing user account for data access. This user information will be used in the *Setup > Data Sources > Hosts* section of Lasso Administration.
- 4 Install all required JDBC drivers for the data source to the Lasso Professional 7/JDBCDrivers folder on the machine running Lasso Service.
- 5 Restart Lasso Service. During startup, Lasso Service scans the JDBCDrivers folder and lists all valid JDBC drivers in the *Setup > Data Sources > Connectors* page of Lasso Administration. Lasso Professional 7 acts as its own JDBC driver manager, and a JDBC driver represents a data source connector.
- 6 Create a connection to a JDBC data source host using the *Setup > Data Sources > Hosts* section of Lasso Administration. This will involve entering a connection URL that contains the host name and other information required by the JDBC driver. The JDBC driver documentation should specify how the connection URL should be formatted.

Data Source Hosts

The *Setup > Data Sources > Hosts* page in Lasso Administration displays all data source hosts for a selected JDBC data source connector, and allows the administrator to add new hosts. The Host Listing panel shows a listing of all the hosts available for the current connector.

Figure 8: JDBC Hosts Page



Unique Add Host and Host Detail panels will be displayed depending on the JDBC data source. These panels allow the administrator to enter additional information that may be required to connect to specific JDBC data sources via specific JDBC drivers.

Both the Add Host and Host Detail panels display the following fields for most JDBC data source hosts:

- **Name** – This is the name of the host that will be displayed in the Hosts Listing panel. The properties of this field are the same as for other hosts.
- **Connection URL** – The connection URL contains the host name or IP address and TCP/IP port of the JDBC data source host in addition to any URL prefixes required by the JDBC data source. Instructions for what the connection URL (or connection string) should look like for a particular JDBC data source should be documented in the JDBC driver documentation. A common connection URL format is `jdbc:company:product://address:port`.
- **Status** – Specifies whether the host is Enabled or Disabled in Lasso Professional 7. The properties of this field are the same as for other hosts.
- **Default Host Username** – The default username for the host. The properties of this field are the same as for other hosts.

- **Default Host Password** – The default password for the host. The properties of this field are the same as for other hosts.
- **Default Host Schema** – The default user schema for the host, which specifies what tables and fields will be available for the databases in the host. This pull-down menu applies only to JDBC data sources that support named schema ownership (e.g. Frontbase, Sybase). If your data source does not support named schema ownership, then only a value of (None) will be shown.

Additional Fields Note: Additional host property fields may appear depending on the JDBC driver. Consult the JDBC driver documentation for instructions on how to use these additional property fields if they appear.

A JDBC data source host may be added or updated by entering the information above in the Add Host or Host Detail panel, and selecting the Add Host or Update Host button, respectively.

Configuration Tip: See the Blue World Support Central Archives at <http://support.blueworld.com> for specific configuration instructions for JDBC data sources that are known to work with Lasso Professional.

Enabling JDBC Databases

The last required step in configuring a JDBC connection is to enable the newly-connected databases in Lasso Administration. This provides a method for the Lasso global administrator to designate what databases can and cannot be used with Lasso.

To enable JDBC databases for use with Lasso:

- 1 In the *Setup > Data Sources > Hosts* section of Lasso Administration, select List Databases next to the host that was just added. This will show a list of available databases in the JDBC host with the status New.
- 2 Select the Enable All New button to enable all new databases shown. Or, select the name of a database and use the Database Detail panel to enable databases individually. See the *Setting Database Preferences* section for more information.

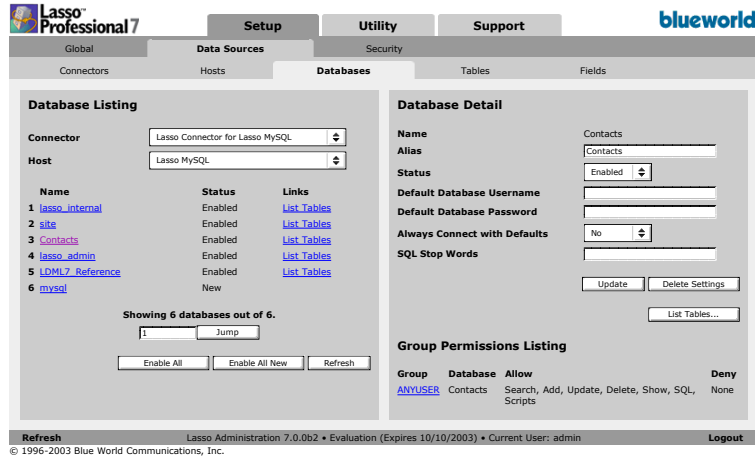
Once databases are enabled in Lasso Administration, the Lasso global administrator may then set preferences and permissions for them so they may be used in LDML code.

For information on setting database, table, and field preferences, see the corresponding sections in this chapter. For information on setting up required Lasso data source permissions for users, see *Chapter 8: Setting Up Security*.

Database Preferences

The Databases page lists all databases within a selected data source host. From here, the administrator can enable or disable selected databases, update database settings details, or list tables within a database.

Figure 9: Databases Preferences Page



The Databases Listing panel shows a listing of all the databases available for the current host. The administrator can switch hosts by selecting a new host from the Hosts pull-down menu.

Selecting Enable All will enable all databases shown for the selected host, while selecting Disable All will disable all databases for the selected host. Selecting Enable All New will enable all New databases for the selected host (see the following section for a description of all database status types). Selecting the Refresh button updates the Database Listing panel with the current list of available databases.

Note: Always select the Refresh button in the Databases Listing panel to view all databases that have been newly opened or loaded in a data source host.

Updating Database Preferences

Selecting a database in the Database Listing panel will show its details in the Database Detail panel, which appears to the right. The following settings can be updated:

- **Alias** – Allows an alternate name to be set for a selected database without changing the actual file name. This is the database name that should be used in format files, and is the only name that will be associ-

ated with that database by Lasso. The alias is the same as the file name by default.

- **Status** – Specifies whether or not a database is accessible by Lasso Professional 7. An **Enabled** or **Disabled** status designates that the database has been actively enabled or disabled in Lasso Administration. Databases are **New** if the database is open or accessible by the database application at the specified host, but have not yet been enabled or disabled in Lasso Administration. Databases are **Not Available** if they exist in Lasso Administration but are no longer available to the current host. Calling from within a solution any database that has a **New**, **Disabled**, or **Not Available** status will produce an error.
- **Default Database Username** – The default database username required for Lasso to connect to the database. If the database does not require a username, then leave this field blank.
- **Default Database Password** – The default database password required for Lasso to connect to the database. If the database does not require a password, then leave this field blank.
- **Always connect with Defaults** – Specifies whether or not the host-level username and password will be used when connecting to the database. Selecting **Yes** uses the username and password in the **Hosts** page. Selecting **No** uses the username and password in the **Databases** page above.
- **SQL Stop Words (SQL Databases Only)** – Allows the administrator to establish a list of words that should not be allowed in SQL statements. For example if **Delete** is listed as a SQL stop word then no SQL statement containing **Delete** will be executed on the specified database. Instead, a Lasso Security error will result.
- **Do ISO/Mac Conversion (FileMaker Pro Only)** – Specifies whether or not the character sets should be converted from Mac to ISO-Latin-1 when communicating with a FileMaker Pro data source. This should be set to **Yes** if the FileMaker Pro data source is hosted on a Macintosh operating system, and Lasso Service is hosted on a Windows operating system.

Updating Database Preferences

The administrator can update the database status by entering or selecting an appropriate value for each field, and then selecting the **Update** button.

Deleting Database Preferences

Selecting the **Delete Settings** button in the **Database Detail** panel will remove the database settings from Lasso Administration, including all permissions,

aliases, and options granted to the database, and its corresponding tables and fields.

Database Schema Note: If a database's schema is significantly altered, the recommended method for updating Lasso Administration is to delete the database settings in the **Database Detail** panel, and then refresh the **Databases Listing** panel. Then, all options for the new database schema may be set again in Lasso Administration.

Current Permissions

The Group Permissions Listing shows which groups have permission to perform actions in the selected table, and which actions are allowed or denied. These can be changed within the Groups section, which is discussed later in this chapter.

Aliases

Aliases allow databases and tables to be given unique names within Lasso administration that are separate from the actual database and table names for each data source. This allows multiple databases with the same names from different hosts to be accessed by Lasso.

The schema of databases can be hidden using aliases, hiding the names of the actual files that contain the database data. On a shared Web server, each database could be given a name specific to the client who has access to the database.

Web site portability can be enhanced using aliases. For example, a site which is being transitional from a FileMaker database `Contacts.fp3` to a Lasso MySQL database `Contacts` could use an alias on `Contacts` so it still appears under the name `Contacts.fp3`. The alias allows the back-end database to be changed without modifying all of the format files that reference a given database name.

Once a database or table alias is established, the aliased name must always be used for access to the database through custom format files. Using a combination of the real name and aliased name is not possible.

If a new host is added to Lasso Administration and some of the databases have the same names as databases already configured within Lasso Administration, then the new databases will have aliases created automatically which add an asterisk to their name so it is unique. For example, if a host is added with a `Contacts` database then it will be added with an alias as `Contacts*` since its name conflicts with the internal `Contacts` database.

Note: Aliases are created with an incremental number of asterisks depending on the number of databases with the same name that exist in Lasso Administration.

Username and Passwords

Lasso provides three methods of passing usernames and passwords to the database applications that it accesses.

- **Default Username and Password** – A default username and password can be established for each host or database, and Lasso can be instructed to always connect with the default. A “Lasso User” can be created in the security of the database application. All actions which Lasso performs will need to be allowed by the permissions of this “Lasso User.”

This is the recommended way to interface with the built-in security of each database application. Only one username and password needs to be entered in Lasso Administration. Specific access to databases and tables can be further restricted using Lasso’s own groups and users.

- **Current Username and Password** – Lasso also provides the ability to pass the username and password of the current authenticated user through to the database application. The users (or simply the Anonymous user) are generally given permission for all database actions within Lasso Administration. The database application is responsible for returning errors when actions are not permitted for the current user.

This can be useful if Lasso is being used to create a front-end to a database application that is also being accessed through other types of native clients. All of the security information for the database application can be kept in a single location.

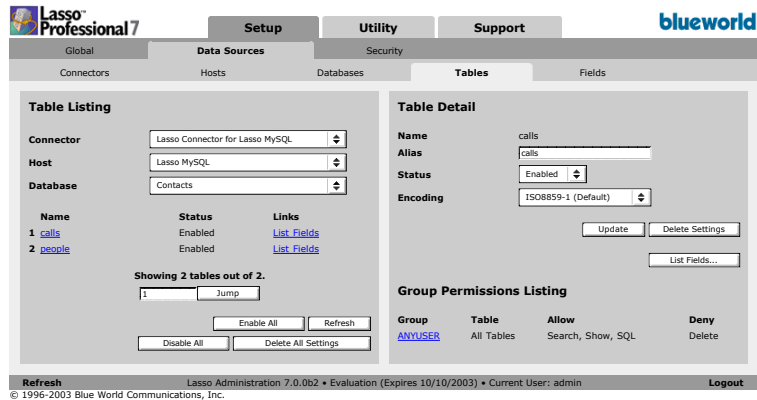
- **Hybrid** – If a default username and password are established (but the Always Connect with Defaults check box is left unchecked), then Lasso will pass the current username and password only if the current user is authenticated. Anonymous users will use the default username and password established within Lasso Administration.

This allows Anonymous users to gain the permissions of the default username and password, but authenticated users can have additional (or fewer) permissions depending on the actual username and password they use for authentication with Lasso Security. Specific database actions can be allowed by embedding a username and password within the opening tag of the [Inline] ... [/Inline] tags that specify the action.

Table Preferences

The Tables page lists all tables within a selected database. From here, the administrator can enable or disable selected tables, update table details, or list fields within a table.

Figure 10: Table Preferences Page



The Tables Listing panel shows a listing of all the tables available for the current database. The current connector, host, and database are displayed by default. The administrator can switch databases by selecting a new database from the Database pull-down menu.

Selecting the name of a table shows its details in the Table Detail panel, which appears to the right. Selecting Enable All will enable all tables shown for the selected database, while selecting Disable All will disable all tables shown for the selected database. Selecting Enable All New will enable all tables for the selected database with the status New. Selecting the Refresh button updates the Tables page with the most current information.

Updating Table Status

Selecting a database in the Tables Listing panel will show its details in the Tables Detail panel, which appears to the right. Here, the administrator can update the selected table by modifying its details in the Tables Detail panel, and then selecting the Update button. The following table details can be updated:

- **Alias** – Allows an alternate name to be set for a selected table without changing the actual file name. This is the table name that should be

used in format files, and is the only name that will be associated with that table by Lasso. The alias is the same as the file name by default.

- **Status** – Specifies whether or not a table is enabled for use with Lasso Professional 7. Calling a disabled table from within a solution will produce an error.
- **Encoding** – Specifies the character encoding that will be used for all data stored in each field in the table. This can be ISO8859-1 (default), or UTF-8 (Unicode).

Updating Table Preferences

The administrator can update the table status by entering or selecting an appropriate value for each field and selecting the Update button.

Deleting Table Preferences

Selecting the Delete Settings button will remove the table settings from Lasso Administration, including all permissions, aliases, and options granted to the table, and its corresponding fields.

Current Permissions

The Group Permissions Listing shows which groups have permission to perform actions in this table, and which actions are allowed or denied. These can be changed within the Groups section, which is discussed later in this chapter.

Field Preferences

The Fields page lists all fields within a selected table. From here, the administrator can enable or disable selected fields, update field details, or list fields within a table.

Figure 11: Field Preferences Page

Lasso Professional 7 Setup Utility Support **blueworld**

Global Data Sources Security
Connectors Hosts Databases Tables **Fields**

Field Listing

Connector: Lasso Connector for Lasso MySQL
Host: Lasso MySQL
Database: Contacts
Table: people

Name	Status
1 ID	Enabled
2 First Name	Enabled
3 Last Name	Enabled
4 Company	Enabled
5 Phone Number	Enabled
6 Title	Enabled
7 Sex	Enabled
8 Jobs	Enabled

Showing 8 fields out of 8.
1 Jump

Enable All Refresh
Disable All Delete All Settings

Field Detail

Name: Company
Status: Enabled
Allow Searching on this Field: Yes
Allow this Field to be Modified: Yes
Require an Exact Match on this Field...
When Searching Records
When Deleting Records
When Updating Records
Filter Search Values for this Field:
Filter Add Values for this Field:
Filter Update Values for this Field:
Allow this Field to be Used as a Format File Response Field: No
Update Delete Settings

Refresh Lasso Administration 7.0.0b2 • Evaluation (Expires 10/10/2003) • Current User: admin © 1996-2003 Blue World Communications, Inc. Logout

The Fields Listing panel shows a listing of all the fields available for the current table. The current connector, host, database, and table are displayed by default. One can switch tables by selecting a new table from the Table pull-down menu. Selecting Enable All will enable all fields for the selected table, while selecting Disable All will disable all fields for the selected table.

Updating Field Status

Selecting a field in the Tables Listing panel will show its details in the Field Detail panel, which appears to the right. The administrator can update the field status by entering or selecting an appropriate value for each field and selecting the Update button.

The following field preferences can be set:

- **Status** – Specifies whether or not a field is accessible by Lasso Professional 7. Calling a disabled field from within a solution will produce an error.
- **Allow Searching on this Field** – Specifies whether or not a field can be searched or viewed by users. Fields can be restricted from being searched by setting this preference to No. The default is Yes so that all fields which are Enabled can be used within searches. This preference can be useful to restrict searches to only indexed fields.
- **Allow this Field to be Modified** – Specifies whether or not a field can be updated by users. Fields can be made read-only by setting this prefer-

ence to No. The default is Yes so that all fields can be modified provided appropriate permissions are granted for the database and table.

- **Require an Exact Match on this Field** – Specifies whether or not an exact value is required when searching, deleting, or updating records. Exact matches are case-sensitive. The equals operator must be used with that field when it is present in a search action. In addition, if any field is defined as exact match, then the -FindAll and -Random actions cannot be used with that database. See the section on *Record-Level Security* below for more information.
- **Filter Search Values for this Field** – Allows the administrator to insert LDML code that is executed every time a -Search action is performed on the selected field. The code can alter the search request or return a custom error message if the search request does not meet the specified criteria. For more information on filters, see the *Field Filters* section below.
- **Filter Add Values for this Field** – Allows the administrator to insert LDML code that is executed every time a -Add action is performed on the selected field. For more information on filters, see the *Field Filters* section below.
- **Filter Update Values for this Field** – Allows the administrator to insert LDML code that is executed every time an -Update action is performed on the selected field. For more information on filters, see the *Field Filters* section below.

Field Filters

Field filters allow LDML code to be performed when specified Lasso actions are performed. This can be useful for preventing certain types of data from being submitted to specified fields. For example, you can set up profanity filters, or filters to prevent operations which may adversely affect the performance or integrity of your databases (e.g. lengthy search or sort requests).

Field filters can be attached to a specific field for the search, add, or update actions. When the specified action is performed, the code within the field filter will be executed, modifying the value of the data being submitted for the field, or returning a security error.

The code within each field filter can access the value for the field in the variable `Filter_Field`. The value for this variable at the end of the LDML code will be the value that is submitted to the data source connector for the action. What follows are examples of various useful field filters.

To use an included file as a filter:

Specify an `[Include]` tag within any type of field filter. The code in the included file will be processed for each field that references the file. This allows the same code to be used for many different field filters. The following tag would include a file named `Add_Filter.lasso` in the `Filters` folder at the root of the Web serving folder.

```
[Include: '/Filters/Add_Filter.lasso']
```

To use a custom tag as a filter:

Define a custom tag within a format file in `LassoStartup`. The custom tag can be called within a filter the same as any LDML tags. The following example calls a custom tag `[MySearchFilter]` with the `Filter_Field` variable as a parameter. It then stores the value of the custom tag back into the `Filter_Field` variable.

```
[Variable: 'Filter_Field' = (MySearchFilter: 'Filter_Field')]
```

To ensure a value is provided when adding a record:

Insert the following code into an add filter in order to ensure that a value is always entered for a specific field. If this code were entered for the field `Full_Name`, then the value `John Doe` would be inserted whenever the field was left blank in the `[Inline]` that performed the add.

```
[If: (Variable: 'Filter_Field') == "]  
  [Variable: 'Filter_Field' = 'John Doe']  
[/If]
```

To ensure a minimum length for search parameters:

Insert the following code into a search filter in order to ensure that the value being searched for is alphanumeric, and contains at least three characters. If the search parameter does not meet these criteria, then a field restriction error is reported and the search is not performed.

```
[If: (Variable: 'Filter_Field')->Length >= 3]  
  [Loop: (Variable: 'Filter_Field')->Length]  
    [If: !(String_IsAlphaNumeric: (Variable: 'Filter_Field')->(Get: Loop_Count))]  
      [Error_SetErrorCode: (Error_FieldRestriction: -ErrorCode)]  
      [Error_SetErrorMessage: (Error_FieldRestriction)]  
    [/If]  
  [/Loop]  
[Else]  
  [Error_SetErrorCode: (Error_FieldRestriction: -ErrorCode)]  
  [Error_SetErrorMessage: (Error_FieldRestriction)]  
[/If]
```

To filter profanity from added or updated records:

Insert the following code into a file named `Profanity_Filter.lasso` at the root of the Web serving folder. Call this file within the add and update filters for any fields which need to be checked for profanity as follows.

```
[Include: '/Profanity_Filter.lasso']
```

The profanity filter will take a list of banned words and quickly scan through the submitted field values, replacing any of them with the string `&#@$!`. The list of banned words is defined in the array `Banned_Words` and is strictly G-rated for demonstration purposes.

```
[Variable: 'Banned_Words' = (Array: 'idiot', 'weirdo', 'moron')]
[Loop: (Variable: 'Banned_Words')->Size]
  [Variable: 'Filter_Field' = (String_Replace: (Variable: 'Filter_Field'),
    -Find=(Variable: 'Banned_Words')->(Get: Loop_Count),
    -Replace='&#@$!')]
[/Loop]
```

This filter can be easily adapted to forbid banned words from being submitted by returning a field restriction error.

To deny search requests with a slow sort request:

In some databases such as FileMaker Pro, a sort request on an unindexed or related field can significantly impact the ability of the application to serve additional database requests. The following filter returns a field restriction error if a search request is entered that requests a sort on the `Grand_Total` field. This filter should be entered as a search filter.

```
[Sort_Arguments]
  [If: (Sort_FieldItem) == 'Grand_Total']
    [Error_SetErrorCode: (Error_FieldRestriction: -ErrorCode)]
    [Error_SetErrorMessage: (Error_FieldRestriction)]
  [/If]
[/Sort_Arguments]
```

This filter can be easily adapted to check search criteria or other sort criteria, and to deny the search request if any undesirable actions are attempted.

8

Chapter 8

Setting Up Security

This chapter describes the methodology of securing Lasso-based Web sites using Lasso Security and Lasso Administration, and is divided into the following sections.

- *Introduction* provides an introduction to Lasso Security and introduces concepts described later in the chapter.
- *Setting Up Groups* describes how to set up groups in Lasso, which represent sets of permissions for end users.
- *Setting Up Users* describes how to define custom usernames and passwords in Lasso to be used for end user authentication.
- *Data Host Permissions* describes the data source host permissions which can be assigned to a group, which includes permission to issue SQL queries.
- *Database Permissions* describes the individual database permissions which can be assigned to a group.
- *Table Permissions* describes the individual table permissions which can be assigned to a group.
- *Field Permissions* summarizes the field preferences which can be set for a field and how they are checked.
- *Tag Permissions* describes how substitution, process, and container tags can be secured by assigning permissions to a group.
- *File Permissions* describes the permissions and preferences unique to file manipulation tags.
- *Web Server Security* describes how Lasso Security interacts with the security systems of Web server applications.

- *Record-Level Security* describes how to use field settings to implement record-level security.
- *Security Tips* includes general principles which help ensure a secure Web site.

Introduction

This chapter describes the tools that Lasso Professional 7 provides to allow developers to build secure Web sites. This chapter documents the concepts behind Lasso's security, and strategies for setting up security on servers with various purposes. This chapter also documents the *Setup > Security* section of Lasso Administration, which is the primary interface for configuring Lasso security.

Lasso Security Model

One of the biggest features in Lasso Professional 7 is the inclusion of a very robust security model that can be used to secure all elements of a Lasso solution. Lasso Security interacts with Web server applications, database applications, Web clients, operating systems, and other CGI products. Lasso provides tools to secure access to each of the different applications that Lasso uses, and also tools to control usage within Lasso.

Lasso Security is comprehensive, and can be used to secure and protect many Web server operations from undesired users. These operations include but are not limited to the following:

- **Database Actions** – Lasso provides tools to restrict the types of actions that can be performed on databases. The same Lasso security model can be applied to all data sources to which Lasso connects.
- **LDML Tag Processing** – Lasso provides tools to restrict the use of LDML tags both at the server level, and at the user level.
- **File Manipulation** – Lasso provides permissions specific to tags that manipulate the file system local to Lasso Service.
- **File Access** – Lasso can restrict the file suffixes which can be processed by Lasso at the server level.
- **Web Browser Authentication** – Lasso automatically prompts Web browsers for authentication as needed, and provides tools to allow developers to prompt for custom authentication.
- **Web Server Realms** – Lasso provides tags for interacting with Web server realms and administration for file suffix mappings.

Lasso Groups and Users

At the core of Lasso Security are Lasso groups and users. **Groups** represent sets of permissions for various operations, and **Users** represent usernames and passwords (or lack thereof) which can be used to access those permissions.

The power of Lasso Security lies not only in what permissions can be set for a group, but also in how those permissions can be assigned to users. Group permissions can be shared by one or more users, and users may be assigned to one or more groups (how Lasso determines what permissions to use for a user assigned to multiple groups is described later). This multi-dimensional security model allows the most advanced authentication systems to be created for those that desire them.

In Lasso Security, there are three classes of groups and users, which are described below. Understanding these classes and what they can do is the first step in using Lasso Security with maximum power and ease.

Global Administrator

The Lasso Global Administrator is the one user in Lasso that has full control over all Lasso-configurable operations by default. Only the Lasso global administrator may access Lasso Administration, and is the only user who can define groups and set preferences for a Lasso Professional 7 server. The global administrator permissions account is a pre-configured group in Lasso Security that consists of only one username and password set. Global administrator permissions cannot be shared by other users.

Figure 1: Lasso Global Administrator

The screenshot displays the Lasso Professional 7 Administration web interface. The top navigation bar includes tabs for Setup, Utility, and Support. Below this, a sub-navigation bar shows 'Global' as the active section, with other options like Data Sources, Security, Admin, Syntax, File Extensions, Sessions, Tags, Java, and Import/Export. The main content area is divided into two panels. The left panel, titled 'Administrator Settings', contains fields for Username (set to 'admin'), Current Password, New Password, and Confirm Password. A note indicates that the current password must be entered above and confirmed below. An 'Update Username and Password' button is at the bottom. The right panel, titled 'Lasso Professional 7', shows system information: Serial Number (LP6-MAC-b6XtVHRdu5****), Product (Lasso Professional 7), Edition (Multi-User), Version (7.0.0a5r6), and Platform (Mac OS X). It includes buttons for 'Update Serial Number' and 'Register Lasso Professional 7'. At the bottom, a status bar shows 'Refresh', 'Lasso Administration 7.0.0a5r6 • Multi-User • Current User: admin', and a 'Logout' button. A copyright notice for 1996-2003 Blue World Communications, Inc. is also present.

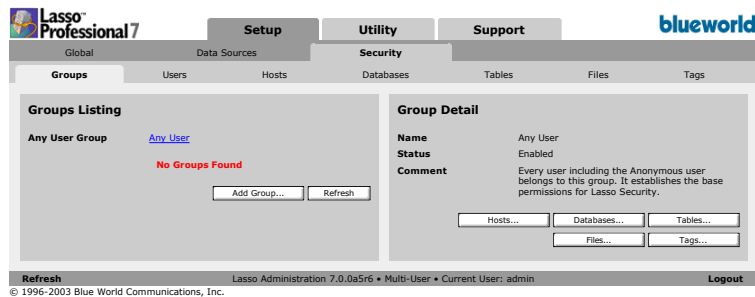
Whenever the global administrator is logged in via a Web browser, he or she will instantly have permission to execute all Lasso code and will pass all security checks without being prompted for authentication again.

When using Lasso for the first time, it is important to understand that the end-users who will be accessing Lasso solutions will not have the same permissions as the global administrator by default, therefore some security settings such as database permissions will have to be set before other users may use them.

AnyUser Group and Anonymous Users

Only one configurable group is predefined in Lasso Professional 7, which is the AnyUser group. If an end user of a Lasso Solution is not logged in with a username and password that is defined in Lasso Security, then he or she will inherit the permissions of this group by default. These users are referred to as Anonymous users.

Figure 2: AnyUser Group



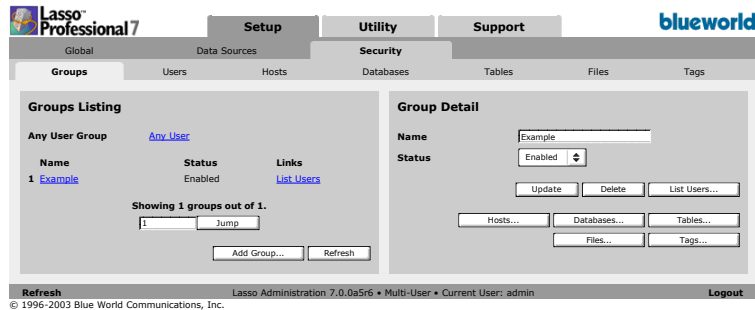
When Lasso Professional 7 is installed, it is secure by default. This means that the AnyUser group has no database or file permissions assigned to it in Lasso Administration by default. When creating a Lasso solution that does not require authentication, explicit permissions must be set for the AnyUser group beforehand. How to set permissions for the AnyUser group is described in this chapter.

Custom Groups and Users

Custom groups may be created by the global administrator if password protection is desired for certain sets of permissions.

A custom group may be created with a defined permissions, and then defined users in Lasso Security (with usernames and passwords) may be added to the custom group. Defined users in Lasso Security may also be added to more than one custom group.

Figure 3: Custom Groups



Much of the security power in Lasso Professional 7 comes from creating custom groups and users, and there are many different ways to use groups in Lasso Security to assign permissions to users. Several custom groups with different permissions can be combined to meet the unique needs of any Web site. For example, separate groups could be created for each database used by Lasso, but a single group could define access to file tags across all users of a Web site.

Lasso Professional 7 also features the ability to designate group administrators among custom groups. A group administrator is a user in Lasso Security defined by the global administrator who has permissions to make changes to user accounts that belong to a specific group.

User Authentication

All LDML tags and actions are executed with the permissions of a specific user. Since permissions are only granted to groups, the permissions for a specific user are defined by the group(s) to which they belong. When a tag is executed, the permissions of all the groups to which the user belongs are checked in alphabetical order by group name.

There is no one-to-one correspondence between users and visitors. It is possible for many visitors to authenticate as the same user. For example, all the members of a workgroup may share a common username and password. In the extreme, all unauthenticated visitors are treated as a single Anonymous user and have the permissions of the AnyUser group.

A single visitor may execute code using the permissions of many users. They will be prompted for a username and password if they do not have permission to access a resource based on the current user information they have supplied. If they enter the authentication information for a different user, then they become that user for subsequent pages.

Lasso primarily relies on the Web authentication routines built into every Web browser in order to authenticate global administrators and other Lasso users. However, Lasso permissions may also be programmatically specified using the `[Inline] ... [/Inline]` tag in LDML.

Username and passwords can be specified within `[Inline] ... [/Inline]` tags so that the contents of the container tags are executed with the permissions of a specified user. Most of a format file will be executed with the permissions of the user defined by the current visitor, but portions of the format file can be executed with the permissions of specific users.

There are several ways to specify what user's permissions should be used to execute a format file or section of LDML code depending on whether or not the current visitor is authenticated, or if a specific username and password are coded into the format file.

- **Anonymous** – By default, all code is executed as the Anonymous user. This is the case if no users are defined within Lasso Security, if the current visitor has not specified a username and password, or if the current visitor has specified an invalid username and password.

If an Anonymous user does not have permission to access a resource, then an authentication dialog will be displayed in the visitor's Web browser. If one enters a valid username and password for a user that has permission to access the resource, then one can continue.

- **Current Visitor** – If the current visitor has entered a username and password into the Web browser's authentication dialog and that username and password can be found in Lasso Security, then the Web site will execute all tags with the permissions of that user.
- **Inline Authentication** – The `-Username` and `-Password` command tags can be used to explicitly set a username and password for all code executed within `[Inline] ... [/Inline]` tags (including a database action within the opening `[Inline]` tag). This allows the permissions of the current visitor to be augmented by the permissions for a specific user for the duration of the `[Inline] ... [/Inline]` tags.
- **Global Administrator** – A single global administrator is defined by Lasso Security. This user has the authority to execute any tag and perform any database action even on tags and databases which are disabled. This user also has the authority to change all of the security settings within Lasso Administration. The global administrator username and password should never be embedded in a format file.

How Lasso Checks User Security

All of Lasso Security is tied to the action of executing LDML tags. Lasso performs a series of checks each time a tag is executed in order to confirm

that the current user has permission to execute the tag, and the current user has permission to access the resources that the tag requires in order to perform its task.

The process that Lasso uses to check security settings each time a tag is executed is shown below. Some of the steps are actually performed when a format file is first accessed, or when an [Inline] ... [/Inline] is entered and information is cached for fast access, but conceptually the steps are performed in this order.

When a user belongs to more than one group in Lasso Security, groups are always checked in alphabetical order with the exception of the AnyUser group, which is always checked last. Groups with names that start with letters earlier in the alphabet have higher priority than groups with names that start with letters later in the alphabet. If a specific ordering of groups is needed, then a prefix can be used to ensure that the group permissions are checked in the desired order.

How Lasso checks security when an LDML action is performed:

- 1** The list of available LDML tags is checked. Any tags which are not enabled (e.g. tags marked Disabled) are not recognized as part of LDML, and will generate a syntax error (rather than a security violation).
- 2** The current username and password are identified. If the current site visitor has authenticated through their Web client, then the username and password they specified are used. If -Username and -Password are specified within the LDML code, then the values of those tags are used. Otherwise, the user is Anonymous.
- 3** The current user is looked up in Lasso Security. If no matching username and password can be found, then the user is treated as Anonymous. Note that Lasso will execute code for a visitor who has specified any unknown username and password as Anonymous.
- 4** The set of groups which the current user belongs to is identified. The permissions for each group will be checked in alphabetical order, followed by the AnyUser group.
- 5** The permissions for each group are checked in alphabetical order. If an Allow permission is found for the tag, then its use is allowed and no further checking is performed. If a Deny permission is found for the tag, then its use is denied, a security violation is generated, and no further checking is performed. If an Ignore permission is found, then the use of the tag is not allowed for that group, but Lasso will continue to check that tag's permissions for the current user in other groups. By default, all substitution tags in AnyUser have Allow permission, while all action tags (e.g. -Search, -Add, -Update, -Delete, -SQL) have Ignore permission.

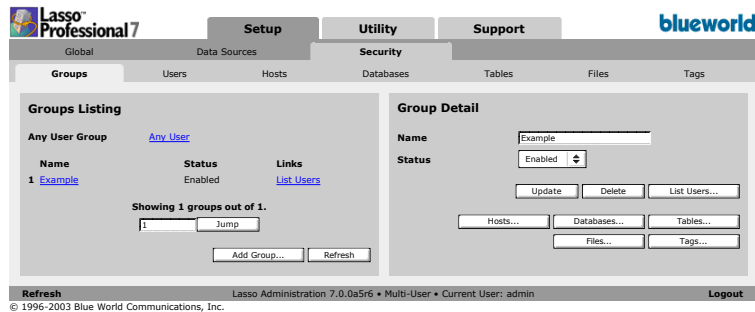
- 6 If the tag references a database, table, or fields, then the permissions specific to those entities are checked. See the sections on *Database Permissions*, *Table Permissions*, and *Field Permissions* for more details.
- 7 If the tag is a [File_...] tag, then the permissions specific to the [File_...] tags are checked. See the *File Permissions* section for more information.
- 8 If a security violation is generated, then the site visitor will be presented with a browser-specific authentication dialog. After the visitor has entered a new username and password, the entire series of steps are performed again checking against a new user.

Setting Up Groups

Groups in Lasso Professional 7 allow security settings to be set for groups of users. Users can log in to a Lasso-driven Web site with assigned group security values, or in the absence of a recognized username and password are automatically assigned to the AnyUser group by default.

The *Setup > Security > Groups* page in Lasso Administration allows the administrator to add, view, enable, disable, and configure groups in Lasso Administration.

Figure 4: Groups List Page



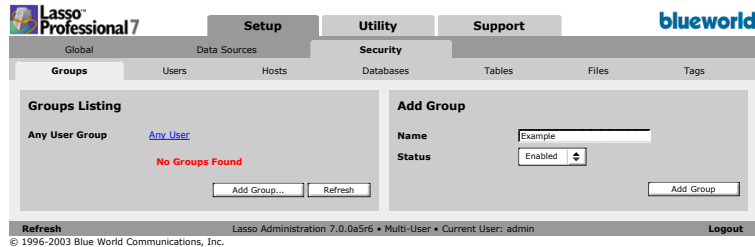
The Group Listing panel shows a list of all the groups defined in Lasso. Prev and Next buttons are shown if more than 10 groups exist. Selecting Enable All will enable all groups shown, while selecting Disable All will disable all groups shown. Selecting Refresh will refresh the Groups page with the most recently updated information.

The default group is AnyUser with one member Anonymous. By default, any permissions granted to this group will be granted to all visitors to the Web site.

Adding a Custom Group

Selecting the Add Group button shows the Add Group panel to the right. The Add Group panel allows the administrator to add a new group to Lasso Administration.

Figure 5: Add Group Panel



To add a new group:

- 1 Enter the name of the group to be added in the Name field.
- 2 Select Enabled or Disabled from the Status pull-down menu to enable or disable the group in Lasso Professional 7.
- 3 Select Add Group.

After selecting the Add Group button, one is taken to the Groups page with the newly added group selected for additional modifications.

Updating Group Properties

Selecting a group name in the Groups Listing panel will show its details in the Group Detail panel, which appears to the right. Here, the administrator can update the selected group name and status by selecting the Update button, or delete the group by selecting the Delete button. The AnyUser group is separated from all created groups, and appears at the top of the Groups Listing panel.

To update details for a selected group:

- 1 Edit the name of the selected group in the Name field.
- 2 Select Enabled or Disabled from the Status pull-down menu to enable or disable the group.
- 3 Select Update.

The List Users link takes one to the Users page with the current group selected. The date and time of the last update is always shown in the lower right corner of the Group Detail panel.

AnyUser Note: The AnyUser group cannot be deleted as it is required by Lasso Professional 7. For this reason, the **Update** and **Delete** buttons will not be shown in the **Group Detail** panel for the AnyUser group.

Setting Group Permissions

Group permissions can be set by selecting the **Hosts**, **Databases**, **Tables**, **Tags**, or **Files** buttons in the **Group Detail** panel. Doing so will take one to the **Hosts**, **Databases**, **Tables**, **Tags**, or **Files** pages where the corresponding permissions can be set, as discussed later in this chapter.

For most Lasso Solutions, setting database and table permissions for the AnyUser group is typically the first task. See the *Data Host Permissions*, *Database Permissions*, and *Table Permissions* sections for more information on these permissions.

A walk-through of setting group permissions for an example solution can be found in *Chapter 11: Setting Up Lasso Solutions*.

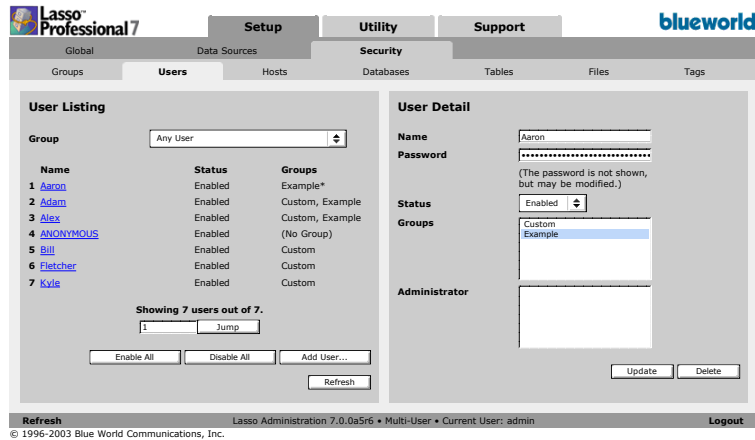
Setting Up Users

Individual user accounts allow different users to access Lasso Professional 7 Web solutions with different levels of security. While access and tag-level security settings are set in the **Groups** section, the **Users** section allows the administrator to set usernames and passwords, set groups to which a user belongs, and to designate specific users as administrators for specific groups.

The **Setup > Security > Users** page in Lasso Administration allows the administrator to add, view, and configure users.

Important: No user configuration is required for **Anonymous** users, which are configured by default through the AnyUser group. The **Users** page is used only for creating custom username and password accounts, and designating custom group administrators.

Figure 6: Users List Page



User Listing

The User Listing panel lists all currently defined users. Users from a particular group as well as users who do not belong to any groups can be shown. The current group may be changed by selecting a group from the pull-down menu. In addition to the groups defined in the *Setup > Security > Groups* section of Lasso Administration, the administrator may choose one of the following user display options from the pull-down menu.

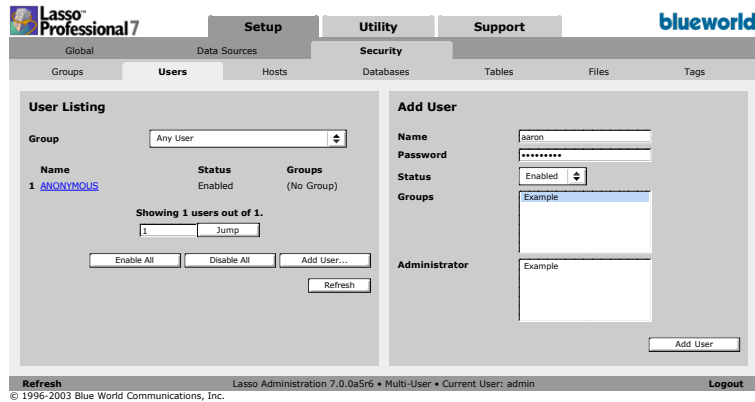
- **All Users** – Displays all users in Lasso Administration regardless of group assignment.
- **No Group** – Displays all users not currently assigned to groups.
- **All Admins** – Displays all group administrators in all groups.

Selecting the username shows details of the user in the User Detail panel, which appears to the right. All users shown can be enabled or disabled by selecting Enable All or Disable All. Selecting Add User... takes one to the Add User page.

Adding Custom Users

Selecting the Add User button in the User Listing panel shows the User Detail panel to the right. The Add User page allows the administrator to create new users in a specified group or groups.

Figure 7: Add User Panel

**To add a new user:**

- 1 Enter the username of the user to be added in the **Name** field.
- 2 Enter the password for the selected user in the **Password** field.
- 3 Select any number of groups from the **Groups** field to which the user is to be assigned.
- 4 Select any number of groups from the **Administrator** field for which the selected user is to be granted administrator privileges. The purpose of a group administrator is to add and remove other users to and from the group the user has group administrator privileges for. There can be as many group administrators as needed. For more information on group administrators, see the following *Group Administrators* section.
- 5 Select the **Add User** button.

The **Search** page allows administrators to search for users by group, name, status, or administrator.

Updating Custom Users

Selecting a user in the **User Listing** panel will show its details in the **User Detail** panel, which appears to the right. Here, the administrator can update or delete the selected user's details by selecting the **Update** button, or delete the user by selecting the **Delete** button.

To update details for a selected user:

- 1 Edit the username of the selected user in the **Name** field.

2 Edit the password for the selected user in the Password field. The password will be hidden, but can be changed by deleting the contents of the Password field, and entering a new password.

3 Select Enabled or Disabled from the Status pull-down menu to enable or disable the user.

Note: Disabled users are treated as anonymous users, and are assigned permissions from the AnyUser group when accessing format files or LassoApps.

4 Select any number of groups from the Groups field to which the user is to be assigned.

5 Select any number of groups from the Administrator field for which the selected user is to be granted administrator privileges. The purpose of a group administrator is to add and remove other users to and from the group the user has group administrator privileges for. There can be as many group administrators per group as needed. For more information on group administrators, see the following *Group Administration LassoApp* section.

6 Select the Update button.

Note: The Anonymous user cannot be modified or deleted as it is required by Lasso Professional 7. For this reason, the Delete button will not be displayed in the User Detail field for the Anonymous user.

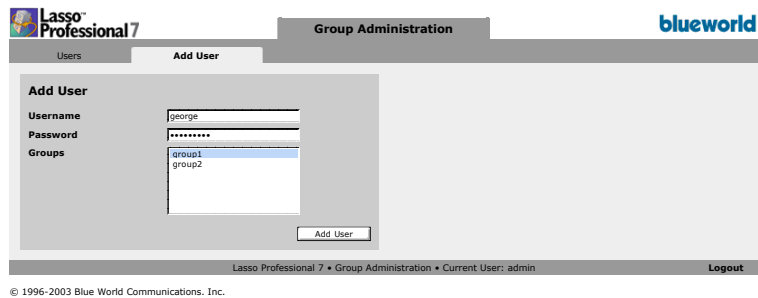
Group Administrators

Users can be granted the privilege to be a group administrator for one or more groups. Any user which is defined as a group administrator can add users to a group using the GroupAdmin.LassoApp file, or using the [Admin_...] tags in LDML. Only a group administrator or the global administrator can add users to a group, and a group can have as many group administrators as needed.

Group Administration LassoApp

The group administrator is able to add and remove users from a group via the GroupAdmin.LassoApp file, which is a LassoApp located in the Lasso folder of the Web server root. This LassoApp only contains the features of the *Setup > Security > Users* section of Lasso Administration. When accessed, the GroupAdmin.LassoApp file prompts one for a group administrator username and password, as designated in the *Setup > Users > Admin* page in Lasso Administration. Within the Group Administration LassoApp, group administrators are only able to access the group to which they have been assigned.

Figure 8: Group Administration LassoApp



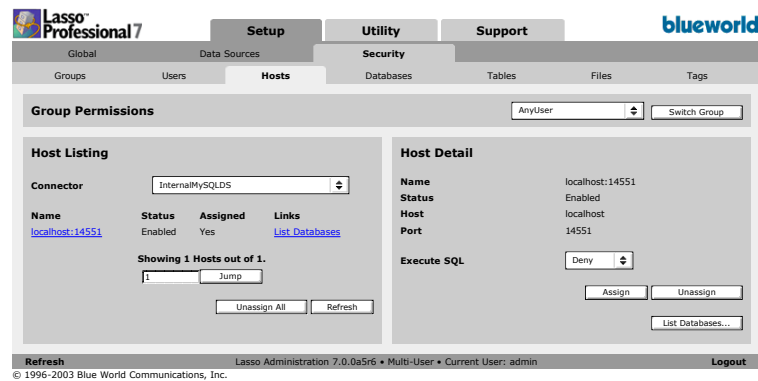
To access the Group Administration LassoApp:

In a Web browser, visit <http://www.example.com/Lasso/GroupAdmin.LassoApp>. Replace www.example.com with your domain name, IP address, or 127.0.0.1 if on a local machine. If an error is displayed, make sure Lasso Service is running.

Data Host Permissions

The *Setup > Security > Hosts* page in Lasso Administration allows the administrator to define all host-level permissions for any specific group.

Figure 9: Hosts Page



The top panel shows the current group to the right of Permissions For Group. The current group can be switched by selecting an existing group from the Groups pull-down menu and selecting Switch Group.

The Host Listing panel shows a listing of all the data source hosts available for the current group. The current connector is displayed by default. The administrator can switch connectors by selecting a new connector from the Connector pull-down menu. Selecting Unassign All will reset all permissions for all hosts to their default values.

Setting Group Host Permissions

Selecting a host in the Host Listing panel shows its permissions settings in the Host Detail panel to the right. The following describes the database security permissions that can be set for the selected group:

- **Execute SQL** – Allows or denies the ability to issue SQL statements by restricting the -SQL command tag in LDML 7. Allowing Execute SQL effectively grants a group the ability to view and edit all databases, tables, and fields in a host via SQL statements, and should be allowed with care. This is the only permission specific to the host-level in Lasso Professional 7, and is only applicable for data sources that can interpret SQL statements.

Warning: Due to the large array of things that permission to execute SQL statements opens up for a developer, SQL permission should only be given to trusted users.

The administrator can update host security settings by selecting Allow or Deny from the Execute SQL pull-down menu, and then selecting the Update button. The List Databases button takes the administrator to the Databases page with the current host selected.

How Lasso Checks Data Host Security Settings

When a user attempts to perform a SQL query via LDML, the permissions for all the groups the user belongs to are checked in sequence. The following steps are performed.

- 1 The set of groups which the current user belongs to is identified. If the user belongs to more than one group, the permissions for each group will be checked in alphabetical order by group name.
- 2 The permissions for each group are checked for a permission which references the current host. If an Allow permission is found for the host, then its use is allowed and no further checking is performed. If a Deny permission is found for the host, then its use is denied, a security violation is generated, and no further checking is performed. If an Ignore permission is found, then the database is not allowed for that group, but Lasso will continue to check database permissions for the current user in other groups.

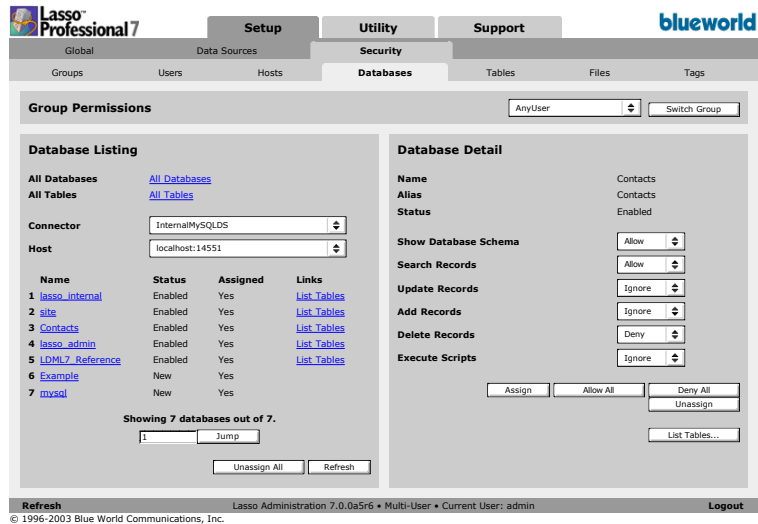
- 3 If no result is found after checking all of the groups which the user belongs to and the AnyUser group, then the SQL query is denied and a security violation is generated.
- 4 If the database referenced in the SQL query has any SQL stop words defined in Lasso Administration, they are compared to the SQL statement which was specified in the LDML SQL query. If a match is found, then the SQL statement is not allowed and a security violation is generated.

An Allow permission is required in order to issue SQL statements for a data source host. The SQL permission for a host is Ignore by default, and this permission must be explicitly set to Allow before any SQL statements can be issued using LDML.

Database Permissions

Lasso Security allows administrators to either Allow or Deny different database actions for a group for each specific database available through Lasso. Permissions can also be defined for a single meta-entry **All Databases**. This entry is checked if no permissions are found for a specific database. The *Setup > Security > Databases* page in Lasso Administration allows the administrator to define all database-level permissions for any specific group.

Figure 10: Databases Page



The top panel shows the current group to the right of Permissions For Group. The current group can be switched by selecting an existing group from the Groups pull-down menu and selecting Switch Group.

The Database Listing panel shows a listing of all the databases available for the current group, as well as links to All Databases and All Tables settings. The current connector and host are displayed by default. The administrator can switch connectors and hosts by selecting a new connector and host from the Connectors and Hosts pull-down menus. Selecting Unassign All will reset all permissions for all databases to their default values. No user will be able to access a database via a Lasso solution unless the database has been assigned with at least one permission set to Allow by the administrator.

Selecting the All Databases link in the Database Listing panel allows permissions to be set for all databases regardless of data source connector or host in the Database Detail panel, which appears to the right. Selecting the All Tables link takes the administrator to the Table Detail panel in the Tables page, where permissions for all tables regardless of data source connector, host, or database can be set. For more information, see the Tables page description.

Setting Group Database Permissions

Selecting a database in the Databases Listing panel will show its permissions settings in the Database Detail panel for the selected group. Here, the administrator can update database security settings by selecting the Update button.

The following describes the database security permissions that can be set for the selected group:

- **Search Records** – Allows or denies record searching for the selected group by restricting the -Search, -FindAll, and -Random command tags in LDML 7.
- **Add Records** – Allows or denies the ability to add records for the selected group by restricting the -Add tag.
- **Update Records** – Allows or denies the ability to update records for the selected group by restricting the -Update tag.
- **Delete Records** – Allows or denies the ability to delete records for the selected group. This is accomplished by restricting the -Delete command tag in LDML 7.
- **Show Database Schema** – Allows or denies the ability to view a database's schema for the selected group. The database schema is a list of all tables in a database, and is accomplished by restricting the -Show command tag in LDML 7.

- **Execute Scripts** – Allows or denies the ability to execute FileMaker Pro scripts utilizing the -FMScript command tags in LDML 7.

Note: All permissions default to **Ignore**, which simply is the absence of an **Allow** or **Deny** permission.

The administrator can update database security settings by selecting **Allow** or **Deny** from each pull-down menu, and then selecting the **Update** button. The **List Tables** button takes the administrator to the **Tables** page with the current table selected.

How Lasso Checks Database Security Settings

When a user attempts to perform a database action, the permissions for all the groups the user belongs to are checked in sequence. The following steps are performed.

- 1 The set of groups which the current user belongs to is identified. If the user belongs to more than one group, the permissions for each group will be checked in alphabetical order by group name.
- 2 The permissions for each group are checked for a permission which references the current database and action. If an **Allow** permission is found for the database, then its use is allowed and no further checking is performed. If a **Deny** permission is found for the database, then its use is denied, a security violation is generated, and no further checking is performed. If an **Ignore** permission is found, then the database is not allowed for that group, but Lasso will continue to check database permissions for the current user in other groups.
- 3 If no result is found in a particular group, then the permission for the **All Databases** entry for that group is checked. If an **Allow** permission is found for the database action for **All Databases**, then the action is allowed. If a **Deny** permission is found, then the database action is denied and a security violation is generated. Note that after the first **Allow** or **Deny** is found, no further checking is performed.
- 4 If no result is found after checking all of the groups which the user belongs to and the **AnyUser** group, then the database action is denied and a security violation is generated.
- 5 If the database has any SQL stop words defined, they are compared to the SQL statement which was specified in the -SQL command tag or to the SQL statement generated automatically by Lasso. If a match is found, then the SQL statement is not allowed and a security violation is generated.

This order of operation means that any database actions which are not explicitly allowed for a group (and its associated users) are effectively

denied. The All Databases entry can be used to allow database actions across all databases available to Lasso.

Database permissions are required in order to access a table. A database must have Allow permission for a specified action in order for the like permissions of the table to even be checked. All actions for a table have Ignore permission by default, and permissions must be explicitly set to Allow before any data can be retrieved from the table.

Table Permissions

Lasso Security allows administrators to either Allow or Deny different database actions for a group for each specific table available through Lasso.

The *Setup > Security > Tables* page in Lasso Administration allows the administrator to define all table-level permissions for any existing group.

Figure 11: Tables Page



The top panel shows the current group to the right of Permissions For Group. The current group can be switched by selecting an existing group from the Groups pull-down menu and selecting Switch Group.

The Table Listing panel shows a listing of all the tables available for the selected database. The current connector, host, and database are displayed by default. The administrator can switch databases by selecting a new database from the Database pull-down menu. Selecting the name of a table shows its group security settings in the Table Detail panel. Selecting Unassign All will reset all permissions for all tables to their default values.

Selecting the All Databases link in the Table Listing panel takes the administrator to the Databases page, where permissions for all databases can be set in the Database Listing panel. Selecting the All Tables link allows permissions to be set for all databases regardless of data source connector, host, or database in the Table Detail panel, which appears to the right.

Note: Allowing permission for all tables does not override any database permission setting of **Deny** or **Ignore**. If a database permission is set to **Deny** or **Ignore**, then a user will not be able to access any information in the database even if all table permissions are set to **Allow**.

Setting Group Table Permissions

The administrator can update table security settings for the selected group in the Tables Detail panel. The following describes the table security permissions that can be set for the selected group.

- **Show Table Schema** – Allows or denies the ability to view a table's schema for the selected group.
- **Search Records** – Allows or denies record searching for the selected group.
- **Update Records** – Allows or denies the ability to update records for the selected group.
- **Add Records** – Allows or denies the ability to add records for the selected group.
- **Delete Records** – Allows or denies the ability to delete records for the selected group.

Note: In order for a user to be able to use a database via a Lasso solution, permissions must be set to **Allow** on both the database and table level. For example, a user will not be able to search for records in a database unless the **Search Records** permission is set to **Allow** for both the database and the table that contains the records.

The administrator can update database security settings by selecting **Allow** or **Deny** from each pull-down menu, and then selecting the **Update** button.

How Lasso Checks Table Security Settings

When a user attempts to perform a database action, the permissions for all the groups the user belongs to are checked in sequence. The following steps are performed.

- 1 The set of groups which the current user belongs to is identified. If the user belongs to more than one group, the permissions for each group will be checked in alphabetical order by group name.
- 2 First, permission is checked for the database which contains the table and for the **All Databases** entry. If **Allow** permission is granted, then the table security settings are checked.
- 3 The permissions for each group are checked for a permission which references the current table and action. If an **Allow** permission is found for the table, then its use is allowed and no further checking is performed. If a **Deny** permission is found for the table, then its use is denied, a security violation is generated, and no further checking is performed. If an **Ignore** permission is found, then the use of the table is not allowed for that group, but Lasso will continue to check table permissions for the current user in other groups.
- 4 If no result is found in a particular group, then the permission for the **All Tables** entry for that group is checked. If an **Allow** permission is found for the database action for **All Tables**, then the action is allowed. If a **Deny** permission is found, then the database action is denied and a security violation is generated. Note that after the first **Allow** or **Deny** is found, no further checking is performed.
- 5 If no result is found after checking all of the groups which the user belongs to and the **AnyUser** group, then the database action is denied and a security violation is generated.

Database permissions are required in order to access a table. A database must have **Allow** permission for a specified action in order for the permissions of the table to even be checked.

Note: In order for a user to be able to use a database via a Lasso solution, permissions must be set to **Allow** on both the database and table level. For example, a user will not be able to search for records in a database unless the **Search Records** permission is set to **Allow** for both the database and the table that contains the records.

Field Permissions

Field permissions are established as preferences in the **Setup > Data Sources > Fields** page of Lasso Administration. Field permissions are discussed in *Chapter 7: Setting Up Data Sources*, and also in the *Record-Level Security* section that follows.

If both the database and table referenced by a given Lasso action have been allowed, then the field preferences are checked. Since field prefer-

ences cannot be set on a per-group basis, they are the same for all users who have access to the database and table regardless of what groups they belong to.

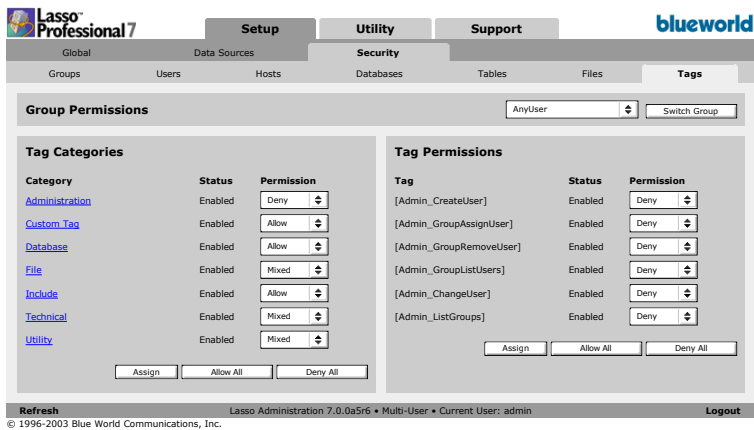
How Lasso checks field permissions:

- 1 The Allow... preferences are checked to ensure the field can be used in searches, or can be modified. Otherwise, a security violation is generated.
- 2 The Require an Exact Match... preferences are checked and if any are set to Yes, the values of the fields involved are compared to those in the database before the action is allowed. If any field values do not match, then a security violation is generated.
- 3 The field filters are processed. If any of them return errors, then the error is returned and the database action is not performed. Otherwise, the values of the field filters are used to process the database action.
- 4 If the field is being referenced as a response field, then the appropriate preferences must be established for the field. Otherwise, a security violation is generated.

Tag Permissions

Lasso Security allows administrators to either Allow or Deny access to any of the tags in LDML. The *Setup > Security > Tags* page in Lasso Administration allows the administrator to define all tag-level permissions for any existing group.

Figure 12: Tags Page



The top panel shows the current group to the right of Permissions For Group. The current group can be switched by selecting an existing group from the Groups pull-down menu, and then selecting Switch Group.

Setting Tag Category Permissions

The Tag Categories Listing panel shows a listing of all relevant tag categories for which tags can be enabled or disabled at the group level. Category level permissions can be set by selecting Allow or Deny from the Status pull-down menu, and selecting Update. All categories can be allowed or denied by selecting Allow All or Deny All. A Mixed status indicates that a selected tag category may contain both Allow and Deny permissions for individual tags.

Setting Tag Permissions

When a category is selected in the Tag Categories Listing panel, it shows all relevant tags in that category and their security permissions for the selected group in the Tags Listing panel. Prev and Next buttons appear for navigation if there are more than ten tags in a selected category. Each tag can be individually allowed or denied by selecting Allow or Deny from the Status pull-down menu, and then selecting Update. An Ignore permission designates the absence of an Allow or Deny permission. All tags shown in the Tags Listing panel can also be allowed or denied by selecting Allow All or Deny All.

Tag Dependencies

Some LDML tags have dependencies on other tags to function properly. If permissions for a tag has been denied that has dependencies with other tags, then those tags will not function correctly. For example, if [TCP_...] tags are denied, it will cause tags such as [Email_Send] not to work, which relies on the use of the [TCP_...] tags. To see whether or not a tag has any dependencies, consult the LDML 7 Reference and check to see if there are any tags listed in the Required field in the Detail view for any tag.

When a user attempts to execute a tag, the permissions for all the groups they belong to are checked in sequence. The following steps are performed.

How Lasso Checks Tag Security Settings

- 1 The set of groups which the current user belongs to is identified. If the user belongs to more than one group, the permissions for each group will be checked in alphabetical order by group name.
- 2 The permissions for each group are checked for a permission which references the current tag. If an Allow permission is found for the tag, then

the tag execution is allowed. If a Deny permission is found, then the tag execution is denied and a security violation is generated. Note that after the first Allow or Deny is found, no further checking is performed.

3 If no result is found, then the tag execution is allowed.

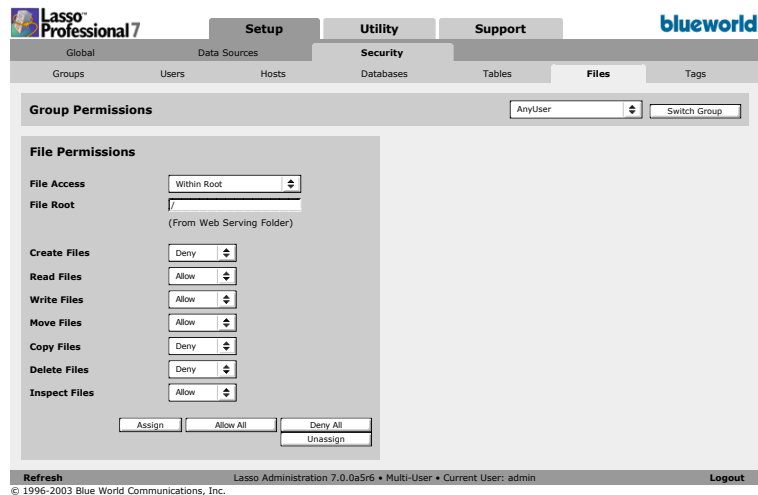
This order of operation means that any tag which is not explicitly denied is implicitly allowed.

File Permissions

Lasso Security allows administrators to establish permissions for what files a group of users can manipulate, and what operations they can perform on those files.

The *Setup > Security > Files* page in Lasso Administration allows the administrator to set file-level security for selected groups. This affects the use of the [File_...], [HTTP_...], [FTP_...], [Image], and [PDF_...] tags, which are described in the Lasso 7 Language Guide and LDML 7 Reference.

Figure 13: Files Page



The top panel shows the current group to the right of Permissions For Group. The current group can be switched by selecting an existing group from the Group pull-down menu, and then selecting Switch Group.

Updating File Permissions

The File Permissions panel shows the file permissions for the current group. Here the administrator can designate the folder from which a group may access files, and the permissions the group has for accessing and manipulating the files and sub-folders within that folder.

- **File Access** – Designates what level of file access should be allowed to the current group. Within **Root** designates that only files and folders within the Web serving folder may be accessed. All **Files** designates that the group may access files and folders anywhere on the hard drive.

Warning: Selecting **All Files** as the file access level automatically grants all file permissions to the group in addition to allowing access outside of the Web serving folder. It is not possible grant access to all files on the hard drive without allowing all file permissions for the group as well. Use this setting with care.

- **File Root** – Designates the folder within the Web serving folder that the group may access. For example, entering `/Some_Folder/` would restrict group access to files in the folder named `Some_Folder` within the Web serving folder.
- **Create Files** – Allows users in the group to create new files.
- **Read Files** – Allows users in the group to read the content of existing files.
- **Write Files** – Allows users in the group to write to existing files.
- **Move Files** – Allows users in the group to move existing files.
- **Copy Files** – Allows users in the group to copy existing files.
- **Delete Files** – Allows users in the group to delete existing files.
- **Inspect Files** – Allows users in the group to retrieve information about files, such as the file size or creation date.

File permissions can be set by selecting **Allow** or **Deny** for each permission, and selecting **Update**. All permissions can be allowed or denied by selecting **Allow All** or **Deny All**.

File Uploading

In order for site developers to be able to use uploaded files, they must be granted **All Files** permission to access and read files contained within the temporary items folder for the machine that hosts Lasso Service. The user must also have permission to write or copy files to the permanent destination where the uploaded files will be stored.

- On Windows this directory is:

c:/TEMP/

- On Mac OS X and Linux this directory is:

/tmp/

Lasso automatically deletes any files which are not removed from the temporary items folder before the current format file is finished being processed. This ensures that unwanted uploads are not allowed to occupy disk space for longer than the time it takes Lasso to process a single format file.

In addition, the temporary items folder is automatically cleaned by the operating system when the computer is restarted. This ensures that even if Lasso Service crashes, unwanted file uploads will be deleted the next time the computer is restarted.

See *Chapter 20: Files and Logging* in the Lasso 7 Language Guide for more information about using file uploads.

How File Permissions are Checked

- 1 When a file tag is called, the groups for the current user are determined. In the following example, [File_Read] attempts to read a file within the Web server root in a Windows machine.

```
[File_Read: 'c:/inetpub/wwwroot/default.lasso']
```

- 2 The permissions for the groups are checked in alphabetical order by group name for a File Root that contains the file which is referenced within the [File_Read] tag. For example, a group that provides access to the wwwroot directory would match the [File_Read] tag above.

```
Allow Path = 'c:/inetpub/wwwroot/'
```

Alternately, if file access to All Files is allowed, then no File Root is required. This allows users to access files anywhere on the machine hosting Lasso Service.

- 3 Once a matching File Root is found, the individual permissions are checked. For a [File_Read] tag, the user must be granted Read Files permission.
- 4 If Read Files is not permitted, then the permissions for the groups continue being checked for another permission that matches the File Root of the parameter to [File_Read]. If no valid permission can be found then a security violation is generated.

Note: It is recommended that file permissions always reference an explicit File Root. Allowing access to All Files gives the LDML developer a great deal of power to manipulate files contained anywhere on the Web server.

Web Server Security

Most Web server applications provide built-in security which protects files with certain names or in certain directories. Lasso generally works in concert with Web server security, but can also be used in some instances to bypass Web server security.

- **Format Files** – If Lasso format files are called directly, they will only be served if the current site visitor has permission to access the specified file. For example, if the Web server has a realm protecting the folder `Private` then the following URL can only be accessed if the visitor has permission to access that realm.

`http://www.example.com/Private/default.lasso`

Lasso will be called on to process the format file only if the appropriate file suffix (e.g. `.lasso`) is set properly within the Web server administration options. The file suffix must also be allowed within Lasso Security.

- **Response Files** – Format files which are referenced using one of the `-Response...` tags may obey Web server realms. Depending on the Web server application, Lasso checks with the Web server's security before serving any file as a response page. Since Lasso can work with many different Web Server connectors it is best to test whether realms protect Lasso response files before relying on this security.

For example, if the Web server has a realm protecting the folder `Private` then the following URL can only be accessed if the visitor has permission to access that realm.

`http://www.example.com/Action.Lasso?-Response=/Private/default.unknown`

The suffix mappings within the Web server administration options do not have any effect on what files Lasso will process using a `-Response...` tag. The `.lasso` suffix in `Action.Lasso` ensures that Lasso is called without checking the file suffix of the actual response file.

This allows format files with suffixes not defined in the Web server administration options to be processed by Lasso. However, the file suffix settings in Lasso Security do still apply. Lasso will only process format files with suffixes that have been allowed in Lasso Security. In this case, the suffix `.unknown` would have to be allowed in Lasso Security.

- **Include Files** – Format files which are served as part of a valid format files using one of the `[Include_...]` tags are not dependent on the Web server's file suffix mappings or realms. Any file within the Web server root which is allowed by Lasso's own file suffix settings within Lasso Security can be served using the `[Include_...]` tag.

Important: The [Include...] tags can be used to bypass Web server realms and serve any files from within the Web server root. Only trusted developers should be allowed to upload LDML format files to be served by Lasso.

- **File Tags** – The file tags can be used to manipulate any files within the Allow Path according to the permissions which have been granted to the current group. It is important to grant only the least number of permissions which each developer needs to implement the desired behavior of their site.

If Allow Access to Files Outside Root is granted to a group, then any users in that group can access any files on the machine hosting Lasso Service. This includes any files on the machine inside or outside of the Web server root.

Record-Level Security

Record-level security can be enabled in Lasso by setting fields to require an exact match when various Lasso actions are performed. A specific action will be allowed only if a value is specified for each field that requires an exact match, and if that value is exactly the same as the value currently stored in the database.

Note that record-level security will only be checked if the current user has permission to perform the action in the database or table directly. Record-level security can only be used to deny actions to users who would otherwise be able to perform an action.

Three types of actions can be secured using record-level security.

- **Search** – Records can only be viewed when the proper value for a field is specified. This could be used to allow visitors to password protect individual records. No other visitors will be able to view a specific record unless they know the proper password.
- **Update** – Records can be updated only when the proper value for a field is specified. This could be used to allow only authorized visitors to update certain records. No other visitors will be able to update a specific record unless they know the proper password. This can be used separate from the search option in order to allow visitors to view records, but not to update them.
- **Delete** – Similarly, records can be deleted only when the proper value for a field is specified. This can secure a database so only certain users can delete records, or can serve as a simple check where deletes must be confirmed by specifying a special field value before they are carried out.

To establish record-level security:

- 1 Create two fields within the database or table to be secured. In the following example, Username and Password fields will be created in the People table of the Contacts database. Visitors will be able to specify their username and password when they create a new record. Only the visitor that created the record will then be able to update, or delete that record, but anyone will be able to view the record.
- 2 Within Lasso Administration *Setup > Data Sources > Fields* check the box for Require an Exact Match on this Field when Updating Records for both the Username and Password fields.
- 3 Ensure that the AnyUser group has permission to search the database, add records to the database, and to update records within the database. The exact match option will only be checked when the user attempts to update a record within the database.
- 4 The add records page needs to require values for both the Username and Password fields. The following example shows an HTML form with -Required command tags embedded before the text inputs for Username and Password.

```
<form action="response.lasso" method="post">
  <input type="hidden" name="-Required" value="">
  <p>Username: <input type="text" name="Username" value="">
  <input type="hidden" name="-Required" value="">
  <p>Password: <input type="text" name="Password" value="">
  <p>First Name: <input type="text" name="First_Name" value="">
  <p>Last Name: <input type="text" name="Last_Name" value="">
  <p>Phone: <input type="text" name="Phone_Number" value="">
  <p><input type="submit" value="Add Record">
</form>
```

When this form is submitted, the following [Inline] ... [/Inline] tags in the response.lasso format file add a new record to the table with the Username and Password established for that record.

```
[Inline: -Add,
  -Database='Contacts',
  -Table='People',
  -KeyField='ID',
  'Username'=(Action_Param: 'Username'),
  'Password'=(Action_Param: 'Password'),
  'First_Name'=(Action_Param: 'First_Name'),
  'Last_Name'=(Action_Param: 'Last_Name'),
  'Phone_Number'=(Action_Param: 'Phone_Number')]
[/Inline]
```

- 5 Any user will be able to view the First_Name, Last_Name, and Phone_Number established for the user using simple search and response format files. Of course, the Username and Password fields should never be revealed on any search response.
- 6 Users will be able to modify their record in the database using the following update form. This form is similar to the add form which was defined above, but has the added feature of the exact match setting. Lasso Security will not allow the [Inline] ... [/Inline] which this form triggers to be processed unless both the Username and Password fields are defined with the right values.

```
<form action="response.lasso" method="post">
  <input type="hidden" name="-Required" value="">
  <p>Username: <input type="text" name="Username" value="">

  <input type="hidden" name="-Required" value="">
  <p>Password: <input type="text" name="Password" value="">

  <p>First Name: <input type="text" name="First_Name"
    value="[Field: 'First_Name']">
  <p>Last Name: <input type="text" name="Last_Name"
    value="[Field: 'Last_Name']">
  <p>Phone: <input type="text" name="Phone_Number"
    value="[Field: 'Phone_Number']">

  <p><input type="submit" name="-Nothing" value="Update Record">
</form>
```

When this form is submitted, the following [Inline] ... [/Inline] tags in response.lasso perform the update action within the database.

```
[Inline: -Update,
  -Database='Contacts',
  -Table='People',
  -KeyField='ID',
  -KeyValue=(KeyField_Value)
  'Username'=(Action_Param: 'Username'),
  'Password'=(Action_Param: 'Password'),
  'First_Name'=(Action_Param: 'First_Name'),
  'Last_Name'=(Action_Param: 'Last_Name'),
  'Phone_Number'=(Action_Param: 'Phone_Number'))
[/Inline]
```

Security Tips

This section provides some important tips and concepts about using security on a Lasso Professional 7 server.

General

- Grant the least number of privileges necessary for a user to access the resources they need. By denying all accesses and only granting permissions when needed, unauthorized uses of the server can be minimized. Additional permissions are easy to grant within Lasso Administration.
- Turn off Classic Lasso support to prevent the ability for site visitors to submit LDML commands directly to your Web server through URLs or HTML form submissions.
- Never allow untrusted parties to write LDML code in Lasso format files stored on your server. All LDML tags should be authored by trusted developers. By default only code which is stored within valid format files (or database fields) can be executed by Lasso. Consider carefully before allowing code from other sources to be executed.
- Use operating system privileges to protect sensitive files. The security of a Web site goes only as far as the security which protects the format files and databases files that comprise it. Create user accounts so that only trusted users can modify or read critical files.
- Store backed-up setup files in a secure location. These files contain all of the passwords and security settings for Lasso Professional 7.
- Use SSL security when appropriate. Lasso Administration and custom-built Web site administration interfaces can be accessed through SSL for greater security.
- Disable any tag modules which will not be in use. Remove any third-party LCAPI or LJAPI tag modules or data sources which are not in use. Remove any libraries or LassoApps from LassoStartup that are not in active use. Disable LJAPI if no LJAPI tag modules are in use.

Databases

- Never allow database files to be served directly by the Web server application. Lasso MySQL, FileMaker Pro, or other third party database files should never be stored within the Web server root. The database security in Lasso MySQL and FileMaker Pro is largely designed to prevent access to the databases through client applications or the graphical user interface. If a user gains access to the database file itself, they can usually read the data from it using a text editor.
- Store sensitive data encrypted within the database. The [Encrypt...] tags can be used to encrypt data so only a format file with the appropriate [Decrypt...] tag can access it. Personal information and sensitive data like credit card numbers can be stored encrypted within the database, and only decrypted when necessary to process the order. Encryption tags are

discussed in detail in *Chapter 18: Encoding* of the Lasso 7 Language Guide.

- If sensitive information such as a record ID, password, or credit card number needs to be passed in a URL, or in a place where it can be viewed in the HTML source code, use of the [Encrypt...] tags is recommended to encrypt the data so only a format file with the appropriate [Decrypt...] tag can access it.

User Authentication

- Once authentication information is entered into a Web browser for a specific Web server that same authentication information will be sent with each subsequent request.
- Usernames and passwords are cached by many Web browsers for easier authentication. If the username and password for the global administrator or any Lasso user is cached, then subsequent users of the Web browser may be able to access Lasso Administration or portions of a Web site without being prompted for authentication.
- If Lasso Administration or a protected area of a Web site is visited using a public browser such as in a library or Internet café, any requests to store cookies or cache usernames and passwords should be denied, and the history of the browser should be cleared before logging off of the machine.
- The global administrator is not bound by any of the settings established in Lasso Security. When a user is authenticated as the global administrator it may be possible to perform actions which are normally not allowed by Lasso Security.
- Sessions can be used to provide an alternate method of authentication for users. Sessions rely on cookies or information passed in URLs to authenticate a user. Sessions can be deleted explicitly, or will automatically timeout after a set period of inactivity.

Testing Solutions

- Each Web browser implements authentication in a slightly different fashion. If a Web site must be accessed from many different Web browsers, it should be tested on each one to ensure that the authentication works properly.
- Since authentication information is cached, the Web browser should be quit between each test of a different username and password. On some systems it might be necessary to quit all Internet applications in order to clear out cached usernames and passwords.

- Be careful with testing solutions using the same browser which has been used to access Lasso Administration. Since the global administrator can access any resources within Lasso, it can be difficult to tell how Lasso Security is set up if the current user is the global administrator.

9

Chapter 9

Administration Utilities

This chapter documents the Utility section in Lasso Administration, which provides the administrator with tools for managing and maintaining the Lasso Professional 7 server. This chapter describes the following:

- *SQL Browser* describes how to issue SQL queries to configured databases in Lasso Administration.
- *Lasso MySQL* describes utilities for maintaining MySQL tables.
- *Email* describes managing the email queue, sending a basic email message, and establishing email settings.
- *Events* introduces Lasso events, and describes how they can be set and managed.
- *Errors* describes viewing and setting preferences for the Lasso error log.
- *LassoApps* describes how to build and manage LassoApps on the Lasso Professional 7 server.
- *Caches* describes how to view and manage developer-defined caches on the Lasso Professional 7 server.

SQL Browser

The SQL section provides a Web-based interface that allows one to issue SQL queries to Lasso-accessible SQL databases. A Lasso-accessible SQL database is any MySQL or SQL-compliant JDBC database that has been set up and enabled in the *Setup > Data Sources* section of Lasso Administration.

Issuing SQL Statements

The Query page is where SQL statements can be entered. The results of the query will be presented at the bottom of the page with one column for each field that is returned. The results could contain actual field data from a database search, or could contain synthetic field data which is generated by the database in order to format the results of various SQL statements and functions. See the examples that follow for more information.

Figure 1: Query Page

ID	First_Name	Last_Name	Company	Phone_Number	Title	Sex	Jobs
1	John	Doe	Blue World	555-1212	Mr.	Male	Sales Representative , Technical Support Representative
2	Jane	Doe	Blue World	555-1212	Mrs.	Female	Sales Representative , Technical Support Representative
3	Bob	Surname	Blue World	555-1212	Mr.	Male	Sales Representative , Technical Support Representative
4	Jane	Surname	Blue World	555-1212	Mrs.	Female	Product Manager , Sales Manager , Administration

4 records returned
8 fields returned.

To issue a SQL statement:

- 1 Select a data source connector from the Connector pull-down menu. Only connectors to data sources that support SQL will be shown.
- 2 Select a data source host from the Host pull-down menu.
- 3 Select a database to issue a SQL statement from the Database pull-down menu. Only databases enabled in the **Setup > Data Sources** section will be shown.
- 4 Enter a SQL query in the SQL Query field.
- 5 Select the Issue SQL Query button. The results of the statement are shown in the lower panel, which by default shows No Results Found.

SQL Statement History

A special feature of the SQL Browser is that the last ten statements entered into the SQL Query field will be displayed in a pull-down menu that appears to the right of History. If one wishes to issue a statement stored in the History pull-down menu, simply select the statement from the pull-down menu, and it will automatically appear in the SQL Query field. Then select Issue SQL Query.

SQL Options

Selecting the Show Options button in the SQL Query Browser panel shows the View Options panel to the right. Here, global options can be set for how SQL query results are displayed.

The following options may be edited:

- **Show Fields** – Allows the maximum number of fields displayed in the results to be selected. The options are 4 Fields, 8 Fields, 12 Fields, 16 Fields, and All Fields. If more than eight fields are selected, then the results panel will expand to the right to accommodate the extra fields.
- **Max Records** – Allows the maximum number of records displayed in the results to be selected. The options are 10 Records, 25 Records, 50 Records, 75 Records, 100 Records, and All Records.
- **Max Field Lines** – Allows the maximum number of lines of text to be displayed per field in the results to be selected. One line consists of approximately 20 characters horizontally. The options are 1 Lines, 4 Lines, 7 Lines, 10 Lines, and All Lines. Selecting All Lines will display the entire contents of the field.

Options are changed by selecting the desired values from the pull-down menus and selecting the Apply button. The Reset button returns all options to their default values. Selecting the Hide Options button hides the View Options panel.

Note: The View Options panel in the Query page only modifies how the SQL results are displayed within the Lasso Administration interface. Changing options in the View Options panel does not affect the function of any SQL commands issued.

Supported SQL Syntax

Consult your data source documentation for complete details about SQL statements which can be issued. Some MySQL examples are given here of different types of SQL statements that can be issued. For more information

and examples of MySQL statements, see the MySQL documentation at <http://www.mysql.com>.

To display records from a MySQL table:

Use the SELECT statement. The following SELECT statement returns all * fields FROM the Sessions table WHERE the field ID contains values greater than 0.

```
SELECT * FROM Sessions WHERE id > 0;
```

The results of issuing this SQL statement will vary depending on whether sessions are in active use within Lasso.

→ ID	Session_Key	Last_Access	Expire_Minutes
11	SessionTracker_admin_...	20010627	60
12	SessionTracker_admin_...	20010628	60

To create a new database and table in MySQL:

Use the CREATE statement. The following two CREATE statement creates database named Store_X and a table named Products. The Products table contains the fields id, product, category, description, and last_modified. As we are creating a new database, it does not matter which database is selected in the Database pull-down menu.

```
CREATE DATABASE Store_X;
CREATE TABLE Store_X.Products (
  id BIGINT NOT NULL PRIMARY KEY AUTO_INCREMENT,
  product VARCHAR (255),
  category VARCHAR (255),
  description TEXT,
  last_modified TIMESTAMP);
```

To add a record to a MySQL database:

Use the INSERT statement. The following INSERT statement adds a record to the people table in the Contacts database.

```
INSERT INTO Contacts.people (first_name, last_name) values ('John', 'Smith');
```

To update a record in a MySQL database:

Use the UPDATE statement. The following UPDATE statement updates a record in the people table in the Contacts database where first_name equals John and last_name equals Smith.

```
UPDATE Contacts.people SET company = 'Blue World' where first_name = 'John' &&
last_name = 'Smith';
```

Lasso MySQL

The Lasso MySQL section allows the administrator to perform maintenance tasks and view status information on MySQL databases and tables. Maintenance features include table check, repair, verify, backup and restore functions, as well as the ability to view server and status variables, and modify the internal permissions table in MySQL.

Startup Note: Lasso Service does automatically check and repair Lasso MySQL tables upon startup. This section of Lasso Administration allows the administrator to schedule more comprehensive and more frequent maintenance routines.

Maintenance

The Maintenance page allows the administrator to view table status and perform maintenance tasks on any MySQL table.

Figure 2: Maintenance Page

Lasso Professional 7 Setup Utility Support **blueworld**

SQL **Lasso MySQL** Email Events Errors LassoApps Cache

Maintenance Backup Restore

Table Maintenance

Database: lasso_internal

Operation: Check Tables

Table Name	Last Checked
_errors	2003-09-07 22:47:57
global_prefs	2003-09-07 22:47:57
jdbc_drivers	2003-09-07 22:47:57
security_database_tables	2003-09-07 22:47:57
security_datasource_databases	2003-09-07 22:47:57
security_datasource_hosts	2003-09-07 22:47:57
security_datasources	2003-09-07 22:47:57
security_group_db_map	2003-09-07 22:47:57
security_group_file_perms	2003-09-07 22:47:57
security_group_generic_perms	2003-09-07 22:47:57

Select All Select None

Showing 10 tables out of 20 found.
20 tables are selected.

1 Jump Next > Last >>

Schedule Operation... Perform Operation

Table Status

Name	security_datasource_databases
Type	MyISAM
Row_format	Dynamic
Rows	8
Avg_row_length	40
Data_length	320
Max_data_length	4294967295
Index_length	2048
Data_free	0
Auto_increment	9
Create_time	2003-09-05 12:05:02
Update_time	2003-09-05 12:05:47
Check_time	2003-09-07 22:47:57
Create_options	N/A
Comment	N/A

Refresh Lasso Administration 7.0.0a5r6 • Multi-User • Current User: admin Logout

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Table Maintenance

The Table Maintenance panel shows a list of tables in a selected MySQL database. The current database can be changed by selecting a new database from the Database pull-down menu. The Operation pull-down menu

provides a list of maintenance operations that can be performed on one or more selected tables. The following operations can be performed:

- **Flush Tables** – Issues a SQL FLUSH statement for the selected table(s). This refreshes the table data and schema by removing the selected tables from the MySQL cache.
- **Backup Tables** – Issues a SQL BACKUP TABLE statement for the selected table(s). This duplicates the selected tables and saves them in the Lasso Professional 7/Admin/Backup/ folder. A folder for each backup database will be created, and the table files for each individual backup will be stored in a subsequent folder with a date/time stamp as a name (e.g. Contacts/20020916_155005/). For information on how to restore a table that has been backed up, see the *Restore* section later in this chapter.
- **Analyze Table Indices** – Issues a SQL ANALYZE TABLE statement for the selected table(s). This verifies the key value distribution in the index of each table is correct.
- **Optimize Tables** – Issues a SQL OPTIMIZE TABLE statement for the selected table(s). This removes unnecessary space from MySQL tables and indices allowing them to perform faster.
- **Check Tables** – Issues a SQL CHECK TABLE statement for the selected table(s). This checks a MySQL table for errors, including individual records.
- **Check Tables (Quick)** – Issues a SQL CHECK TABLE statement for the selected table(s). The QUICK option checks a MySQL table for errors without checking individual records.
- **Check Tables (Extended)** – Issues a SQL CHECK TABLE statement for the selected table(s). The EXTENDED option checks a MySQL table for errors including individual records and verifies all key values for consistency. This takes the longest time to perform.
- **Repair Tables** – Issues a SQL REPAIR TABLE statement for the selected table(s). This repairs a MySQL table that has been possibly corrupted.
- **Repair Tables (Quick)** – Issues a SQL REPAIR TABLE statement for the selected table(s). This repairs a MySQL table that has been possibly corrupted, and the QUICK option repairs only the index tree.
- **Repair Tables (Extended)** – Issues a SQL REPAIR TABLE statement for the selected table(s). This repairs a MySQL table that has been possibly corrupted. The EXTENDED option repairs the index one record at a time. This takes the longest time to perform.

Note: For more information on the operations listed here, consult the MySQL documentation.

An operation can be performed by selecting an operation from the Operation pull-down menu, checking one or more tables on which to perform the operation, and selecting the Perform button. The Select All button automatically checks all tables shown, while the Select None button automatically unchecks all tables. Results of an operation are shown in the right panel.

Scheduling Operations

An operation can be scheduled by selecting an operation from the Operation pull-down menu, checking one or more tables on which to perform the operation, and selecting the Schedule Operaton button. This takes the administrator to the *Utility > Events > Schedule Event* page in Lasso Administration, which allows the administrator to schedule when the operation should be performed. For instructions on how to use the event scheduler, see the *Events* section of this chapter.

Note: Once on the Schedule Event page, the details of an operation may not be edited. Operations may only be edited by returning to the Maintenance page.

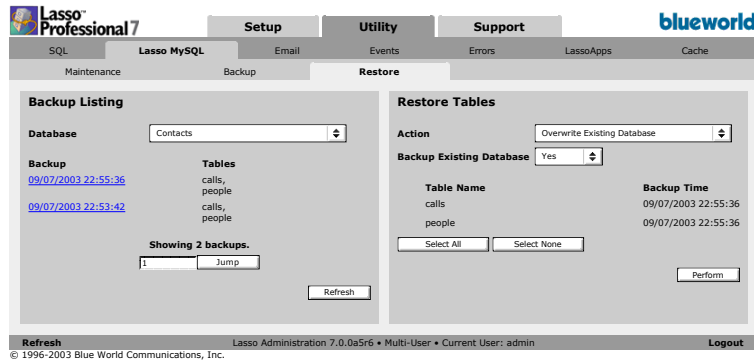
Table Status

Selecting the name of a table in the Table Maintenance panel shows the Table Status panel for that table to the right. The Table Status panel displays all available status variables for the selected table. For more information on table status variables, consult the MySQL documentation.

Restore

The Restore page allows the administrator to restore any MySQL database that had been backed up previously using the Maintenance page.

Figure 3: Restore Page



Backup Listing

The Backup Listing panel allows the administrator to select a database to be restored and lists all backups for that database that are currently available. The current database can be changed by selecting a database from the Database pull-down menu and selecting the Select button.

Restore Tables

Selecting the name of a database backup in the Backup Listing panel shows the Restore Tables panel for that databases to the right. This lists all tables in the current backup with the date/time of backup for each. The Restore Tables panel allows the administrator to restore a database from an existing backup, or create a new database with a new name using the backup data. Procedures for restoring a backup to an existing database and creating a new database are described in separate procedures below.

To restore a backup over an existing database:

- 1 In the Backup Listing panel, select a database to restore from the Database pull-down menu. This will display a list of previous backups below.
- 2 Select a backup to restore from. This shows the Restore Tables panel for that backup to the right.
- 3 In the Restore Tables panel, select a Overwrite Existing Database from the Action pull-down menu. This option will overwrite the current database shown in the Backup Listing panel with the backup data.
- 4 Select Yes or No from the Backup Existing Database pull-down menu. Selecting Yes will create a new backup of the existing database before overwriting the database with the old backup data (recommended). Selecting No overwrites the existing database without making a backup.

Warning: Once table data has been overwritten, it cannot be retrieved. Please exercise caution before selecting **No**.

- 5 Select the individual tables to restore by checking or unchecking the tables shown. If a table is unchecked, the corresponding table in the existing database will not be altered.
- 6 Select the **Restore** button. This will create a new database with the name specified in the **New Database Name** field in MySQL. The database and tables will be enabled by default, and will have the same group and user settings as the former database.

To restore a backup as a new database:

- 1 In the **Backup Listing** panel, select a database to restore from the **Database** pull-down menu. This will display a list of previous backups below.
- 2 Select a backup to restore from. This shows the **Restore Tables** panel for that backup to the right.
- 3 Select **Create New Database** from the **Action** pull-down menu. This option will create a new database that contains the backup data with a new name. This will not overwrite the existing database.
- 4 Enter a name for the new database in the **New Database Name** field. This name must be different from the original database name.
- 5 Select the individual tables to restore by checking or unchecking the tables shown.
- 6 Select the **Restore** button. This will create a new database with the name specified in the **New Database Name** field in MySQL. All permissions in Lasso Administration will need to be set for the new database.

Email

The **Email** section allows the administrator to manage the global Lasso email queue, send email, and set global email options in Lasso Professional 7. Full documentation for sending an email in Lasso Professional 7 can be found in *Chapter 25: Email* in the Lasso 7 Language Guide.

Email Queue

The email queue logs all email messages that are sent from within Lasso Administration or via the `[Email_Send]` tag. Messages remain in the queue while they are being sent to the SMTP mail server specified in the `[Email_`

Send] tag by the developer. For more information, see *Chapter 25: Email* in the Lasso 7 Language Guide.

Messages in the queue can be viewed by status by selecting a message category from the pull-down menu in top panel, and then selecting the **Select** button. These categories are as listed below.

- **All Messages** – Shows all messages in the email queue.
- **Queued Messages** – Shows messages currently queued in the email queue.
- **Sent Messages** – Shows all messages that have been sent previously in the email queue.
- **Message Errors** – Shows all messages that were unable to be sent in the email queue due to an error.

Figure 4: Email Queue Page



The Email Queue panel lists all email messages in the email queue. The message ID, summary, and status are all shown in this panel. Selecting the **Delete Shown Messages** button deletes all messages currently shown, and selecting the **Delete All Messages** button deletes all messages in the current message category.

Email Message

Selecting the ID of a message shows the message detail in the Email Message panel, which appears to the right. The administrator can delete messages in the queue by selecting the **Delete** button in this panel. Selecting **Stop Mail Queue** prevents all email messages with a **Queued** status from being sent until the resulting **Start Mail Queue** button is selected.

Sending Email

The Send Email page allows email messages to be sent. After the message is queued, one returns to the Email Queue page. While Lasso Professional 7 provides robust support for custom email sending programmed within your format files, the Send Mail form allows the administrator to quickly test email sending.

Figure 5: Send Email Page

The screenshot shows the 'Send Email' page in Lasso Professional 7. The page layout includes a top navigation bar with 'Setup', 'Utility', and 'Support' tabs. Below this is a sub-navigation bar with 'SQL', 'Lasso MySQL', 'Email', 'Events', 'Errors', 'LassoApps', and 'Cache'. The 'Email' tab is active, showing 'Email Queue', 'Send Email', and 'Setup' sub-tabs. The 'Send Email' sub-tab is selected, displaying a form with fields for SMTP Host, To, From, Subject, Body, CC, and BCC. A 'Send Email' button is at the bottom of the form. The footer contains 'Refresh', 'Lasso Administration 7.0.0b3 • Evaluation (Expires 10/10/2003) • Current User: admin', and 'Logout'.

To send an email:

- 1 Enter the email host name in the Host field.
- 2 Enter the recipient's email address in the To field.
- 3 Enter the sender's email address in the From field.
- 4 Enter the subject of the email in the Subject field.
- 5 Enter the body of the email in the Body field.
- 6 Enter the email address of any carbon-copy recipients in the CC field (optional).
- 7 Enter the email address of any blind carbon-copy recipients in the BCC field (optional).
- 8 Select the Send Message button. The message will be inserted into the email queue database and sent out per settings specified on the Email Setup page.

Email Setup

The Setup page allows one to set preferences for the [Email_Send] tag. This includes setting the administrator email address, default host IP address, message retention, and system automation.

Figure 6: Setup Page

The screenshot shows the 'Email Setup' configuration page in Lasso Professional 7. The interface includes a top navigation bar with tabs for 'SQL', 'Lasso MySQL', 'Email' (selected), 'Events', 'Errors', 'LassoApps', and 'Cache'. Below the navigation bar, the 'Email Setup' form is displayed with the following fields and options:

- Default SMTP Host:** A text input field containing 'smtp.example.com'.
- Maximum Retries:** A numeric input field set to '5'.
- Retry Delay:** A numeric input field set to '30' with a 'Seconds' label.
- Email Sweep Delay:** A numeric input field set to '15' with a 'Seconds' label.
- TCP Timeout:** A numeric input field set to '15' with a 'Seconds' label.
- Retain Successful Messages:** A dropdown menu set to 'No'.
- Retain Error Messages:** A dropdown menu set to 'Yes'.
- Retain Message Bodies in Log:** A dropdown menu set to 'No'.
- Delete Attachments from Log:** A dropdown menu set to 'Yes'.

At the bottom of the form are two buttons: 'Update' and 'Stop Mail Queue'. The footer of the page contains a 'Refresh' button, the text 'Lasso Administration 7.0.0a5r6 • Multi-User • Current User: admin', and a 'Logout' button.

The following describes the options in the Send Email page:

- **Default Host IP** – The default SMTP server for sending email. If this is specified then the Host field in the Send Email page and the -Host parameter in the [Send_Email] tag are optional.
- **Maximum Retries** – The maximum number of times a message send will be attempted (5 attempts by default).
- **Retry Delay** – The number of seconds to pause between retrying a message send (30 seconds by default).
- **Email Sweep Delay** – The amount of time the email sender sleeps before it checks to see if there are any messages to send (15 seconds by default).
- **TCP Timeout** – The amount of time the email sender will wait before disconnecting from a remote host that is not responding (15 seconds by default).
- **Retain Successful Messages** – Retains details about messages that have been successfully sent in the email queue (No by default).
- **Retain Error Messages** – Retains messages which have an error when sending (Yes by default).

- **Retain Message Bodies in Log** – Retains the body of messages which are retained using the options above. Otherwise, only the headers are retained (No by default).
- **Delete Attachments from Log** – Removes attachments from the queue even for messages which are retained using the options above (Yes by default).

Email settings can be changed by entering new values for the options above and selecting the **Update** button. Selecting the **Stop Mail Queue** button stops the email queue while global options are being set.

Events

The Events section allows the administrator to list events, get the status of an event, clear the event queue, or delete events that have been scheduled. Additional documentation on events and the [Event_Schedule] tag can be found in *Chapter 22: Control Tags* in the Lasso Professional 7 Language Guide.

Introduction to Events

Events in Lasso Professional 7 can take one of two forms. Events can be scheduled administrator-defined URL requests, or they can be scheduled maintenance tasks as defined in the *Utility > MySQL > Maintenance* section of Lasso Administration. For user-defined URL requests, the event scheduler can operate as a virtual site visitor which visits specific URLs at specific times. The event scheduler can be used to schedule page loads on the local server or even on remote servers.

Normally, the pages which the event scheduler has been programmed to visit will be pages which perform specific tasks that only the event scheduler has access to. For example, a folder named **Events** could be created, and all pages that the event scheduler calls could be placed in it. A file **SendEmail.lasso** would then be scheduled as:

```
http://www.example.com/Events/SendEmail.lasso
```

Events can be scheduled to execute at a specific time, but the actual time the event is executed may vary based on server traffic and other conditions. Events can only be certain to execute within one minute of their scheduled time.

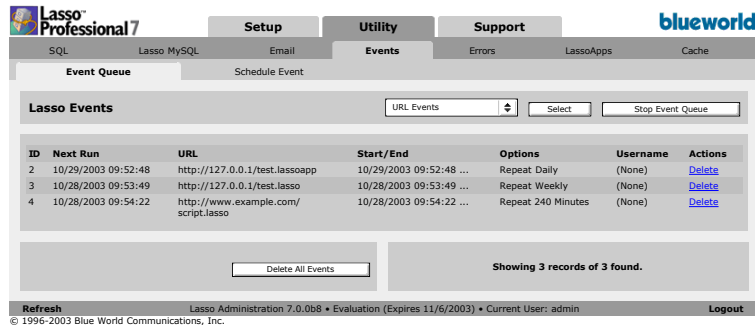
Event Queue

The Event Queue page provides a list of scheduled events. The events can be filtered by type, and events can be deleted if they have not yet been performed. There are two types of events that can be viewed in the Event Queue page:

- **URL Events** – These are administrator-defined URL requests. The administrator explicitly defines these using the *Utility > Events > Schedule Event* page.
- **Maintenance Events** – These are MySQL maintenance tasks. The administrator defines these using the *Utility > MySQL > Maintenance* page in Lasso Administration.

All events that have been scheduled and not performed yet are shown in the queue. If an event repeats over time, then it will remain in the queue until the administrator-defined period for that event has ended. Once an event has ended, it is removed from the queue.

Figure 7: Event Queue Page



The top panel allows the administrator to toggle between URL Events and Maintenance Events queues. This is done by selecting a queue from the pull-down menu, and then selecting the **Select** button. Selecting the **Stop Event Queue** temporarily suspends all queued events from being executed. This allows the administrator to delete events that are causing problems or schedule a batch of events. The button then changes to **Start Event Queue**, and can be re-selected to start event execution again. Events are restarted when the server is restarted even if the event queue is stopped.

The middle panel shows all queued events for the selected queue that have not been performed yet. The URL (or MySQL action for maintenance events), time of next run, start and end dates (for repeating events), options, and username are shown for each event. The administrator may

delete an event from the current queue by selecting the **Delete** link under **Actions** for that event.

Selecting the **Delete All Events** button in the lower-left panel removes all shown events from the queue shown.

Scheduling Events

The **Schedule Event** page provides a convenient interface for scheduling events. Events can also be scheduled programmatically via the [Event_Schedule] tag, as discussed in *Chapter 22: Control Tags* in the *Lasso 7 Language Guide*. All scheduled events can be viewed in the **Event Queue** page.

Figure 8: Schedule Event Page

The screenshot shows the 'Schedule Event' page in Lasso Professional 7. The page has a navigation bar with tabs: SQL, Lasso MySQL, Email, Events (selected), Errors, LassoApps, and Cache. Below the navigation bar is a sub-bar with 'Event Queue' and 'Schedule Event' (selected). The 'Schedule Event' form includes fields for Type (URL Event), Event URL, Perform Event (Once), Event Date/Time (MM/DD/YYYY HH:MM:SS), Continue After Restart (Yes), Username, and Password. A 'Schedule Event' button is at the bottom right. The footer shows 'Refresh', 'Lasso Administration 7.0.0b3 • Evaluation (Expires 10/10/2003) • Current User: admin', and 'Logout'.

The type of event that is being scheduled is shown in the **Type** field. This field is not modifiable by the user, and can be either **Schedule URL** or **Table Maintenance**. The **Perform Event** pull-down menu specifies how often an event should be run. The remaining fields in the **Schedule Event** page will vary depending on which option is selected for **Perform Event**, and the options are as follows:

- **Once** – Event is performed once at a specified date and time.
- **Weekly** – Event is repeated once a week on a specified day and time between the **Start Date/Time** and **End Date/Time**.
- **Daily** – Event is repeated once a week on a specified day and time between the **Start Date/Time** and **End Date/Time**.
- **Custom Repeat** – Event is repeated at a specified time interval (in minutes) between the **Start Date/Time** and **End Date/Time**.

Because the input fields vary for each option, scheduling an event to be performed once, weekly, daily, and in a custom repeating fashion are described in separate procedures below.

To schedule an event to be performed once:

- 1 If the type is Schedule URL, enter the URL address of the event in the Event URL field. Otherwise, if the type is Table Maintenance, information about the maintenance operation is displayed in an Action field. The details of a Table Maintenance operation may only be edited by returning to the *Utility > MySQL > Maintenance* section of Lasso Administration.
- 2 Enter the specific date and time on which the event will occur in the Event Date/Time field (mm/dd/yyyy hh:mm:ss format).
- 3 Select Yes or No from the pull-down menu in the Continue After Restart field. If set to Yes, the event will continue after the Web server is stopped and restarted.
- 4 Enter any username required to perform the event in the Username field (optional). An event will require a username if the page to be loaded is protected by Lasso Security, and requires a username for access. For more information on usernames, see *Chapter 8: Setting Up Security*.
- 5 Enter any password required to perform the event in the Password field (optional). The same conditions apply to passwords as for usernames.
- 6 Select Schedule Event.

To schedule a weekly event:

- 1 If the type is Schedule URL, enter the URL address of the event in the Event URL field. Otherwise, if the type is Table Maintenance, information about the maintenance operation is displayed in an Action field. The details of a Table Maintenance operation may only be edited by returning to the *Utility > MySQL > Maintenance* section of Lasso Administration.
- 2 Select a day of the week on which the event will be performed from the Day of Week pull-down menu (e.g. Sunday, Monday, ...).
- 3 Enter the time of day on which the event will be performed from the Time of Day pull-down menu (24-hour hh:mm:ss format).
- 4 Enter the start date of the event in the Start Date/Time field. The date on which a repeating event is scheduled to start. The format is mm/dd/yyyy hh:mm:ss. If the start date is specified without a time, the time will default to 00:00:00 (12:00 AM).
- 5 Enter the ending date of the event in the End Date/Time field. The date when a repeating event is scheduled to end. The format is the same as Start Date/Time.

- 6 Select Yes or No from the pull-down menu in the Continue After Restart field. If set to Yes, the event will continue after the Web server is stopped and restarted.
- 7 Enter any username required to perform the event in the Username field (optional). An event will require a username if the page to be loaded is protected by Lasso Security, and requires a username for access. For more information on usernames, see *Chapter 8: Setting Up Security*.
- 8 Enter any password required to perform the event in the Password field (optional). The same conditions apply to passwords as for usernames.
- 9 Select Schedule Event.

To schedule a daily event:

- 1 If the type is Schedule URL, enter the URL address of the event in the Event URL field. Otherwise, if the type is Table Maintenance, information about the maintenance operation is displayed in an Action field. The details of a Table Maintenance operation may only be edited by returning to the *Utility > MySQL > Maintenance* section of Lasso Administration.
- 2 Enter the time of day on which the event will be performed from the Time of Day pull-down menu (24-hour hh:mm:ss format).
- 3 Enter the start date of the event in the Start Date/Time field. The date on which a repeating event is scheduled to start. The format is mm/dd/yyyy hh:mm:ss. If the start date is specified without a time, the time will default to 00:00:00 (12:00 AM).
- 4 Enter the ending date of the event in the End Date/Time field. The date when a repeating event is scheduled to end. The format is the same as Start Date/Time.
- 5 Select Yes or No from the pull-down menu in the Continue After Restart field. If set to Yes, the event will continue after the Web server is stopped and restarted.
- 6 Enter any username required to perform the event in the Username field (optional). An event will require a username if the page to be loaded is protected by Lasso Security, and requires a username for access. For more information on usernames, see *Chapter 8: Setting Up Security*.
- 7 Enter any password required to perform the event in the Password field (optional). The same conditions apply to passwords as for usernames.
- 8 Select Schedule Event.

To schedule a custom repeating event:

- 1 If the type is Schedule URL, enter the URL address of the event in the Event URL field. Otherwise, if the type is Table Maintenance, information about the maintenance operation is displayed in an Action field. The details of a

Table Maintenance operation may only be edited by returning to the *Utility > MySQL > Maintenance* section of Lasso Administration.

- 2 Enter the number of minutes at the beginning of the start date after which you want the event to begin in the Repeat Delay field. Repeat Delay is the interval (in minutes) by which an event will repeat.
- 3 Enter the start date of the event in the Start Date/Time field. The date on which a repeating event is scheduled to start. The format is mm/dd/yyyy hh:mm:ss. If the start date is specified without a time, the time will default to 00:00:00 (12:00 AM).
- 4 Enter the ending date of the event in the End Date/Time field. The date when a repeating event is scheduled to end. The format is the same as Start Date/Time.
- 5 Select Yes or No from the pull-down menu in the Continue After Restart field. If set to Yes, the event will continue after the Web server is stopped and restarted.
- 6 Enter any username required to perform the event in the Username field (optional). An event will require a username if the page to be loaded is protected by Lasso Security, and requires a username for access. For more information on usernames, see *Chapter 8: Setting Up Security*.
- 7 Enter any password required to perform the event in the Password field (optional). The same conditions apply to passwords as for usernames.
- 8 Select Schedule Event.

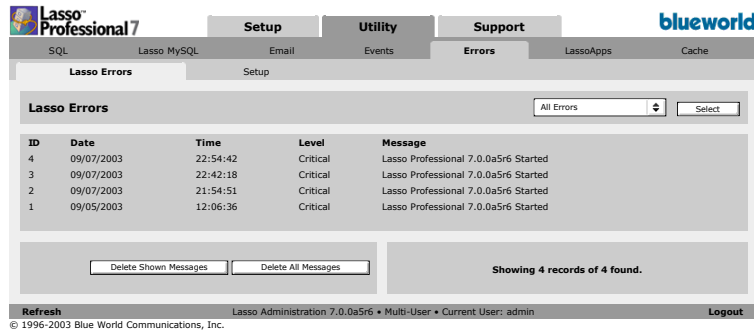
Errors

The Errors section allows the administrator to view and delete errors, warnings and details that have been logged both internally in Lasso Professional 7 and via the [Log] tag, as well as set global logging options. For more information on the [Log] tag, see *Chapter 20: Files and Logging* in the Lasso 7. Language Guide.

Lasso Errors

The Lasso Errors page lists all errors and system messages stored in the Lasso_Internal database. Errors and system messages can also be deleted within this interface.

Figure 9: Errors Page



The Lasso Errors page contains a list of all error messages received by their date, time, level, and message. The list is navigable via the Prev and Next buttons at the bottom of the panel.

Filtering Messages

The Lasso Errors pull-down menu allows messages to be filtered by level, which includes Critical Errors, Warnings, and Details. Each error level is described individually in the following *Error Log Setup* section. Individual format file and database errors are not logged here, but are rather controlled using the [Error...] tags. For more information, see *Chapter 21: Error Control* in the Lasso 7 Language Guide.

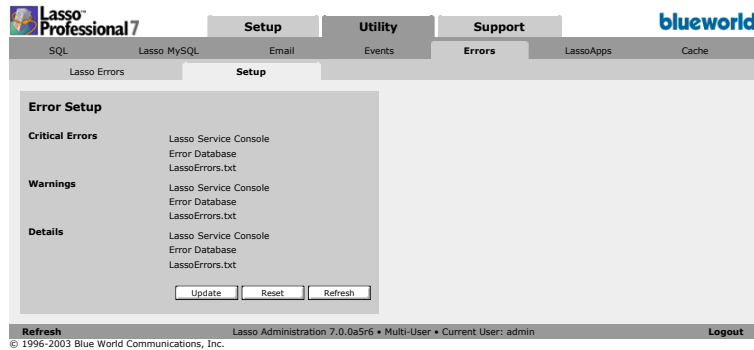
Deleting Messages

Selecting the Delete Errors Shown button deletes only the errors shown in the current panel, while selecting the Delete All Errors button deletes all errors in the current selected category. A confirmation dialog box will be displayed upon selecting either of these buttons.

Error Log Setup

The Setup page allows the administrator to set global logging options for Lasso Professional 7. These logging options are not limited to errors, and any feedback that occurs within the Lasso Service console can be logged for display in the Lasso Errors page.

Figure 10: Error Setup Page



The Error Setup panel allows the administrator to set unique logging options for three types of feedback:

- **Critical Errors** – This includes fatal errors that affect the overall functionality of Lasso Professional 7. This can include startup errors, module and connector errors, and system-related errors that cause Lasso Professional 7 not to function properly.
- **Warnings** – This includes non-fatal errors that do not affect the overall functionality of Lasso Professional 7, but the administrator should be aware of. This can include non-fatal startup errors, duplicate module or connector errors, SQL status errors, and logging errors.
- **Details** – This logs all processes performed by Lasso Service, which are not limited to errors.

For each feedback type, the administrator can choose to log or display feedback in any of the following three places:

- **Lasso Service Console** – If selected, feedback will be displayed in the Lasso Service console window when Lasso Service has been started as an application. For more information on starting Lasso Service as an application, see the installation chapters of this guide.
- **Error Database** – If selected, feedback will be logged to the `_Errors` table in the `Lasso_Internal` database and displayed in the Lasso Errors page in Lasso Administration.

Note: The `_Errors` table will store a maximum of 10,000 records. Once this limit has been reached, the oldest records will automatically be deleted.

- **LassoErrors.txt** – If selected, feedback will be logged to the `LassoErrors.txt` file in the Lasso Professional 7 folder in the hard drive.

Options are changed by checking or unchecking the desired values in the Error Setup panel and selecting the Update button. The Reset button returns

all options to their default values. Selecting the Refresh button reloads the Setup page with its currently stored values.

Note: For information on how to programmatically log custom data to the logs described above, see *Chapter 20: Files and Logging* in the Lasso 7 Language Guide.

LassoApps

The *Utility > LassoApps* section in Lasso Administration allows administrators to create and manage LassoApps. The following is an introduction to LassoApps, and describes how they can be used.

Introduction to LassoApps

LassoApps (short for “Lasso Applications”) allow entire Lasso solutions—including format files, html pages, images, and any other files—to be encrypted and compiled into a single file called a LassoApp. Once a LassoApp has been compiled, the original LDML code can no longer be viewed (client-side or server-side). LassoApps are served from a Web server using Lasso Professional 6, and are capable of the same functionality as traditional Lasso format files.

LassoApp Advantages

LassoApps are useful for hiding implementation details, locking format files, selling locked solutions, and installing pre-compiled solutions. Just like regular format files, LassoApps are portable and cross-platform compatible. LassoApps also offer the following advantages over regular format files.

- **Performance** – Performance is enhanced over regular format files due to the file existing as a single, cohesive unit. Once a LassoApp is read by Lasso once, it is cached in the RAM memory of the Web server and is no longer accessed from the hard disk until it is dumped from memory or the system is restarted.
- **Size** – LassoApps take up less disk space than the sum of its format files since the overhead associated with multiple files (file headers, image files, etc.) is reduced.
- **Security** – The code within a LassoApp is stored securely into a single file and cannot be viewed in a text or HTML editor. There is no way to extract format files from a LassoApp.

- **Portability** – LassoApps are easily portable since they consist of only one file, and all file paths to the different parts of the solution are retained internally.

LassoApp Characteristics

LassoApp file names end with the .LassoApp extension, instead of .html or .lasso. The ability to serve LassoApps must be enabled within Lasso Professional 6 global settings in order to serve LassoApps. If LassoApp serving is not enabled in Lasso Administration, then the user will receive a security error.

The functionality within LassoApps is only effective if the functions being performed by the LassoApp are permitted by Lasso Administration. LassoApp developers have the ability to create routines for checking whether or not the necessary permissions and settings are enabled, and instruct the administrator on what to do to configure Lasso Professional 6 settings for use with specific LassoApps. For further information on LassoApps, see *Chapter 2: LassoApps* in the Extending Lasso 7 Guide.

Building LassoApps

LassoApps can be created by the Lasso global administrator in the *Utility > LassoApps > Build* section of Lasso Administration. Creating a LassoApp involves supplying three pieces of information:

- The LassoApp root folder, which is the folder that contains all format files, HTML pages, images, and any other files to be compiled.
- The LassoApp root file, which is the default page or start page for the Lasso solution to be compiled.
- The file name for the compiled LassoApp.

Preparing source files for LassoApp Builder

Before building a LassoApp, all links to files within the LassoApp root folder must be replaced with the [LassoApp_Link] LDML tag. The [LassoApp_Link] LDML tag is what allows internal navigation between pages in a LassoApp. Links to files outside of the LassoApp root folder do not need to be formatted with this tag. Below are examples of how to express links within format files contained within a LassoApp.

- Links to files within the LassoApp root folder:


```
<a href="page.html">Link</a>
```

→

```
<a href="[LassoApp_Link:'page.html']">Link</a>
```
- Forms within the LassoApp root folder:


```
<Form Action="page.html"> ... </Form>
```


→ <Form Action="[LassoApp_Link:'page.html']"> ... </Form>

- Images within the LassoApp root folder:

→

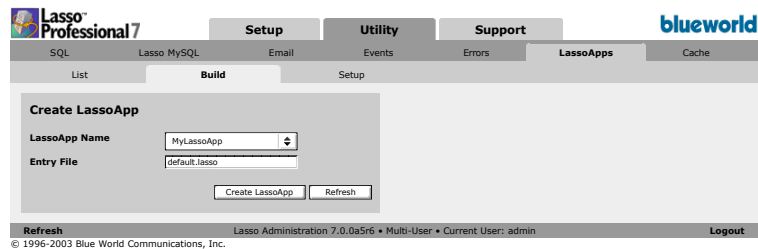
All links to files within the LassoApp root folder need to be formatted as shown above before using LassoApp Builder. Not doing this will prevent the LassoApp from being created. For more information on preparing format files to be converted into a LassoApp, see *Chapter 2: LassoApps* in the Extending Lasso Guide.

Note: Adding these tags in regular format files will not affect how the links, forms, and images function. Lasso will ignore these tags until they are compiled into a LassoApp using LassoApp Builder.

Using LassoApp Builder

The *Utility > LassoApps > Build* section of Lasso Administration is where LassoApps can be compiled.

Figure 11: LassoApp Build Page



To create a LassoApp:

- 1 Format all links to files within the LassoApp source files using the [LassoApp_Link] tag as shown previously.
- 2 Copy the project folder that contains all format files and images into the Lasso Professional 7/Admin/BuildLassoApps folder located on the same machine as Lasso Service.
- 3 Go to the *Utility > LassoApps > Build* section of Lasso Administration.
- 4 Select the name of the project folder that contains all format files and images in the LassoApp Name field.
- 5 Enter the name of the default page for the solution in the Entry File field. The Entry File is the first page the user will see when accessing the LassoApp.

6 Select Create LassoApp.

This will create a LassoApp with the same name as the project folder in the Lasso Professional 7/Admin/BuildLassoApps folder. To test the LassoApp, move the LassoApp file out of the BuildLassoApps folder and into the Web server root folder (or any folder therein), and then enter the URL to the LassoApp, as shown in the example below.

http://www.example.com/folder/Your_LassoApp.LassoApp

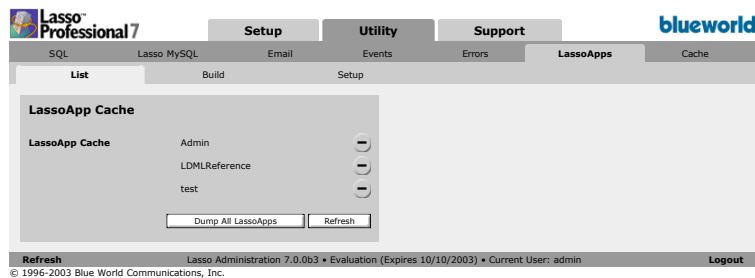
For more information on navigating LassoApps, see *Chapter 2: LassoApps* in the Extending Lasso 7 Guide.

Viewing and Dumping LassoApps

When a LassoApp is first called in a Web browser, it gets cached in the computers's RAM for efficient serving. If a new version of a particular LassoApp is loaded to the Web server, then the LassoApp will need to be removed from the system cache before the new version can be accessed.

The *Utility > LassoApps > List* section is where the administrator can view the names of LassoApps that have been loaded on the server, and dump them from the system cache.

Figure 12: List LassoApps Page



To remove a LassoApp from the system memory cache:

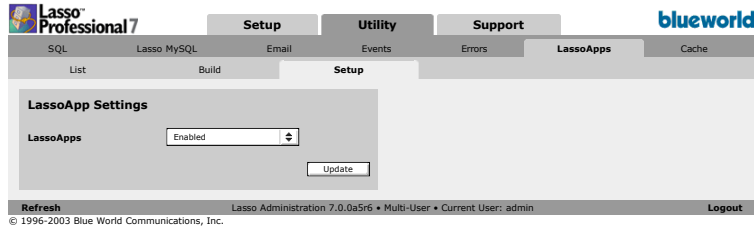
In the LassoApp Cache panel, select the minus (-) button next to the name of the LassoApp (e.g. MyLassoApp.LassoApp) to dump from memory. This panel contains all LassoApps that have been served by Lasso Professional 7 since startup.

Selecting Dump All LassoApps will remove all LassoApps from the system cache. After LassoApps have been dumped from the system cache, new versions of the LassoApps may be loaded.

LassoApp Settings

The *Utility > LassoApps > Setup* section is where the administrator can enable or disable LassoApps in Lasso Professional 7.

Figure 13: LassoApp Settings Page



Disabling LassoApps prevents the execution of any custom or third party LassoApp not included with Lasso Professional 7. The LassoApps that cannot be disabled are Admin.LassoApp, GroupAdmin.LassoApp, LDMLReference.LassoApp, and Setup.LassoApp in the LassoStartup folder.

To enable or disable LassoApps:

- 1 In the Settings panel, select Enabled or Disabled from the LassoApps pull down menu.
- 2 Select the Update button.

Caches

New caching tags in Lasso Professional 7 make it possible for developers to cache content in their pages using the `[Cache] ... [/Cache]` tags. These custom caches are stored in memory on the server. These caching tags allow developers to reduce database and server load by having Lasso only recalculate various portions of a page periodically.

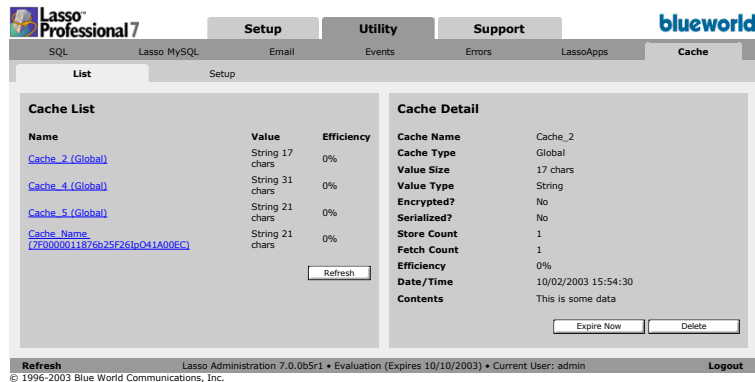
The Lasso global administrator has global control over all caches stored on the Lasso Professional 7 server. The *Utility > Cache* section of Lasso Administration provides information about all current caches, allows caches to be reset, and allows preferences for the caching mechanism to be set.

Viewing and Dumping Caches

The *Utility > Cache > List* page in Lasso Administration provides a list of active caches on the server, including cache name, the size of cached data,

and the efficiency of the cache. This page also provides total cache usage statistics since Lasso was started (cache statistics always reset when Lasso Service is restarted).

Figure 14: Cache List Page



The Cache List panel displays a list of all caches that have been served by Lasso Professional 7 since startup, the size and data type of cached data, and an efficiency score. A cache's efficiency score is the number of times the cache has been loaded minus the number of times it has been refreshed or expired, then divided by the number of loads (loads - stores / loads). Clicking the Refresh button updates the panel with the latest information.

Clicking on the name of a cache shows the Cache Detail panel to the right, where statistics about the cache may be viewed, and the cache can be deleted or refreshed. Refreshing a cache allows cache statistics to persist, whereas deleting a cache does not.

To refresh a cache:

- 1 Select the name of the cache to reset from memory in the Cache List panel. This panel contains the names of all caches that have been loaded on the Lasso Professional 7 server.
- 2 In the Cache Detail panel, Select the Expire Now button. Once a cache is manually expired, its contents will be refreshed the next time it is loaded.

To delete a cache:

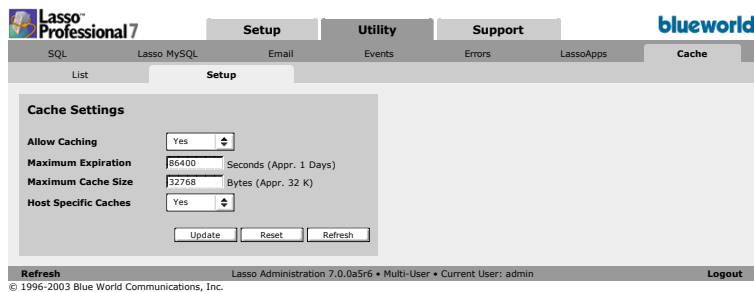
- 1 Select the name of the cache to delete from memory in the Cache List panel.

- 2 In the Cache Detail panel, Select the Delete button. Once a cache is deleted, it is completely removed from the system memory (including the statistics for the cache) until it is loaded again.

Cache Settings

The *Utility > Cache > List* page in Lasso Administration allows global cache preferences to be set. These preferences apply to all caches loaded on the server, and will override any preferences set by developers.

Figure 15: Cache Settings



The following cache preferences may be set:

- **Allow Caching** – Globally enables or disables the [Cache_...] tags on the Lasso Professional 7 server.
- **Maximum Expiration** – A global option for the maximum length of time (in minutes) that any cached content can be stored before it is automatically reset.
- **Maximum Cache Size** – Specifies an upper limit on the amount of data (in kilobytes) that can be stored in a cache. Defaults to 32.
- **Host Specific Caches** – Specified whether or not caches may be accessed across different host names (as output by the [Server_Name] tag).

10

Chapter 10

Building and Browsing Databases

This chapter documents the Lasso Database Browser, which is a LassoApp included with Lasso Professional 7 for interacting with all Lasso-configured databases and building custom MySQL databases.

- *Overview* describes the features of the Lasso Database browser.
- *Database Browser* describes how to search, add, update, view, and delete records in Lasso-enabled databases, and how to import and export data.
- *Database Builder* describes how the administrator can create databases, tables, fields, and indices within Lasso MySQL and MySQL data sources.

Overview

The Lasso Database Browser allows administrators to interact with the records of all databases enabled in Lasso Administration. This includes searching, viewing, adding, updating, and deleting records in any database accessible by Lasso. The Lasso Database Browser also allows the administrator to build custom MySQL databases using a Web-based interface for use in Lasso solutions.

Accessing the Lasso Database Browser

The Lasso Database Browser consists of the DatabaseBrowser.LassoApp file located in the Lasso folder of the Web server root. The Lasso Database

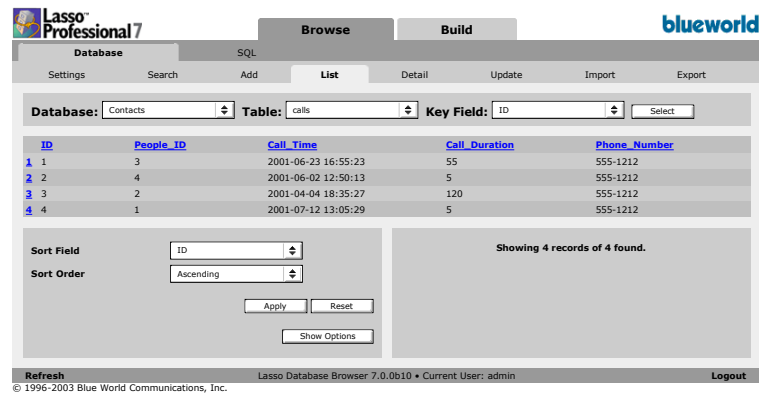
Browser is a LassoApp file, which is accessed via a Web browser similar to a standard HTML page.

The Lasso Database Browser can be accessed in any Web browser that meets the Web browser requirements listed in the installation chapters in this guide.

To access the Lasso Database Browser:

In a Web browser, visit `http://www.example.com/Lasso/DatabaseBrowser.LassoApp`. Replace `www.example.com` with your domain name, IP address, or `127.0.0.1` if on a local machine. If an error is displayed, make sure Lasso Service is running as described in the installation chapters of this guide.

Figure 1: Lasso Database Browser



Security Note: The Lasso Database Browser will prompt for the Lasso global administrator username and password. Only the global administrator may use the Lasso Database Browser by default.

Lasso Database Browser Features

The **Browse** section is useful in that it allows the administrator to test databases once they have been enabled, as well as modify records in existing databases. It is always recommend that databases be tested in the **Browse** section of the Lasso Database Browser before attempting to interact with them via custom LDML code. The **Browse** section also allows the administrator to import and export data.

The **Build** section allows the administrator to create databases, tables, fields, and indices, and edit the schema of Lasso MySQL and MySQL database via

a Web-based interface. No knowledge of SQL is required to build MySQL databases using the Build section.

Database Browser

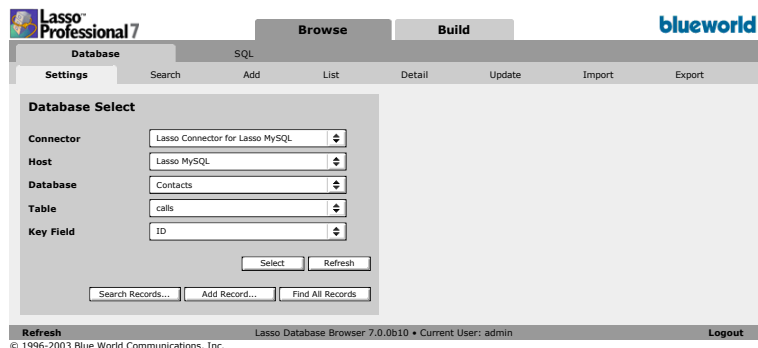
The Database section of the Lasso Database Browser allows administrators to interact with database records and includes the following pages:

- **Select** – Allows the administrator to select a data source connector, host, database, table, and keyfield with which to interact.
- **Search** – Allows the administrator to search records in a selected table.
- **Add** – Allows the administrator to add records to a selected table.
- **List** – Lists records within a selected table.
- **Detail** – Displays the contents of a selected record.
- **Update** – Allows the administrator to update or delete a record within a selected table.
- **Import** – Allows the administrator to import a text data file to a selected table.
- **Export** – Allows the administrator to export data from a selected table to a text format.

Selecting a Database to Work With

The Select page is where the data source connector, host, database, table, and key field of the records to be browsed are first specified. The administrator must first use this page in order to use subsequent pages in the Database section.

Figure 2: Settings Page



To select a connector, host, database, table, and key field:

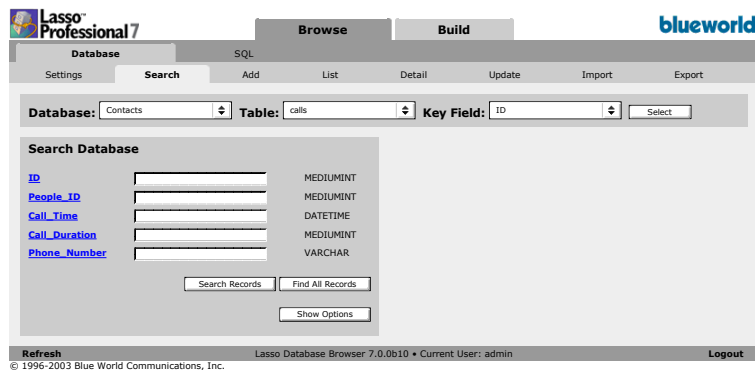
- 1 In the Database Select panel, select a data source connector from the Connector pull-down menu. When a pull-down menu option is selected, the Select page will automatically update to show the correct information for that option in the pull-down menus below.
- 2 Select a data source host from the Host pull-down menu.
- 3 Select a database from the Database pull-down menu.
- 4 Select a table from the Table pull-down menu.
- 5 Select the Key Field from the Key Field pull-down menu. The key field of a table is typically the ID field, and is used to store values unique to each record.
- 6 Select the Select button.

After a database has been selected, selecting the Search Records, Add Records, or Find All Records button will take the administrator to the Search page, Add page, or List page for the selected table. These pages are described later in this chapter.

Searching Records

The Search page allows the administrator to search records in a selected table. All fields are shown by default for the selected table, and both Search and Find All buttons return results in the List page. The data type of each field is displayed to the right of each field by default. For more information on data types, consult the appropriate third-party documentation for the data source being used.

Figure 3: Search Page



To search records in a table:

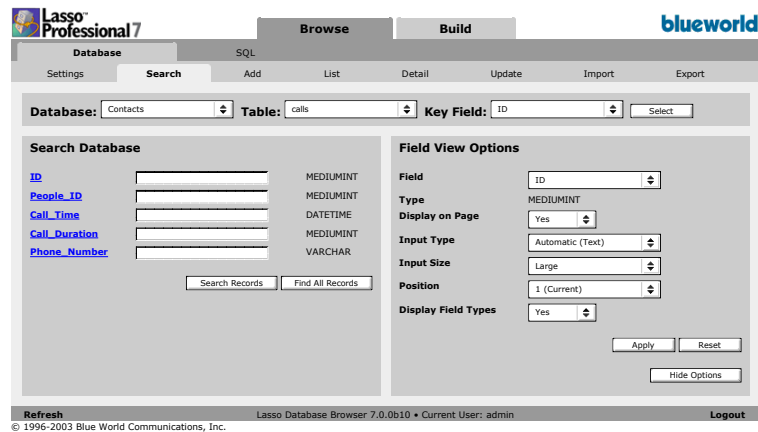
- 1 Enter the information you wish to search for in the appropriate field next to each field name. If data is entered in more than one field, the found set will only contain records containing all values searched for.
- 2 Select Search Records. If records matching the search parameters are found, the administrator will be taken to the List page to view the found set. If no matching records are found, a No Records Found message will be displayed in the Search page.

The top panel displays the current database, table, and key field being used in the Database section. These can be changed by selecting new values in each pull-down menu, and then selecting the Select button. Selecting a new database or table will automatically change the fields in the Search page to represent the new table.

Selecting the Show Options button displays the Field View Options panel to the right with the first field selected. Here, the administrator may set field display options for each field.

Search Options

Selecting the name of a field in the Search Records panel displays the Field View Options panel to the right for that field.

Figure 4: Search Options

The following input and display options can be edited for each field.

- **Field** – Displays the name of the selected field in a pull-down menu. Selecting a different field will display the options for that field. Select a field here if the desired field is not currently visible in the Search Records panel.

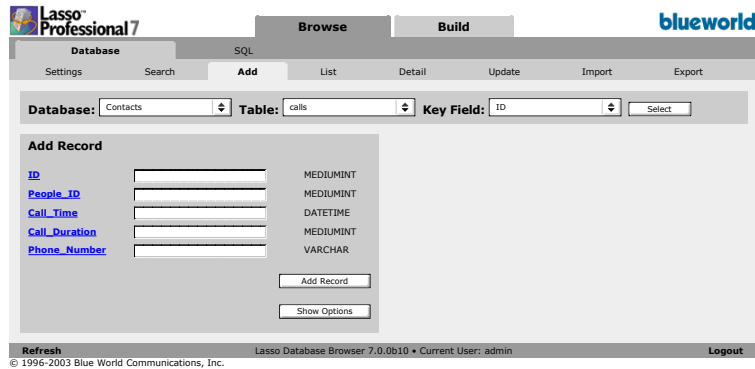
- **Type** – Displays the data type of the field. This is useful for determining an appropriate input type.
- **Display on Page** – Selecting No causes the field to no longer be displayed in the Search Records panel.
- **Input Type** – Designates what HTML input type will be used for the field in the Search page. Options are as follows:
 - Automatic – Determines the input type based on the data type of the field. For example, a VARCHAR or INT type would be a text input, a TEXT data type would be a text area input, and an ENUM data type would be a pull-down menu.
 - Text Input – Uses the HTML input type Text for the field.
 - Password Input – Uses the HTML input type Password for the field.
 - Text Area – Uses the HTML input type Textarea for the field.
 - Select List – Uses the HTML input type List for the field.
 - Pull-Down Menu – Uses the HTML input type Select for the field.
 - Check Boxes – Uses the HTML input type Check for the field.
 - Radio Buttons – Uses the HTML input type Radio for the field.
- **Input Size** – Determines the horizontal and/or vertical size of the field input. This option appears if the Text Input, Password Input, Select List, or Pull-Down Menu options are selected, and the options are Small, Medium, and Large.
- **Position** – Allows a custom field display order to be set. Fields assigned a lower number will be displayed ahead of fields assigned a higher value. Once the Position value has been changed, the Position value of all other fields will adjust to accommodate for the new field value.
- **Display Field Type** – Selecting No causes the field data type to no longer appear to the right of each field in the Search Records panel.

Options are changed by selecting the desired values from the pull-down menus and selecting the Apply button. The Reset button returns all options to their default values. Selecting the Hide Options button hides the Field View Options panel.

Adding Records

The Add page allows the administrator to add a record to the selected table. The Add Record panel displays all fields within the table by default, and displays an input field to the right of each field name. The input type used for each field (text input, pull-down menu, radio buttons, etc.) can be customized in the Field View Options panel, which is described later in this section.

Figure 5: Add Page



To add a record to table:

- 1 Enter the information you wish to add in the appropriate text field next to each field name. The data type of each field is displayed to the right by default.
- 2 Select Add Record. The results of an added record are displayed in the Detail page.

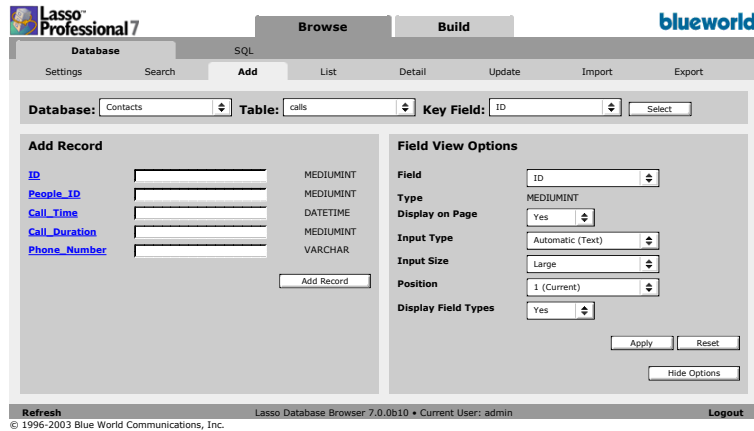
The top panel displays the current database, table, and key field being used in the Databases section. The key field of the current record may be changed by selecting a new key field from the Key Field pull-down menu, and then selecting the Select button. The fields shown in the Add page will change to reflect the new table if a new database or table is selected.

Selecting the Show Options button displays the Field View Options panel to the right with the first field selected. Here, the administrator may set field display options for each field.

Add Options

Selecting the name of a field in the Add Record panel displays the Field View Options panel to the right for that field.

Figure 6: Add Options



The following input and display options can be edited for each field.

- **Fields** – Displays the name of the selected field in a pull-down menu. Selecting a different field will display the options for that field. Select a field here if the desired field is not currently visible in the Add Record panel.
- **Type** – Displays the data type of the field. This is useful for determining an appropriate input type.
- **Display on Page** – Selecting No causes the field to no longer be displayed in the Add Record panel.
- **Input Type** – Designates what HTML input type will be used for the field in the Add page. Options are as follows:
 - Automatic – Determines the input type based on the data type of the field. For example, a VARCHAR or INT type would be a text input, a TEXT data type would be a text area input, and an ENUM data type would be a pull-down menu.
 - Text Input – Uses the HTML input type Text for the field.
 - Password Input – Uses the HTML input type Password for the field.
 - Text Area – Uses the HTML input type Textarea for the field.
 - Select List – Uses the HTML input type List for the field.
 - Pull-Down Menu – Uses the HTML input type Select for the field.
 - Check Boxes – Uses the HTML input type Check for the field.
 - Radio Buttons – Uses the HTML input type Radio for the field.
- **Input Size** – Determines the horizontal and/or vertical size of the field input. This option appears if the Text Input, Password Input, Select List, or Pull-

Down Menu options are selected from Input Type, and the options are Small, Medium, and Large.

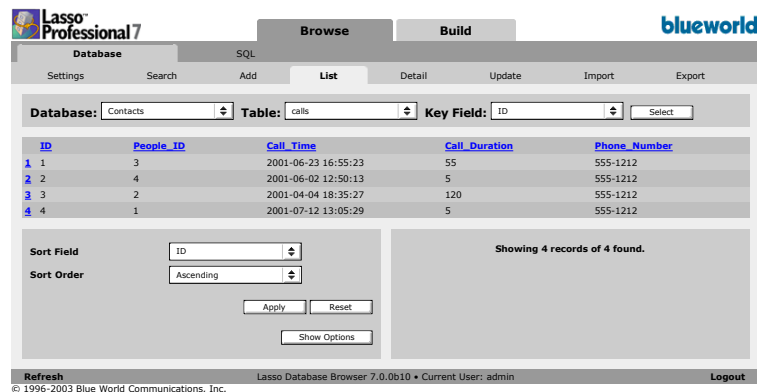
- **Position** – Allows a custom field display order to be set. Fields assigned a lower number will be displayed ahead of fields assigned a higher value. Once the Position value has been changed, the Position value of all other fields will adjust to accommodate for the new field value.
- **Display Field Type** – Selecting No causes the field data type to no longer appear to the right of each field in the Add Record panel.

Options are changed by selecting the desired values from the pull-down menus and selecting the Apply button. The Reset button returns all options to their default values. Selecting the Hide Options button hides the Field View Options panel.

Listing Records

The List page shows results from a Search or Find All action. Each row represents a record from the selected table, and each column represents one of the first eight fields from the selected table. Which fields are displayed in the List page can be set in the Field View Options panel, described later in this section. A number is displayed to the left of each record corresponding to its order in the found set. Selecting the record number link shows the Detail page for the selected record by default.

Figure 7: List Page



The top panel displays the current database, table, and key field being used in the Databases section. These can be changed by selecting new values in each pull-down menu, and then selecting the Select button. Selecting a new database or table will automatically return all records in the new table in the List page.

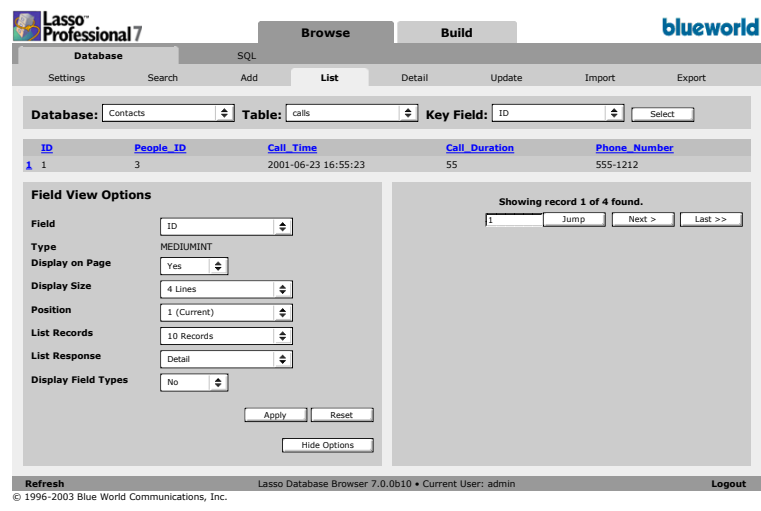
The bottom right panel contains navigation controls allowing the administrator to view different sets of records from the found set. The **Next** and **Previous** buttons take the administrator to the next and previous sets in the found set. The **First** and **Last** buttons will take the administrator to the first and last record in the found set. The **Jump** button allows the administrator to specify the record number from the found set in which to begin the list with.

The bottom left panel contains sort options that allow the administrator to control how the records are sorted in the List page. The **Sort Field** pull-down menu contains the field by which the records are sorted, and the **Sort Order** pull-down menu specifies whether the records are sorted in an ascending (A-Z, 1-9) or descending (Z-A, 9-1) order. The sort options can be changed by selecting a value from each pull-down menu and selecting the **Sort** button.

List Options

Selecting the name of a field displays the **Field View Options** panel in the lower left panel for that field. Doing so will limit the number of records shown in the List page to one record while display options are set.

Figure 8: List Options



The following input and display options can be edited for each field.

- **Field** – Displays the name of the selected field in a pull-down menu. Selecting a different field will display the options for the different field. Select a field here if the desired field is not currently visible in the List page.

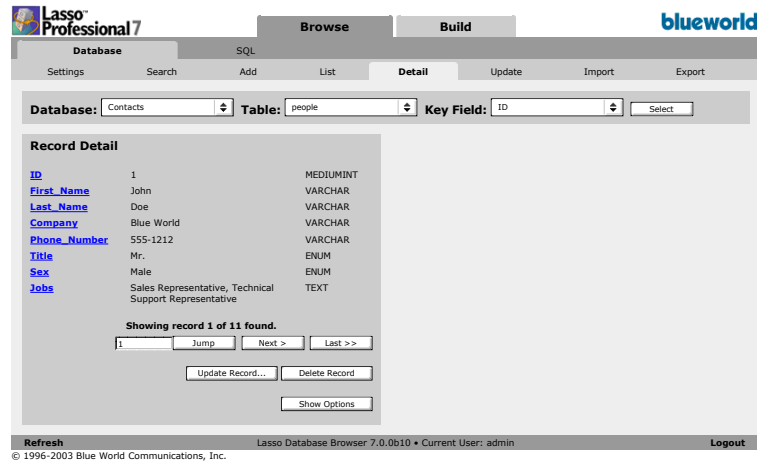
- **Type** – Displays the data type of the field.
- **Display on Page** – Selecting **No** causes the field to no longer be displayed in the List page. In the List page, this only applies to fields in positions 1-8 (see **Position** below).
- **Display Size** – Allows the maximum number of lines of data displayed for the selected field to be set. Options are 1 Line, 4 Lines, 7 Lines, 10 Lines, and All Lines.
- **Position** – Allows a custom field display order to be set. In the List page, only the first eight fields will be displayed. Fields assigned a lower number will be displayed ahead of fields assigned a higher value. Once the **Position** value has been changed, the **Position** value of all other fields will adjust to accommodate for the new field value.
- **List Records** – Allows the number of records displayed in the List page to be set. This can be 5, 10, 25, 50, or 100.
- **List Response** – Determines where the administrator will be taken after a record is selected in the List page. **Detail** takes the administrator to the Detail page when a record is selected. **Update** takes the administrator to the Update page when a record is selected. **No Details Links** disallows records from being selected in the List page.

Options are changed by selecting the desired values from the pull-down menus and selecting the **Apply** button. The **Reset** button returns all options to their default values. Selecting the **Hide Options** button hides the Field View Options panel and returns the administrator to the regular List view with all records displayed.

Displaying Record Details

The Detail page displays the field data for the selected record. All fields in the record are displayed by default.

Figure 9: Detail Page



Record Detail

The Record Detail panel shows the field data for the record. The data type of each field is displayed to the right of the data for that field. Selecting the Update button will take the administrator to the Update page, while selecting Delete button will display a confirmation dialog asking the administrator to confirm the delete. Once this is done, the administrator will be returned to the List page. If a record is deleted, it cannot be retrieved.

The top panel displays the current database, table, and key field being used in the Databases section. The key field of the current record may be changed by selecting a new key field from the Key Field pull-down menu, and then selecting the Select button. Since the database or table of the current record displayed cannot be changed, selecting a new database or table will return the administrator to the Select page.

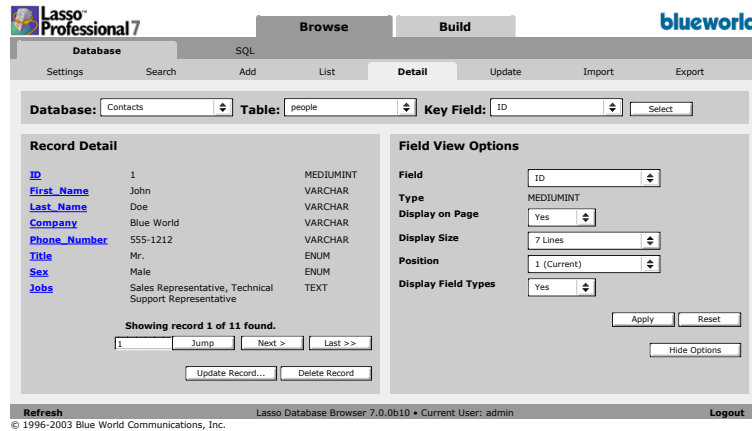
The bottom panel contains navigation controls allowing the administrator to instantly switch to another record in the found set to be displayed in the Detail page. The Next and Previous buttons take the administrator to the next and previous records in the found set. The First and Last buttons will take the administrator to the first and last record in the found set. The Jump button allows the administrator to specify the record number from the search results of the record to be displayed.

Selecting the Show Options button displays the Field View Options panel to the right with the first field selected. Here, the administrator may set field display options for each field.

Detail Options

Selecting the name of a field in the Record Detail panel displays the Field View Options panel to the right for that field.

Figure 10: Detail Options



The following input and display options can be edited for each field.

- **Field** – Displays the name of the selected field in a pull-down menu. Selecting a different field will display the options for the different field. Select a field here if the desired field is not currently visible in the Record Detail panel.
- **Type** – Displays the data type of the field. This is useful for determining an appropriate input type for the field.
- **Display on Page** – Selecting No causes the field to no longer be displayed in the Record Detail panel.
- **Display Size** – Changes the number of lines of data that are displayed for the selected field. Options are 1 Line, 4 Lines, 7 Lines, 10 Lines, and All Lines.
- **Position** – Allows a custom field display order to be set. Fields assigned a lower number will be displayed ahead of fields assigned a higher value. Once the Position value has been changed, the Position value of all other fields will adjust to accommodate for the new field value.
- **Display Field Types** – Selecting No causes the field data type to no longer appear next to each field in the Record Detail panel.

Options are changed by selecting the desired values from the pull-down menus and selecting the Apply button. The Reset button returns all options

to their default values. Selecting the Hide Options button hides the Field View Options panel.

Updating and Deleting Records

The Update page allows the administrator to update or delete records within a database, and displays all fields and their current values for the selected record by default.

Figure 11: Update Page

The screenshot displays the 'Update Record' panel in Lasso Professional 7. At the top, there are tabs for 'Database', 'SQL', 'Browse', and 'Build'. Below these are sub-tabs: 'Settings', 'Search', 'Add', 'List', 'Detail', 'Update' (which is active), 'Import', and 'Export'. The 'Update' sub-tab shows a form for updating a record in the 'people' table. The form includes fields for 'ID', 'First Name', 'Last Name', 'Company', 'Phone Number', 'Title', 'Sex', and 'Jobs'. Each field has a text input and a data type label to its right. For example, 'ID' is a MEDIUMINT, 'First Name' is VARCHAR, 'Last Name' is VARCHAR, 'Company' is VARCHAR, 'Phone Number' is VARCHAR, 'Title' is ENUM, 'Sex' is ENUM, and 'Jobs' is TEXT. Below the form, it says 'Showing record 1 of 11 found.' and provides navigation buttons: 'Jump', 'Next >', and 'Last >>'. At the bottom of the form are buttons for 'Update Record', 'Delete Record', and 'Show Options'. The footer of the application shows 'Refresh', 'Lasso Database Browser 7.0.0b10 • Current User: admin', and 'Logout'.

Updating Records

The Update Record panel shows the field data for the record within input fields. The input type that is used for each field can be specified in the Field View Options page, described later in this section. The data type of each field is displayed to the right of the data for that field.

To update a record in a database:

- 1 Enter the information you wish to update in the appropriate text field next to each field name. The data type of each field is displayed to the right by default.
- 2 Select Update Record. The results of an updated record are displayed in the Detail page.

To delete the current record from the table, select the Delete button. A confirmation dialog will always be displayed asking the administrator to

confirm the delete. Once this is done, the administrator will be returned to the List page. If a record is deleted, it cannot be retrieved.

The top and bottom panels of the Update page act in the same manner as in the Detail page. Selecting the Show Options button displays the Field View Options panel to the right with the first field selected. Here, the administrator may set field display options for each field.

Update Options

Selecting the name of a field in the Update Record panel displays the Field View Options panel to the right for that field.

Figure 12: Update Options

The screenshot shows the Lasso Professional 7 Database Browser interface. The top navigation bar includes 'Database', 'SQL', 'Browse', and 'Build'. The 'Database' tab is active, showing a list of tables: 'Settings', 'Search', 'Add', 'List', 'Detail', 'Update', 'Import', and 'Export'. The 'Update' tab is selected, displaying the 'Update Record' panel on the left and the 'Field View Options' panel on the right.

Update Record Panel:

- Database:** Contacts
- Table:** people
- Key Field:** ID
- Fields and Values:**
 - ID: 1
 - First_Name: John
 - Last_Name: Doe
 - Company: Blue World
 - Phone_Number: 555-1212
 - Title: Mr.
 - Sex: Male
 - Jobs: Sales Representative, Technical Support Representative
- Showing record 1 of 11 found.**
- Navigation:** 1, Jump, Next >, Last >>
- Buttons:** Update Record, Delete Record

Field View Options Panel:

- Field:** ID
- Type:** MEDIUMINT
- Display on Page:** Yes
- Input Type:** Automatic (Text)
- Input Size:** Large
- Position:** 1 (Current)
- Display Field Types:** Yes
- Buttons:** Apply, Reset, Hide Options

Footer:

- Refresh
- Lasso Database Browser 7.0.0b10 • Current User: admin
- Logout
- © 1996-2003 Blue World Communications, Inc.

The following input and display options can be edited for each field.

- **Field** – Displays the name of the selected field in a pull-down menu. Selecting a different field will display the options for the different field. Select a field here if the desired field is not currently visible in the Update Record panel.
- **Type** – Displays the data type of the field. This is useful for determining an appropriate input type for the field.
- **Display on Page** – Selecting No causes the field to no longer be displayed in the Update Record panel.
- **Input Type** – Designates what HTML input type will be used for the field in the Update page. Options are as follows:

Automatic – Determines the input type based on the data type of the field. For example, a VARCHAR or INT type would be a text input, a TEXT data type would be a text area input, and an ENUM data type would be a pull-down menu.

Text Input – Uses the HTML input type Text for the field.

Password Input – Uses the HTML input type Password for the field.

Text Area – Uses the HTML input type Textarea for the field.

Select List – Uses the HTML input type List for the field. Any values defined in an ENUM or SET data type or FileMaker Pro value list for the field will automatically be displayed as selectable values.

Pull-Down Menu – Uses the HTML input type Select for the field. Any values defined in an ENUM or SET data type or FileMaker Pro value list for the field will automatically be displayed as selectable values.

Check Boxes – Uses the HTML input type Check for the field. Any values defined in an ENUM or SET data type or FileMaker Pro value list for the field will automatically be displayed as selectable values.

Radio Buttons – Uses the HTML input type Radio for the field. Any values defined in an ENUM or SET data type or FileMaker Pro value list for the field will automatically be displayed as selectable values.

- **Input Size** – Determines the horizontal and/or vertical size of the field input. This option appears if the Text Input, Password Input, Select List, or Pull-Down Menu options are selected from Input Type, and the options are Small, Medium, and Large.
- **Position** – Allows a custom field display order to be set. Fields assigned a lower number will be displayed ahead of fields assigned a higher value. Once the Position value has been changed, the Position value of all other fields will adjust to accommodate for the new field value.
- **Display Field Types** – Selecting No causes the field data type to no longer appear to the right of each field in the Update Record panel.

Options are changed by selecting the desired values from the pull-down menus and selecting the Apply button. The Reset button returns all options to their default values. Selecting the Hide Options button hides the Field View Options panel.

Importing Records

The Import page allows data to be imported to the selected table from a text file in a comma-delimited, tab-delimited, or XML format. In order to use the Import page, one or more text files must exist in the Lasso Professional 7/ Admin/Browse folder, which is the folder where files exported using the Export page are stored.

Figure 13: Import Page

The top panel displays the current database, table, and key field being used in the Databases section. These can be changed by selecting new values in each pull-down menu, and then selecting the Select button. Selecting a new database, table, and keyfield will change the table to which data is imported.

Import Settings

The Import Settings panel allows the administrator to set the import options for the data to be imported. These options are described below:

- **File Name** – Allows the administrator to select the text file to be imported. The pull-down menu lists all files currently stored in the Lasso Professional 7/Admin/Browse folder. The administrator must select a file and select the Apply button before the remaining options can be used.
- **Type** – Allows the data format of the text file to be explicitly specified. One of three formats may be selected:

Automatic – Lasso Administration automatically determines which format the text file is in and displays it in parentheses after Automatic. This is the default setting.

Comma Delimited – Specifies that the file to be imported is in comma delimited format.

Tab Delimited – Specifies that the file to be imported is in tab delimited format.

XML – Specifies that the file to be imported is in XML format.

- **Line Endings** – Allows the administrator to specify which line ending characters are used in the text file. Supported line ending characters

vary from operating system to operating system, and the options are as follows:

Automatic – Lasso Administration automatically determines which line endings are used in the text file and displays it in parentheses after Automatic. This is the default setting.

UNIX/Mac OS X (/n) – Text file uses the /n line ending, used in UNIX and Mac OS X operating systems.

Mac OS 9 (/r) – Text file uses the /r line ending, used in the Mac OS 9 operating system.

Windows (/r/n) – Text file uses the /r/n line ending, used in Windows operating systems.

- **Replace Matching Key Values** – Selecting Yes causes any data imported to the key field of the current table to be overwritten with new values. For example, if the key field is the ID field in a MySQL table, selecting Yes will cause whatever field that is matched with the ID field in the current database to be overwritten with new ID values, as if it were a new table and records are being added for the first time.
- **Skip First Record** – Selecting Yes does not import the first line of the file, which sometimes includes the names of each field and does not contain record data.
- **Import Preview** – Shows the first five lines of the text file to be imported. This is useful in that it shows the first line of the file to be imported, allowing the administrator to determine if the data and format of the file are correct.

Options are changed by selecting the desired values from the pull-down menus, selecting or deselecting a check box to the left of the desired options, and selecting the Apply button. The Reset button returns all options to their default values.

Field Matching

The Field Matching panel allows fields from the text data file to be matched with fields in the current database. Using the Field Matching panel, it is possible to match any field in the text file with any field in the current table, duplicate an individual field in the text file to any number of fields in the current table, and omit fields from the text file using the (Ignore Field) option.

The Field Matching panel displays all field names in the current database, and the field values for each field (or column) in the text file are shown in pull-down menus to the right of each field name. Often, the first record (or row) of the data file will contain the field names instead of values, which makes matching fields much easier. Otherwise, if the first record does

not contain field names, then the navigation controls below can be used to view field values in subsequent records to determine how the records should be placed.

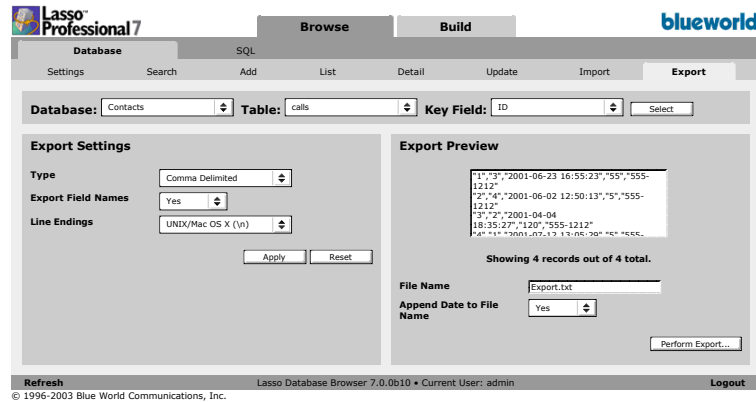
To import data to the current table:

- 1 In the Import Settings panel, select a data file to import from the File Name pull-down menu. Select the Apply button if no other options are shown.
- 2 Select the data type of the text file from the Type pull-down menu, or verify that the Automatic type is correct by looking at the Import Preview field.
- 3 Select the line endings used in the text file in the Line Endings pull-down menu, or verify that the Automatic type is correct by looking at the Import Preview field. Knowing which operating system the file was created in is helpful for determining which line ending characters are used.
- 4 Select Yes for Replace Matching Key Values if you want the imported data to receive new key values in the current table. This is strongly recommended if data is being imported to a table with existing records, however, the field that is matched with the current key field will be overwritten.
- 5 Select Yes for Skip First Record if the first record in the text file contains field names as opposed to values. See the Import Preview field to determine this.
- 6 Select the Apply button.
- 7 In the Field Matching panel, select an appropriate value from the pull-down menu next to each field name. Do this for all fields to ensure the correct data will be imported to the correct field. If the first record in the text file does not contain field names, or if the (Empty) option is shown for any fields, navigate through the records using the Next and Previous buttons to determine which fields should be placed where.
- 8 Select the Perform Import button.

Exporting Records

The Export page allows the administrator to export data from a table to a text file in a comma-delimited, tab-delimited, or XML format. This feature allows the records in the current found set to be instantly exported to a text format that can be interpreted by any number of other data sources.

Figure 14: Export Page



The top panel displays the current database, table, and key field being used in the Databases section. These can be changed by selecting new values in each pull-down menu, and then selecting the **Select** button. Selecting a new database or table will automatically find all records in the new table, which will be the found set that is exported.

Export Settings

The Export Settings panel allows the administrator to set the format options in which the current found set will be exported. The **Type** pull-down menu allows the administrator to select from one of three data formats to export to. The remaining options (which the exception of **Line Endings**) will vary depending on which format is selected.

- **Type** – Allows the text format to be set for the data which will be exported.
 - Comma Delimited – Exports data to text in a comma-delimited format.
 - Tab Delimited – Exports data to text in a tab-delimited format.
 - XML – Exports data to text in an XML format.
- **Export Field Names** – Selecting **Yes** includes the names of each field to be included in the first line of data, similar to a spreadsheet header. Available for comma-delimited and tab-delimited formats.
- **Root Tag Name (XML Only)** – Allows the root XML tag name for the data file to be specified. All data in the text file will be contained in root tags.
- **Record Tag Name (XML Only)** – Allows the record XML tag name for the data file to be specified. All records will be contained in record tags.

- **Field Tag Name (XML Only)** – Allows the root XML tag name for the data file to be specified. All fields will be contained in field tags.
- **Line Endings** – Allows the administrator to specify which line ending character will be used in the text file. Supported line ending characters vary from operating system to operating system, and the options are as follows:
 - UNIX/Mac OS X (/n) – Uses the /n line ending, used in UNIX and Mac OS X operating systems.
 - Mac OS 9 (/r) – Uses the /r line ending, used in the Mac OS 9 operating system.
 - Windows (/r/n) – Uses the /r/n line ending, used in Windows operating systems.

Options are changed by selecting the desired values from the pull-down menus, selecting or deselecting a check box to the left of the desired options, and selecting the Apply button. The Reset button returns all options to their default values.

Export Preview

The Export Preview page displays the first five records of what the exported data will look like in the text file. To preview all data to be exported, select the Preview Full Export button. The Export Preview page also contains the Perform Export button, which allows the data export to be executed.

To export data:

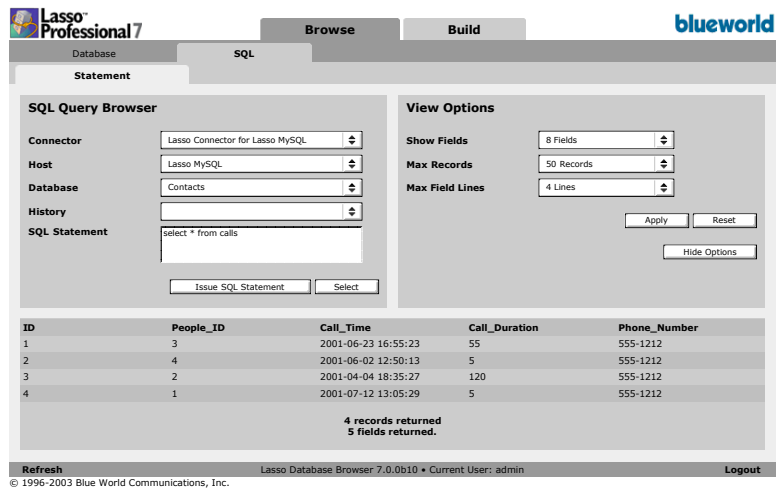
- 1 In the Export Format panel, select the data format to be exported to from the Type pull-down menu.
- 2 Select options for the specified format below the Type pull-down menu.
- 3 Select a line ending option from the Line Endings pull-down menu.
- 4 Select Apply.
- 5 Examine the data to be exported in the Export Preview panel to ensure it is the correct format needed for the data source that will import the file.
- 6 Enter a name for the text file to be created in the File Name field. To have the file name end with the date and time of creation, select Yes from the Append Date to File Name pull-down menu.
- 7 Select the Perform Export button.

Note: The Export page will only export the current found set from the List page. To export all records in a table, make sure the Find All Records button was selected previously in the Select or Search page.

SQL Browser

The *Browse > SQL* section of the Lasso Database Browser provides a Web-based interface that allows the administrator to issue SQL queries to Lasso-accessible SQL databases. This includes any MySQL or SQL-compliant JDBC database that has been set up and enabled in the *Setup > Data Sources* section of Lasso Administration.

Figure 15: SQL Browser



The functionality of the *Browse > SQL* section is similar to that of the *Utility > SQL* section of Lasso Administration. For documentation on issuing SQL statements, see *Chapter 9: Administration Utilities*.

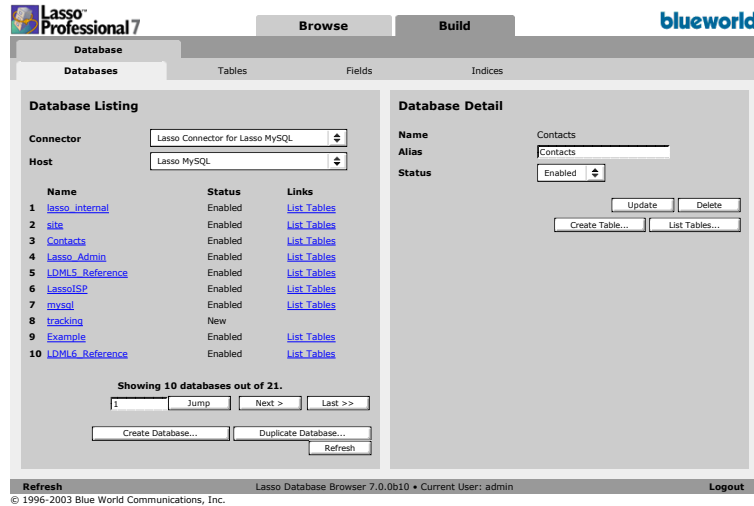
Database Builder

The Build section of the Lasso Database Browser allows the administrator to create databases, tables, fields, and indices, and edit the schema of Lasso MySQL and MySQL database via a Web-based interface. This is useful for easily creating new MySQL databases for custom solutions, or for editing the schema (tables names, field names and types) of existing MySQL databases.

Creating MySQL Databases

The Databases page is where the administrator can view all databases within a selected host and create new databases. The Databases Listing panel shows a listing of all databases within the selected host and data source connector.

Figure 16: Databases Page

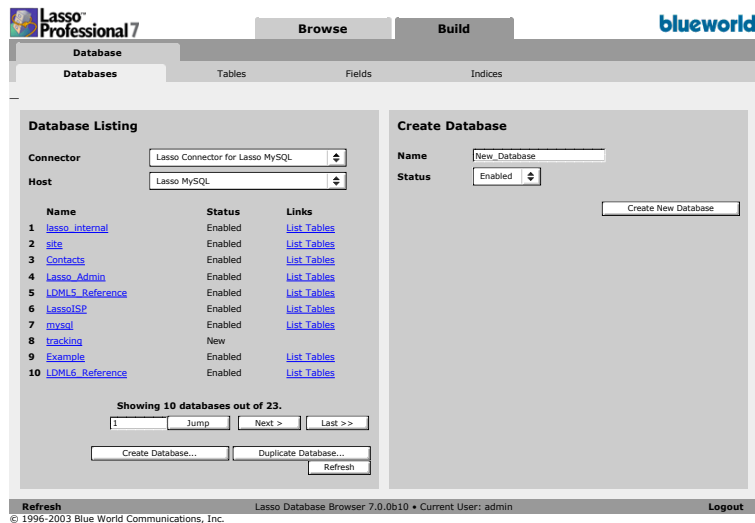


The current data source connector and host can be changed using the Connector and Host pull-down menus. The administrator can view database details by selecting the database name, which will show the details to the right in the Database Detail panel.

Creating Databases

Selecting the Create Database button displays the Create Database panel to the right. The Create Database page is where the administrator can create new databases within a specified data source host.

Figure 17: Create Database Panel



To create a new database:

- 1 Enter the name of your database in the Name field.

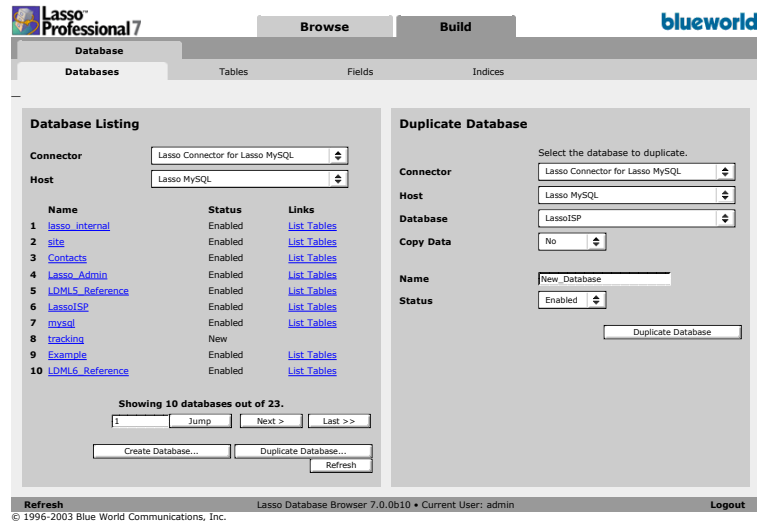
Note: Per naming conventions in MySQL, database names may only consist of alpha-numeric characters plus the `_` and `$` characters. For more information on MySQL naming conventions, see the MySQL documentation.

- 2 Select Enabled or Disabled from the Status pull-down menu to enable or disable the database within Lasso.
- 3 Select Create Database.

Duplicating Databases

Selecting the Duplicate Database button shows the Duplicate Database panel to the right. The Duplicate Database panel is where the administrator can duplicate an existing database within a specified data source host. The administrator has the option to duplicate a database's schema only (tables and fields), or the schema along with all data (records).

Figure 18: Duplicate Database Panel

**To duplicate an existing database:**

- 1 Select the data source connector of the source database from the Connector pull-down menu. This can be either Lasso Connector for Lasso MySQL or Lasso Connector for MySQL.
- 2 Select the data source host of the source database from the Host pull-down menu.
- 3 Select the source database from the Database pull-down menu.
- 4 Select Yes from the Copy Data pull-down menu to copy all records from the source database to the new database. Selecting No copies only the database schema (table and field structure) with no records.
- 5 Enter the name of the new database in the Name field.

Note: Per naming conventions in MySQL, database names may only consist of alpha-numeric characters plus the `_` and `$` characters. For more information on MySQL naming conventions, see the MySQL documentation.

- 6 Select Enabled or Disabled from the Status pull-down menu to enable or disable the database within Lasso.
- 7 Select Duplicate Database. The new database will appear in the Database Listing panel to the left.

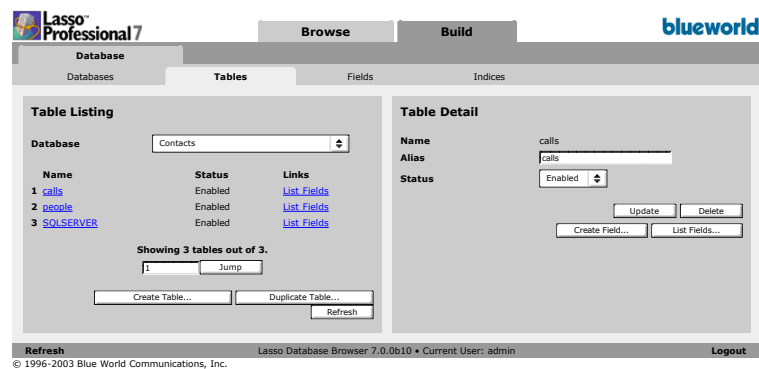
Updating and Deleting Databases

The administrator may update or delete a database by selecting the Update Database or Delete Database button in the Database Detail panel. To update a database, the administrator can change the name, alias, and status for the database via the Name, Alias, and Status fields, and select the Update Database button. Selecting the Delete Database button will display a confirmation message for deleting the selected database, and selecting OK will permanently delete the database.

Creating MySQL Tables

The Tables page is where the administrator can view all tables and create new tables within the selected database. The Table Listing panel shows the current database and lists all tables within the database. The administrator can view table details by selecting a table name, which will show details to the right in the Table Detail panel.

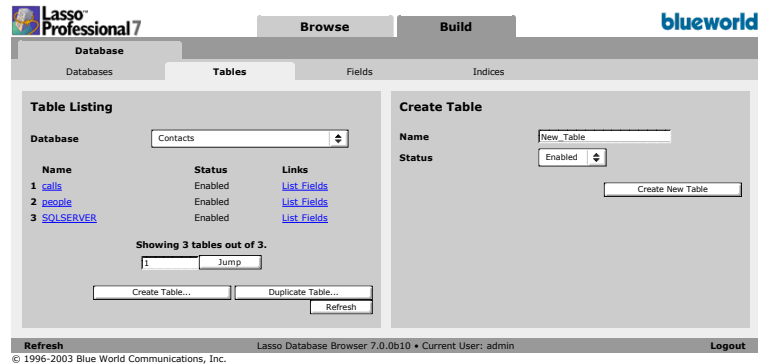
Figure 19: Tables Page



Creating Tables

Selecting the Create Table button show the Create Table panel to the right. The Create Table page is where the administrator can create tables in the selected database.

Figure 20: Create Table Panel



To create a table in the selected database:

- 1 Enter the name of your table in the Table Name field.

Note: Per naming conventions in MySQL, table names may only consist of alpha-numeric characters plus the `_` and `$` characters. For more information on MySQL naming conventions, see the MySQL documentation.

- 2 Select Enabled or Disabled from the Status pull-down menu to enable or disable the table within Lasso.

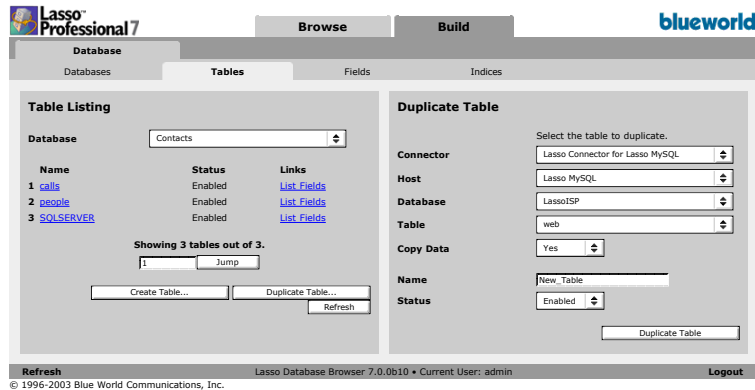
- 3 Select Create Table.

The ID field is automatically created in each new table, which increments automatically with every new record added. There can only be one ID field per table.

Duplicating Tables

Selecting the Duplicate Table button shows the Duplicate Table panel to the right. The Duplicate Table panel is where the administrator can duplicate an existing table within a specified database.

Figure 21: Duplicate Table Panel



To duplicate a table in the selected database:

- 1 Select the data source connector of the source table from the Connector pull-down menu. This can be either Lasso Connector for Lasso MySQL or Lasso Connector for MySQL.
 - 2 Select the data source host of the source table from the Host pull-down menu.
 - 3 Select the database of the source table from the Database pull-down menu.
 - 4 Select the source table from the Table pull-down menu.
 - 5 Select Yes from the Copy Data pull-down menu to copy all records from the source table to the new database. Selecting No copies only the table schema (field structure) with no records.
 - 6 Enter the name of the new table in the Name field. This new table will contain the information being duplicated, and will be created within the database currently selected in the Table Listing panel.
- Note:** Per naming conventions in MySQL, table names may only consist of alpha-numeric characters plus the _ and \$ characters. For more information on MySQL naming conventions, see the MySQL documentation.
- 7 Select Enabled or Disabled from the Status pull-down menu to enable or disable the table within Lasso.
 - 8 Select Duplicate Table. The new table will appear in the Tables Listing panel to the left.

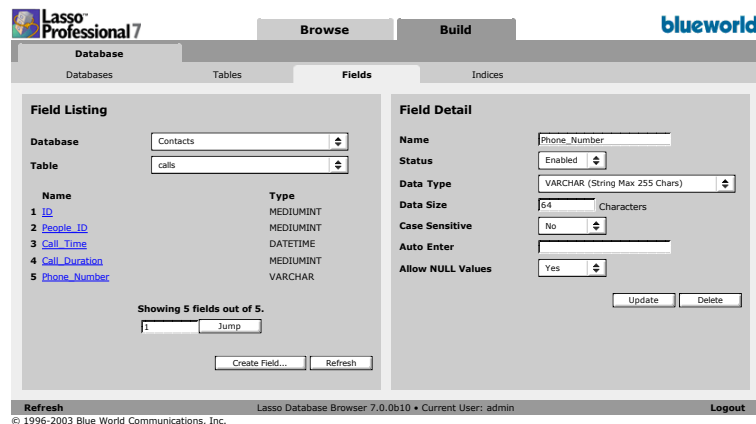
Updating and Deleting Tables

The administrator may update or delete a table by selecting the Update Table or Delete Table button in the Table Detail panel. To update a table, the administrator can change the name, alias, and status for the table via the Name, Alias, and Status fields, and select the Update Table button. Selecting the Delete Table button will display a confirmation message for deleting the selected table, and selecting OK will permanently delete the table from the selected database.

Creating MySQL Fields

The Fields page is where the administrator can view all fields within the selected table and database. The Fields Listing panel includes a list of fields for the current table. Selecting a field name will show details in the Field Detail panel on the right, where attributes of the field can be modified, or where the field can be deleted.

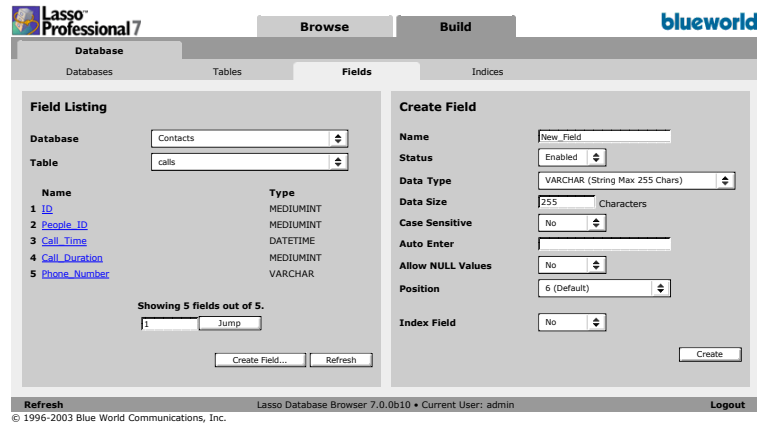
Figure 22: Fields Page



Creating Fields

Selecting the Create Field button show the Create Field panel to the right. The Create Field panel is where the administrator can create fields in the selected table.

Figure 23: Create Field Panel



To create fields in a selected table:

- 1 In the Create Field panel, enter the name of the field you wish to create in the Name field.

Note: Per naming conventions in MySQL, field names may only consist of alpha-numeric characters plus the `_` and `$` characters. For more information on MySQL naming conventions, see the MySQL documentation.

- 3 Select Enabled or Disabled from the Status pull-down menu to enable or disable the newly created field (Enabled by default).
- 4 Select the data type for the field in the Data Type pull-down menu (VARCHAR by default). A brief description of each data type is in parentheses to the right of the data type. For more information on data types, see the MySQL documentation at <http://www.mysql.com>.
- 5 If the field is a CHAR or VARCHAR data type, then enter a maximum data size for your field in the Data Size field (optional) and select Yes or No in the Case Sensitive pull-down menu. Selecting Yes will cause all searches on the CHAR or VARCHAR field to require correct case before returning data. The Data Size will default to 255 if no value is entered.

If the field is a INT type, then select Yes or No in the Unsigned Integer pull-down menu (this option is ignored for other data types). An Unsigned value of No will allow both positive and negative integers to be entered in the field, whereas a value of Yes will only allow positive integers to be entered (No by default).

If the field is a DECIMAL data type, enter values in the Integer Size and Precision fields. The integer size is the number of digits allowed before

the decimal point, and the precision field is the number of significant digits allowed after the decimal point.

If the field is an ENUM or SET data type, then enter values to be displayed for the field in the **Values** field. Each unique value must be in single quotes and delimited by commas (see the default values entered for an example).

- 6 Enter values you would like automatically entered into the field upon record creation in the **Auto Enter** field (optional).

Note: TEXT and BLOB data types cannot use **Auto Enter** values.

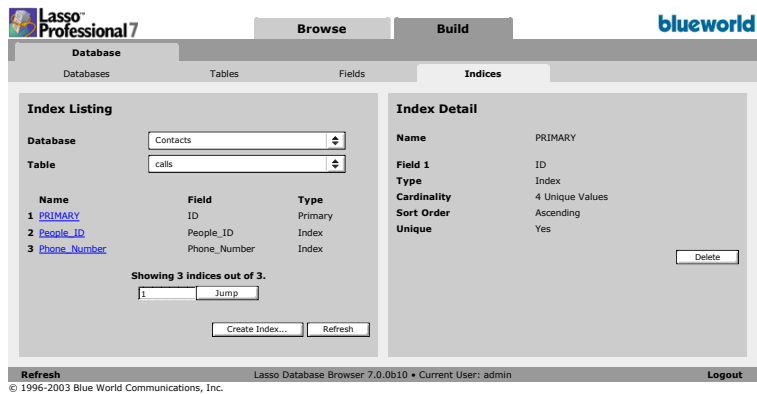
- 7 Select **Yes** or **No** in the **Nulls OK** pull-down menu. **Nulls OK** allows records to be added to the database without entry in this field (**Yes** by default). For more information on nulls, see the MySQL documentation at <http://www.mysql.com>.
- 8 Select **Yes** or **No** in the **Index** pull-down menu. **Index** allows fields to be indexed within the database for faster searching and processing (**No** by default). For more information on indexing, see the next section.
- 9 If **Yes** was selected for **Index**, select an index type from the **Index Type** pull-down menu. For more information on index types, see the next section.
- 10 Select the **Create** button. The new field will be displayed in the **Field Listing** panel to the left.

Creating MySQL Indices

An index in a MySQL database is an ordered list of the contents of a field or group of fields in a table (also known as the MYI file in the MySQL database folder). Indices in MySQL databases allow faster searches to be performed for the fields specified, and up to 25 indices can be specified for a MySQL table. For more information on MySQL indices, see the MySQL documentation.

The **Indices** page allows to administrator to view the current indices for a selected table, as well as create new indices that contain one or more fields.

Figure 24: Indices Page



The Index Listing panel shows a list of current indices in the current table. The administrator can view details for an index by selecting the index name, which will show the details in the Index Detail panel to the right.

Creating Indices

Selecting the Create Index button show the Create Database panel to the right. The Create Index panel is where the administrator can create new indices for the selected table. Unlike setting the index options for individual fields in the Fields page, indices created in the Index Detail panel may contain more than one field. A single MySQL index may contain up to 16 unique fields. To learn about the benefits associated with multiple field indexing, see the MySQL documentation.

Figure 25: Create Index Panel



To create a new index:

- 1 In the Create Index panel, select an index type from the Type pull down menu. The following index types may be selected:
 - Index – Indexes up to the first 255 characters of each field selected (default).
 - Full Text – Indexes the entire contents of each field selected. Is useful for keyword searching.
 - Unique – Indexes up to the first 255 characters of each field selected, but requires that all values indexed be unique between fields. If a new record is added containing a value for this field that is already present in the index, the field will not be added and MySQL will return an error.
 - Primary – Is identical in function to Unique, but also designates the field as the primary key field for the table. All tables should have a primary key field by default (typically the ID field), and in most cases there should only be one primary key field per table. See the MySQL documentation for more information on primary key fields.
- 2 Enter a name for the index in the Name field. If no name is entered, then the name will default to the name of the first field in the index as shown below.
- 3 Select a field to be indexed from the Field 1 pull-down menu. Once a field is selected, the data type of the field is shown below.
- 4 If the field is a VARCHAR or CHAR data type, enter the number of characters to index in the Length field. If no value is entered, then the number of characters indexed will default to 255.

Note: The Length field will not appear if the Full Text index type is selected, which will automatically index all characters.
- 5 If creating an index with multiple fields, select a second field to be indexed from the Additional Field pull-down menu and set length options if necessary. Once a second field is selected, it will become Field 2 and another Additional Field pull-down menu will appear below. Up to 16 fields may be specified.
- 6 Select the Create button The new index should appear in the Index Listing panel to the left.

Index Detail

The Index Detail panel shows all information available from the database for the selecting index. The following information is displayed:

- **Name** – The name of the index.

- **Field** – The names of the fields that the index contains. Multiple fields are delineated as Field 1, Field 2, etc.
- **Type** – The index type. For a list of possible types, see the next section.
- **Cardinality** – The number of unique field values across all fields and records in the index.
- **Sort Order** – Indicates whether the fields are sorted in an ascending or descending order. The fields are shown in an ascending order in the Index Listing panel.
- **Unique** – Indicates whether or not the index only contains unique field values for each record.

The administrator may delete an index by selecting the **Delete** button in the **Index Detail** panel. MySQL indices cannot be edited, only created and deleted. A confirmation message will always be displayed before an index is deleted.

11

Chapter 11

Setting Up Lasso Solutions

This chapter guides the administrator through setting up an example database with example LDML pages in Lasso Professional 7, and provides information on how to get started building custom Lasso solutions.

- *Introduction* describes the purpose and scope of this tutorial.
- *Setting Up an Example Database* provides a walk-through for setting up an example database that will be Web-enabled using provided example Lasso files.
- *Setting Up User Security* provides a walk-through for setting up Lasso Security for the example Lasso files and database provided.
- *Using the Example Lasso Pages* describes how to use and test the example Lasso files provided.
- *Troubleshooting* provides useful information for testing and troubleshooting custom Lasso solutions.

Introduction

Lasso Professional 7 provides a powerful language (LDML) and numerous server suite configuration tools (Lasso Administration) that allow Lasso developers to build and serve custom Web applications. How to build custom solutions using LDML is covered in the Lasso 7 Language Guide, which is a separate document from the Lasso Professional 7 Setup Guide.

The Lasso 7 Language Guide should be a developer's first reference for learning how to write LDML to create custom Lasso solutions, and can be found in the Lasso Professional 7/Documentation/3-Language Guide folder installed with the product.

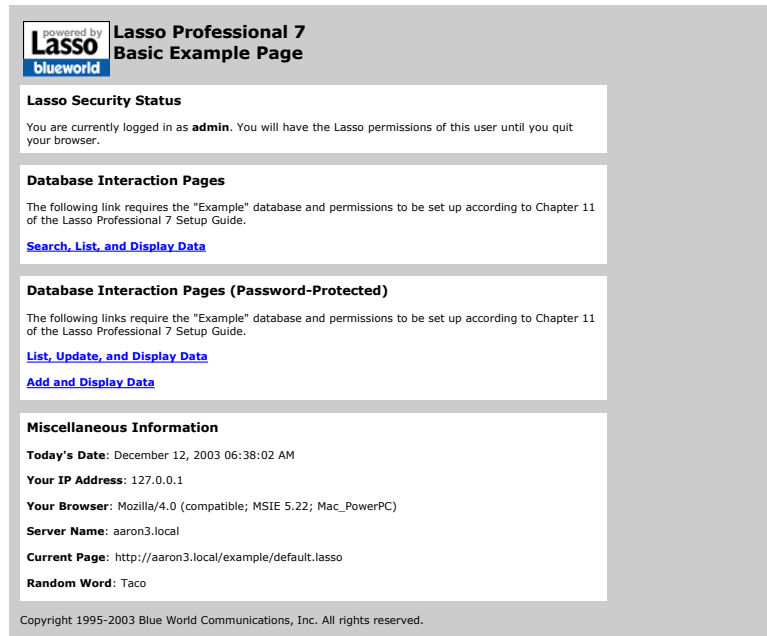
However, not every part of a Lasso solution lies in the written LDML code. Lasso solutions also incorporate security features, data source connections, and other preferences that are set up in Lasso Administration.

The purpose of this chapter is to familiarize the administrator with the most common steps required to set up a custom Lasso solution in Lasso Administration. This usually involves setting a database to communicate with Lasso, and setting up end-user access permissions for the database as required by the Lasso solution files.

About the Example Lasso Pages

The example Lasso solution consists of a group of very basic Lasso files, initially located in the /Lasso Professional 7/Documentation/2-Setup Guide/Tutorial folder. These files have .lasso extensions, and should be placed in the Web serving folder of the Web server running Lasso Professional 7.

Figure 1: Example Page



The example Lasso pages interact with a provided example database, and demonstrate how to protect specific database actions and Lasso pages with user authentication. How to set up the Example_DB database and user access permissions, and how to use the example files are all described in this chapter.

The source code of the example files provided illustrate the following basic functionality in Lasso Professional:

- **Basic Database Interactivity** – The example files allows users to browse, search, add, update, and delete records within a secure, customizable Web-interface. The LDML source code is data source independent, meaning the solution operates identically with either a FileMaker Pro or MySQL back-end.
- **Authenticated User Access** – The example files show how Lasso Security can be used to restrict certain database operations (such as adding, updating, and deleting records) to authenticated users with assigned permissions, while allowing all users to perform other database actions (such as searching and displaying records).
- **Outputting Information** – The example files illustrate how to output dynamic information to a Web browser, such as database records, the current server date, client IP address, client username, random values, and more.

The source code also illustrates the usage of basic Lasso tags and techniques such as inline database actions, conditional statements, authentication tags, variables, server-side includes, and more. Each of these topics is explained in detail in the Lasso 7 Language Guide.

By using this tutorial, one may acquire the skills to be able to easily set up custom solutions in Lasso Professional 7.

Disclaimer: The example files and procedures presented represents one out of many possible ways to build a Web solution in Lasso 7, and do not represent the only ways to achieve specific functionality.

Setting Up the Example Database

Before continuing with the tutorial, it is necessary to decide whether you want to use the FileMaker Pro or Lasso MySQL version of the Example_DB database. The example solution files require a single database named Example_DB. Because the FileMaker Pro and MySQL versions of the Example_DB database both have the same name, they cannot be used at the same time in Lasso Professional 7.

If two databases with the same name are connected to Lasso Professional 7 at the same time, Lasso Professional 7 will assign an alias to the most recently connected database with an asterisk (*) at the end of the name. The alias is the name by which Lasso Professional 6 sees the database, and is the database name that is used in all LDML code. For information on aliases, see *Chapter 8: Setting Up Security*.

To set up an instance of the Example_DB database, follow the procedures in either the *Lasso MySQL* or *FileMaker Pro* section below.

Lasso MySQL

In order to set up and use the example solution files, the MySQL version of the Example_DB database must be moved into the appropriate data folder in Lasso MySQL. The following describes the procedures for moving the MySQL database in Mac OS X and Windows.

To move the MySQL Example database in Mac OS X:

- 1 Locate the Example_DB folder in Applications/LassoProfessional7/Documentation/2-Setup Guide/Tutorial/Databases/MySQL folder on the Mac OS X hard drive.
- 2 Copy the Example_DB folder into the Applications/Lasso Professional 7/Lasso MySQL/Databases folder on the Mac OS X hard drive.

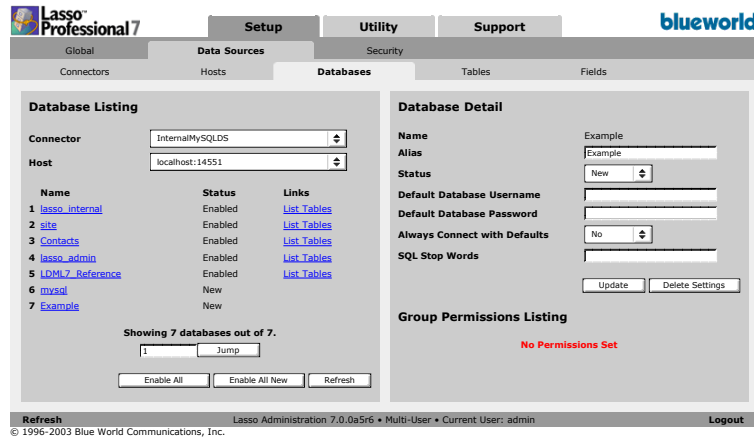
To move the MySQL Example database in Windows:

- 1 Locate the Example_DB folder in C:\Program Files\Blue World Communications\Lasso Professional 7\Documentation\2-Setup Guide\Tutorial\Databases\MySQL folder on the Windows hard drive.
- 2 Copy the Example_DB folder into the C:\Program Files\Blue World Communications\Lasso Professional 7\LassoMySQL\Databases folder on the Windows hard drive.

Enabling the Example Database

The Databases page lists all databases within a selected data source host. Here, you should be able to see Example_DB listed in the Databases Listing panel for the data source host with which you are working. The Example_DB database will need to be enabled here before data can be accessed.

Figure 2: Databases Page



To enable the Example database and tables:

- 1 In Lasso Administration, go to *Setup > Data Sources > Databases*.
- 2 Select Lasso Connector for Lasso MySQL from the Connector pull-down menu. This will display a list of hosts for that connector in the Hosts pull-down menu.
- 3 Select an appropriate host from the Hosts pull-down menu. This will display a list of databases for that host below.
- 4 Select Example in the Databases Listing panel. This will show the Database Detail panel to the right. If Example_DB does not appear in the Databases Listing panel immediately after it has been set up, then try selecting the Refresh button.
- 5 In the Database Detail panel, select Enabled from the Status pull-down menu to enable the database.
- 6 Leave the Default Database Username field blank.
- 7 Leave the Default Database Password field blank.

Note: Since Lasso MySQL security comes pre-configured to accept requests from Lasso Professional 7 only, it is not necessary to set a password for the Lasso MySQL version of the Example_DB database.

- 8 Select Update. This enables the Example_DB database and all tables within. Now the Example_DB database and its tables have been enabled, Lasso security preferences for the Example_DB database may be set, as described in the *Setting Up User Access* section.

FileMaker Pro

In the installation of FileMaker Pro 4.x, 5.x, or 6 you wish to use, you will need to open the `Example_DB.fp3` file from its location on the machine running Lasso Professional 7. The FileMaker Pro version of the database can be located anywhere, so long as it can be opened in the FileMaker Pro application.

To open the Example database in FileMaker Pro:

- 1 In FileMaker Pro 4.x, 5.x, or 6, select *File > Open* from the menu bar.
- 2 In the Open File window, browse to the location of the `Example_DB.fp3` file. See the *Setting Up the Example Database* section earlier in this chapter for the default location of this file on your operating system.

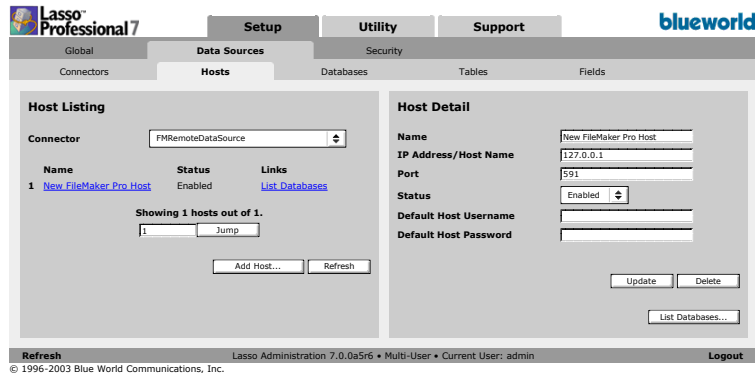
FileMaker 5/6 Note: If you are using FileMaker 5.x or 6, it will automatically convert the `Example_DB.fp3` file into `Example_DB.fp5`, and will prompt for renaming the old file so that the file names do not conflict.

Make sure that the database stays in Browse mode, as listed under View in the FileMaker Pro menu bar, when the database is used by Lasso. Also, the Filemaker Pro Web Companion must be enabled, and the database must be shared via the Web Companion. For FileMaker Pro setup requirements and tips, please refer to *Chapter 7: Setting Up Data Sources*.

Setting Up A FileMaker Pro Data Source Connection

When Lasso Professional 7 connects to any data source other than Lasso MySQL, connection settings (e.g. the IP address or domain name of the machine running FileMaker Pro) must be added to the *Setup > Data Source > Hosts* section of Lasso Administration under the appropriate data source connector.

Figure 3: Data Source Hosts Page



To add a FileMaker Pro host:

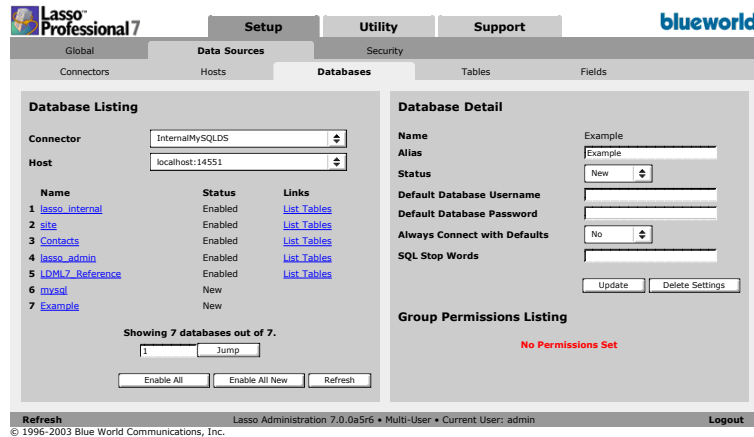
- 1 In Lasso Administration, go to **Setup > Data Sources > Hosts**.
- 2 In the Host Listing panel, select Lasso Connector for FileMaker Pro from the Connector pull-down menu.
- 3 In the Host Listing panel for FileMaker Pro, select the Add Host button.
- 4 In the Add Host panel, enter a host name in the Name field. This is simply the name for the host that will be displayed in Lasso Administration.
- 5 Enter the IP address or domain name of the FileMaker host in the IP Address/Host Name field. This is the address of the machine running the FileMaker Pro application (127.0.0.1 can be used if FileMaker Pro is on the same machine as the web server).
- 6 Enter the port of the FileMaker host in the Port field. The port number is the port that the FileMaker Pro Web Companion is configured for (e.g. 591).
- 7 Select Enabled from the Status pull-down menu to enable the host.
- 8 Leave the Default Host Username field blank, unless there are other databases on the Filemaker Pro host that require a username (typically FileMaker Pro databases do not require usernames if FileMaker Pro Access Privileges are used).
- 9 Leave the Default Host Password field blank, unless there are other databases on the Filemaker Pro host that require a password.
- 10 Select the Add Host button.

Once the FileMaker Pro host is added, you will be taken back to the Hosts page, where you can see what databases are open and running in FileMaker Pro by selecting the List Database button or selecting the Databases tab.

Enabling the Example Database

The Databases page lists all databases within a selected data source host. Here, you should be able to see Example_DB listed in the Databases Listing panel for the data source host with which you are working. The Example_DB database will need to be enabled here before data can be accessed.

Figure 4: Databases Page



To enable the Example database and tables:

- 1 In Lasso Administration, go to *Setup > Data Sources > Databases*.
- 2 Select Lasso Connector for FileMaker Pro from the Connector pull-down menu. This will display a list of hosts for that connector in the Hosts pull-down menu.
- 3 Select an appropriate host from the Hosts pull-down menu. This will display a list of databases for that host below.
- 4 Select Example_DB in the Databases Listing panel. This will show the Database Detail panel to the right. If Example does not appear in the Databases Listing panel immediately after it has been set up, then try selecting the Refresh button.
- 5 Check that Example_DB has been entered correctly in the Alias field. The alias is the name by which Lasso recognizes the database, and is the same as the database file name by default.

Note: Make sure that the alias of the database is Example_DB, and not Example_DB.fp3 or Example_DB.fp5. Make this change if necessary.

- 6 In the Database Detail panel, select Enabled from the Status pull-down menu to enable the database.

7 Leave the Default Database Username field blank, as the database does not require a FileMaker username.

8 Leave the Default Database Password field blank, as the database does not require a FileMaker password.

Note: For enhanced security, it is highly recommended that a password be set for the FileMaker Pro version of the Example_DB database, and then added here.

9 Select No from the Always Connect with Defaults pull-down menu. This means Lasso will connect to the Example_DB database with the password specified in the Databases page as opposed to the Hosts page in Lasso Administration.

10 Select No from the Do ISO/Mac Conversion pull-down menu unless Lasso Service and FileMaker Pro are on different operating systems (where one is Mac OS).

11 Select Update. This enables the Example_DB database and all tables within. Now the Example_DB database and its tables have been enabled, Lasso security preferences for the database may be set, as described in the *Setting Up User Access* section.

Setting Up User Security

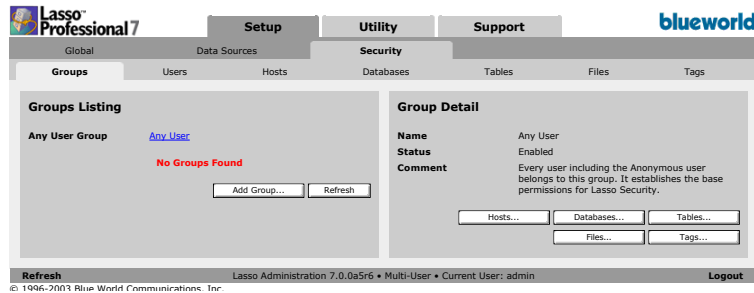
For the example solution to function properly, appropriate database permissions must be given to the AnyUser group, and an Example group that will hold custom user accounts must be created. This is accomplished in the *Setup > Groups* section of Lasso Administration.

Anonymous User Access

Groups in Lasso Professional 7 represent sets of permissions for users who belong to the group. The AnyUser group is the group to which all users of a Lasso 7 solution are assigned by default if they have not logged in with an existing Lasso username or password.

In order for anonymous users to view and browse the example solution files, we need to allow the Search and Show permissions to the AnyUser group for the Example_DB database. To protect and further enhance the security of the Example_DB database, this will be the only permission we grant to the AnyUser group.

Figure 5: Groups Page



To assign Example database permissions to the AnyUser group:

- 1 In Lasso Administration, visit *Setup > Security > Groups*.
- 2 In the Groups Listing panel, select the AnyUser group. The Group Detail panel for the AnyUser group should appear to the right.
- 3 In the Groups Detail panel, select the Databases... button. This will take you to the Databases page with the AnyUser group selected.
- 4 In the Databases Listing panel, select Example_DB under the appropriate data source connector and host. This should show the Database Detail panel for the Example_DB database to the right.
- 5 In the Show Database Schema pull-down menu, select Allow. This will allow users to see things such as dynamic value lists for fields that are defined inside the database.
- 6 In the Search Records pull-down menu, select Allow.
- 7 Select Assign.

Now that the AnyUser group has permissions for the Example_DB database, we need to assign appropriate permissions for the Web table in the Example_DB database. Users will not be able to interact with a database unless they have permission for both the database and table they are accessing.

To assign Web table permissions to the AnyUser group:

- 1 In Lasso Administration, visit *Setup > Security > Groups*.
- 2 In the Groups Listing panel, select the AnyUser group. The Group Detail panel for the AnyUser group should appear to the right.
- 3 In the Groups Detail panel, select the Tables... button. This will take you to the Tables page with the AnyUser group selected.
- 4 In the Tables Listing panel, select Example from the pull-down menu and select Switch. This should show the Web table below.
- 5 Select Web. This will show the Table Detail panel to the right.

6 In the Search Records pull-down menu, select Allow.

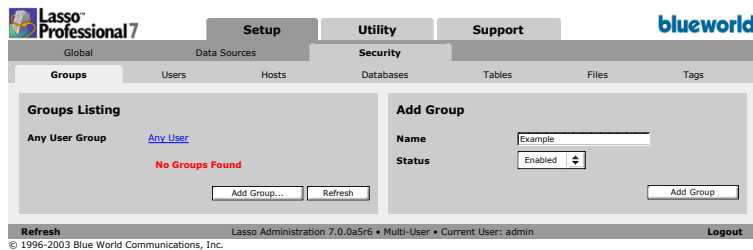
7 Select Assign.

Permissions have now been successfully set up for anonymous users wishing to search the Example_DB database via the example solution files.

Authenticated User Access

The Example group is a group we create that will have permissions to add, update, and delete records as well as search the Example_DB database. Users who have usernames and password accounts assigned to this group will be able to perform these actions using the example solution files. The Add Group page in Lasso Administration allows a new group to be created.

Figure 6: Add Group Page



To add the Example group:

- 1 In Lasso Administration, visit **Setup > Security > Groups**.
- 2 In the Groups Listing panel, select the Add Group button. This shows the Add Group panel to the right.
- 3 Enter Example in the Name field.
- 4 Select Enabled from the Status pull-down menu.
- 5 Select Add Group.

The Example group should now be shown in the Groups Listing panel and in the Group Detail panel to the right. Now, we need to assign database and table permissions to the Example group.

To assign Example_DB database permissions to the Example group:

- 1 In the Group Detail panel for the Example group, select the Databases... button.
- 2 In the Databases Listing panel, select Example_DB under the appropriate data source connector and host. This should show the Database Detail panel for the Example_DB database to the right.

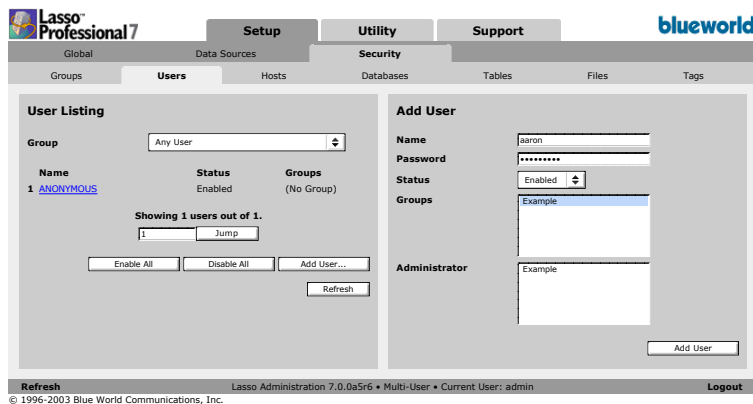
- 3 In the Show Database Schema pull-down menu, select Allow.
- 4 In the Search Records pull-down menu, select Allow.
- 5 In the Update Records pull-down menu, select Allow.
- 6 In the Add Records pull-down menu, select Allow.
- 7 In the Delete Records pull-down menu, select Allow.
- 8 Select Assign.

To assign Web table permissions to the Example group:

- 1 In the *Setup > Security > Groups* section of Lasso Administration, select the Example group. The Group Detail panel for the Example group should appear to the right.
- 2 In the Group Detail panel, select the Tables... button. This will take you to the Databases page with the Example group selected.
- 3 In the Tables Listing panel, select Example from the pull-down menu and select Switch. This should show the Web table below.
- 4 Select Web. This will show the Table Detail panel to the right.
- 5 In the Search Records pull-down menu, select Allow.
- 6 In the Update Records pull-down menu, select Allow.
- 7 In the Add Records pull-down menu, select Allow.
- 8 In the Delete Records pull-down menu, select Allow.
- 9 Select Assign.

Members of the Example group may now search, add, update, and delete records in the Web table of the Example_DB database. Next, we need to create at least one user within the Example group.

Figure 7: Add User Page



To add a user account:

- 1 In Lasso Administration, visit *Setup > Security > Users*.
- 2 In the User Listing panel, select the Add User Button. This displays the Add User panel to the right.
- 3 Enter a username in the Username field.
- 4 Enter a password in the Password field.
- 5 Select Example in the Groups field to which the user is to be assigned.
- 6 Select Add User.

This will create a user account within the Example group. This user will have extended permissions over the Example_DB database that anonymous users will not have.

Using the Example Lasso Pages

Now that the Example_DB database and Lasso Security have been set up, we can now test and view the example solutions files.

Setting Up the Example Lasso Pages

The first step in using the example Lasso pages is to move them into the Web server root folder where they can be served.

To move the example Lasso pages in Mac OS X:

- 1 Locate the Example folder in Applications/Lasso Professional 7/Documentation/2-Setup Guide/Tutorial folder on the Mac OS X hard drive.
- 2 Copy the Example folder into the Library/Webserver/Documents folder on the Mac OS X hard drive.

WebSTAR V Note: If using WebSTAR V, move the Example folder into the Applications/4DWebSTAR/Webserver/DefaultSite folder instead.

To move the example Lasso pages in Windows:

- 1 Locate the Example folder in C:\Program Files\Blue World Communications\Lasso Professional 7\Documentation\2-Setup Guide\Tutorial folder on the Windows hard drive.
- 2 Copy the Example folder into the C:\inetpub\wwwroot folder on the Windows hard drive.

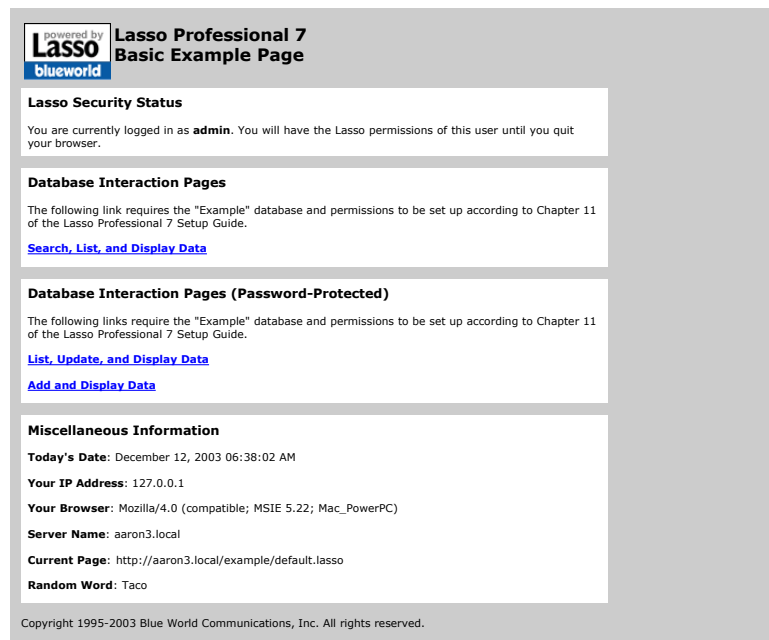
Testing the Example Lasso Pages

Once the example solution files have been moved to their Web serving folder location, and security and database options have been set for the example solution (as covered previously in this chapter), we are ready to view and test the example solution.

To view the example Lasso pages:

In a Web browser, visit <http://www.example.com/Example/default.lasso>. Replace www.example.com with your domain name, IP address, or 127.0.0.1 if on a local machine. You should see the default splash page, as shown below. If the dynamic information under the Miscellaneous Information heading appears, then Lasso is working properly.

Figure 8: Example Page



Security Status

The first item on the page to be aware of is the Lasso Security Status box. This displays the current user in Lasso Security that you are logged in as, which indicates what data source permissions you will have.

To properly test the security of the solution, you will want to start as an anonymous user (not logged in). If the Lasso Security Status box indicates you are currently logged in as a user such as the Lasso global administrator,

then you can log out by quitting your browser, restarting it, and returning to the page.

Administrator Note: You will be logged in as the Lasso global administrator if you logged into Lasso Administration at any point during your browser session. Once you are logged in as the global administrator, you will have no security restrictions and will not be asked for authentication again at any point. Be sure to quit your browser to remove your administrator status before attempting to test the security of the example solution.

Database Interaction

To test if the example solution is communicating with the Example_DB database, select the Search, List, and Display Data link. These pages will allow you to search and view data, which any user will be able to do.

Next, click either the List, Update, and Display or Add and Display link. If you currently have anonymous user status, then this will display a dialog box asking for a username and password (generated by the [Auth] LDML tag in the subsequent pages). Here you can enter the username and password for your custom user, and try searching, adding, updating, and deleting records using the various pages in the solution.

If you encounter any error messages or get unexpected results, then make sure the Example_DB database has been set up properly, and double-check the conditions described earlier. Otherwise, see the *Troubleshooting* section below for a list of common configuration problems.

Troubleshooting

This section provides a list of some of the most basic problems that can be encountered when troubleshooting a Lasso solution. These are mostly configuration issues, and many of the points listed here are covered previously in this guide. If you experience any problems while testing a Lasso solution, then check the following.

General

- Make sure Lasso Service is running. Refer to the OS configuration chapters earlier in this guide for instructions.
- Make sure the Web server (e.g. Apache, IIS, or WebSTAR) is running.
- Make sure that the Lasso MySQL or FileMaker Pro version of the Example_DB database is configured as described earlier in this chapter, and has a correct alias of Example_DB in the *Setup > Data Sources* section of Lasso Administration.

- Make sure the pages are being served by your Web server and not opened as files. In other words, make sure `http://` is in the URL of your Web browser, as shown below.

`http://127.0.0.1/Example/search.lasso`

- Make sure the pages you are loading in a Web browser are in the correct folder in the Web serving folder from which they are being called.
- When performing database operations, make sure that explicit Allow permissions are provided in Lasso Administration at both the database and table level for the particular database action.

Lasso MySQL

- If you have trouble adding or updating records, make sure that Lasso itself (represented by the Lasso user in Mac OS X, or the System user in Windows) has read, write, and execute permissions for the Example_DB database folder and its contents within the operating system. For Mac OS X, refer to the `Mac_OS_X_Tips.pdf` document for instructions on changing file and folder permissions.

FileMaker Pro

- Make sure the Example_DB database is open and running in FileMaker Pro.
- Make sure that the FileMaker Pro Web Companion is enabled and is configured on a port in which there are no conflicts. See *Chapter 7: Setting Up Data Sources* for more details.
- Make sure that sharing is enabled via the Web Companion for the Example_DB database in FileMaker Pro. See *Chapter 7: Setting Up Data Sources* for more details.
- Make sure you are using the correct version of FileMaker Pro with all current patches and updates applied. See *Chapter 7: Setting Up Data Sources* for more details.



Appendix A

Glossary

This glossary is provided as a single location where the most critical terms which are used in the manual are defined. Please browse through the glossary to familiarize yourself with the terminology of Lasso 7. The glossary is divided into sections and the terms are listed alphabetically within each section.

User Types

Administrator – A person who has privileges to access the configuration and security settings of your server.

Client – An application which access your Web site. A Web browser is the most common example of a client.

Developer – A person who creates Lasso format files. Developers include both HTML programmers and LDML programmers.

User – A visitor to your site defined in Lasso Security or in the security system of a database. A visitor may authenticate themselves as a user in order to gain permission to execute restricted tags or database actions.

Visitor – An end-user who visits your site through a Web browser or other means. When a developer is testing a Web site, the developer is considered a visitor of the Web site.

Product Line

Lasso 7 – The name of the Lasso 7 product line including Lasso Professional 7 and Lasso Studio 7.

Lasso Professional 7 – The Lasso 7 product used to serve data-driven Web sites. Lasso Professional 7 is commonly abbreviated LP7.

Lasso Studio 7 – A Lasso 7 product used to build data-driven Web sites to be served by Lasso Professional 7. Lasso Studio installs as a set of extensions for Adobe GoLive or Macromedia Dreamweaver.

LDML 7 – LDML stands for Lasso Dynamic Markup Language, the name of the programming language implemented and supported by the Lasso 7 product line.

Architecture

Lasso Connector – A module or plug-in that provides connectivity between Lasso Service and an external application.

Lasso Data Source Connector – A module that installs into Lasso Service and provides connectivity to an external data source application. Built-in data source connectors are provided for MySQL, JDBC data sources, and FileMaker Pro. Third parties can build their own Lasso data source connectors using LCAPI.

Lasso Modules – Extensions to Lasso that are installed into Lasso Service. There are two types of Lasso Modules: Lasso data source connector Modules and Lasso Tag Modules. Lasso Modules can be implemented in C/C++ through the Lasso C Application Programming Interface (LCAPI), or in Java through the Lasso Java Application Programming Interface (LJAPI).

Lasso MySQL – The internal MySQL database provided with Lasso Professional 7. Lasso MySQL is required to store Lasso 7 settings and preferences, and can also be used to store data in place of, or in concert with, external databases.

Lasso Service – 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.

Lasso Tag Module – A Blue World or third party provided module that installs into Lasso Service and implements one or more LDML tags providing extended functionality.

Lasso Web Server Connector – A module or plug-in that installs into a Web Server and provides connectivity to Lasso Service. There are three initial Lasso Web server connectors: Lasso Connector for Apache, Lasso Connector for IIS, and Lasso Connector for WebSTAR V. Other connectors may be created using Lasso Connector Protocol.

Web Application Server – An industry term for a tool that allows one to serve an application to clients over the Web typically tied to a back-end database. Lasso Professional 7 is a Web Application Server which serves Lasso-enabled Web sites. Web Application Server is synonymous with Web Data Engine.

Web Data Engine – Blue World’s trademark name, synonymous with Web Application Server, but specific to the Lasso product line.

Web Serving Folder – The folder from which a Web site is served (also known as the Web server root). This folder typically contains HTML files, Lasso format files, JPEG or GIF image files, style sheets, and more. Note that if multiple Web sites are served from the same Web server, they might each have their own Web serving folder.

Administration and Security

Administrator – A person who has privileges to alter the setup of Lasso Professional 7. In Lasso Professional 7, there are two types of administrators: a single required global administrator, and multiple optional group administrators.

Anonymous User – Any client which visits a Lasso-based Web site without authenticating, or for which there exists no matching username and password. This client inherits the permissions specified for the AnyUser group.

Global Administrator – The person who has access to all configuration and security settings. There is only one Global Administrator specified by a single username and password.

Group – A collection of users in Lasso Security. Permissions are assigned exclusively to groups. A user can belong to one or more groups, and inherits the permissions from all of the groups to which they belong.

Group Administrator – A user who has the privilege to assign other users to a specified group.

Lasso Administration – The interface and functionality for configuring Lasso Professional 7. Available as a LassoApp entitled Admin.LassoApp and located in the Lasso folder of the Web server root folder.

Lasso Security – The built-in system for securing data-driven Web sites powered by Lasso Professional 7. Lasso Security allows data sources, databases, tables, records, fields, tags, and format files to be secured.

Permissions – Permissions are granted to groups and define what tags a user who belongs to the group can execute, and what data sources the user can access. Users inherit the permissions from all of the groups to which they belong.

Privileges – Privileges are granted to administrators and define what administrative and security settings each administrator can access. Administrators are generally granted privileges to modify the permissions of one or more users and groups.

Tag Category – A set of related tags which can be enabled or disabled as a group. Tag categories include Math, Date, String, etc. The names for LDML

tags in a category are often related by sharing the same prefix before an underscore character. (e.g. [File_Control] and [File_Delete] are both members of the File tag category.)

User – A specific visitor of a Web site with a unique username and password. A user is asked for authentication information by the Web browser. A user can belong to one or more groups and inherits the permissions from all of the groups to which they belong.

Internet Technologies

CGI or Common Gateway Interface – Commonly used as a generic term for any server-side technology that processes URLs and HTML form inputs and returns formatted results.

FTP or File Transfer Protocol – A client/server protocol for exchanging files with a host computer.

HTML or HyperText Markup Language – The tag-based markup language for the World Wide Web. HTML can be created using a text editor or a visual authoring tool.

HTTP or HyperText Transfer Protocol – The protocol which governs how a Web browser communicates with a Web server.

HTTPS or HyperText Transfer Protocol, Secure – Version of HTTP developed by Netscape for secure transactions. URLs that begin with “HTTPS” indicate that the SSL protocol is being used.

SMTP or Simple Mail Transfer Protocol – The protocol which governs how email clients communicate with email servers. SMTP support allows Lasso to send email directly to an SMTP email server.

SSL or Secure Socket Layer – A protocol designed by Netscape to enable encrypted, authenticated communications across the Internet.

WAP or Wireless Application Protocol – The protocol which governs how a wireless browser, such as in a cell phone or PDA, communicates with a Web server.

WML or Wireless Markup Language – A tag-based markup language based on XML which allows pages to be formatted for display on a wireless browser.

XML or Extensible Markup Language – A tag-based markup language which is similar to HTML but can be extended with new tags for special purposes. This language is commonly used for data exchange.

XML-RPC or XML Remote Procedure Call – A communication method using HTTP as the transport and XML as the encoding. XML-RPC allows complex data structures to be transmitted, processed, and returned.

Programming

Array – A series of values stored sequentially. The values can be stored and retrieved by index. This allows many related values to be stored and retrieved as a group. For example, the days of the week might be defined as an array, and then the name of the third day of the week retrieved:

```
[Variable: 'Week'=(Array: 'Sunday', 'Monday', 'Tuesday', 'Wednesday',  
    'Thursday', 'Friday', 'Saturday')]
```

```
[Array_Get: 'Week', 3] → Tuesday
```

Classic Lasso or Classic Method – The programming method which uses LDML commands within URLs or HTML forms. These commands are passed from the page in which they are specified to a response page which formats the result of the commands. This method is commonly contrasted with Inline Lasso or Inline Method.

Command Tags – LDML tags which can be embedded within URLs, HTML forms, or [Inline] tags which instruct Lasso to perform a command or action. Command tags are named starting with a hyphen (e.g. -Database or -KeyField). Their value is specified differently depending on how the command tag is used.

Compound Expression – A form of LDML syntax that incorporates traditional bracket syntax and LassoScript. For example, [Output: {If: (\$Var == Null); Return: 'Default'; Else; Return: \$Var }->Run], uses a LassoScript conditional statement and variables within the [Output] tag. LassoScript within traditional syntax is always contained within {...} characters.

Container Tags – LDML tags which perform an operation on a portion of a page. For instance, the [Records] ... [/Records] tags will repeat the code contained within them for every database record returned by a Lasso action, but will still allow the code contained within the container tags to be processed.

Data Type – The type of data for any value used by Lasso (e.g. string, integer, etc.). Operations and member tags behave differently depending on the Data Type of the values they are passed. For more information see *Chapter 4: LDML 7 Tag Language > Data Types* in the Lasso 7 Language Guide.

Decimal – Any number that contains a decimal place. -300.20, 1.0, 2000.40 are all decimals. Decimal literals should never be surrounded by quotes.

Encoding – The process of converting characters to their hexadecimal equivalent in order to accurately represent them to the client in a Web browser, URL, or XML file. Values returned by Lasso can be returned using a variety of different encoding methods to ensure the proper results.

Expressions – The building blocks of values in Lasso. Expressions include sub-tags, mathematical operators, and member tag calls. Any place that a string or integer can be used as a parameter value for a tag, an expression can be used instead. For more information see *Chapter 4: LDML 7 Tag Language > Expressions and Symbols* in the Lasso 7 Language Guide.

Format File – A text file that contains LDML which Lasso reads for instructions on how to process and format any specific action or request.

Inline Lasso or Inline Method – The programming method accomplished using the [Inline] tag which provides the ability to specify commands and the formatted results of those commands within a single format file. This method is commonly contrasted with Classic Lasso and can provide enhanced security and code protection.

Integer – A whole number that does not contain a decimal place. -3000, 1, 200 are all integers. Integer literals should never be surrounded by quotes.

Keyword – A parameter for an LDML tag that affects the output of the tag. Keywords always start with a hyphen. For example, the -Encode... keywords in substitution tags are used to specify how the output of the tag is encoded so HTML tags are rendered properly.

LassoScript – A method of specifying LDML tags within a single container `<?LassoScript ... ?>`. This allows for a block of programming logic to be formatted in a more readable fashion without any square brackets. Usually used by developers who are familiar with other programming languages such as JavaScript. The following example performs a series of math operations in a LassoScript.

```
<%LassoScript
  Var: 'Total' = 0;
  Var: 'Total' = (Var: 'Total') + (Var: 'Item One Price');
  Var: 'Total' = (Var: 'Total') + (Var: 'Item Two Price');
  Var: 'Total' = (Var: 'Total') + (Var: 'Shipping');
%>
```

Map – A series of values stored and retrieved by name. This allows many values to be stored and retrieved as a group, but still referenced individually by name. A record for a user of your site might be constructed as follows where the first name is retrieved:

```
[Var: 'User'=(Map: 'First'='Bob', 'Last'='Smith', 'Phone'='555-1212')]

[Map_Get: 'User', 'First'] → 'Bob'
```

Member Tags – Tags which are associated with a specific data type. The function of these tags is defined by the data type with which they are associated. A member tag is called as part of an expression by using the member operator `->`. The tag is specified to the right of the operator and the value which the tag is to operate upon is defined to the left of the oper-

ator. The following expression gets the third element of the array returned by the variable `myArray`.

[Output: (Var: 'myArray') -> (Get: 3)]

Parameter – A component of a tag that follows the tag name and defines the functionality of the tag. Parameters can be simple keywords or complex expressions with many sub-tags. Named parameters and keywords always start with a hyphen.

Pipes – A pipe is a technique for passing information from one process to another. Pipes allow data to be sent to background processes for asynchronous processing, allowing threaded systems to be created for faster performance.

Process Tags – LDML tags which perform an action, but do not return any result to the client. For instance, the [Email_Send] tag sends an email message when the format file that contains it is loaded, but does not show any information regarding the email to the client.

References – A method of passing parameters from one action to another where an alias to a parameter value is passed rather than the actual value. Returning data by reference reduces memory usage and increases code execution speed.

Semaphores – A variable with a value that indicates the status of a common resource. A process needing a resource can check a semaphore to determine the resource's status and then decide how to proceed. Semaphores allow safe use of the same resources across multiple threads.

String – A sequence of letters, numbers, and other characters. Strings with letters are enclosed in single quotes, e.g. 'This is a string'. Strings with numbers which are to be interpreted as an integer, decimal, or date type should not be enclosed in quotes lest they be interpreted as a non-numeric text string.

Substitution Tags – LDML tags which take one or more parameters and return a result that is substituted in place of the tag in the page which will be output to the client. For instance: [Date_GetCurrentDate] is replaced by the current date and time.

Sub-Tags – Substitution tags used as part of an expression. The sub-tag is specified exactly like a normal substitution tag except that the square brackets which delimit the tag are replaced by parentheses. Sub-tag expressions are usually used as parameters for another tag. In the following example the [Field] tags are sub-tags used as parameters for the [Math_Add] tag:

[Math_Add: (Field: 'Price'), (Field: 'Shipping')]

Symbols – Used to perform math or string operations, or logical comparisons in conditional [If] tags and expressions (e.g. =, <, +). The behavior of symbols change based on how their parameters are defined and based on the data type of the parameters being modified. For example, ('1'+1) returns 11 since both parameters are of the string data type (in single quotes). (1 + 1) returns 2 since both parameters are of the integer data type. For more information see *Chapter 4: LDML 7 Tag Language > Expressions and Symbols* in the Lasso 7 Language Guide.

Variable – A temporary storage place for a programmer-defined value. Values can be stored in variables and then referenced later in a page. Or, using a session, values can be stored in a variable and then referenced on subsequent pages accessed by the same client. The following example sets a variable and then retrieves it within an HTML tag:

```
[Var:'URL'='http://www.blueworld.com']  
  
<a href="[Var:'URL']">Blue World</a>
```

Database Technologies

CDML or Claris Dynamic Markup Language – The language of the FileMaker Pro Web Companion. It is basically a subset of an earlier version of LDML.

Data Source – A database application or database server. Lasso can connect to a data source and access any of the databases which that data source provides.

Database – A collection of tables and their associated records and fields. Every database is hosted by a particular data source.

Field – A container for storing data in a database. In Lasso, field is synonymous with the SQL term column.

JDBC or Java Database Connectivity – JDBC™ technology, produced by Sun Microsystems, is the standard API that allows access to virtually any tabular data source using the Java™ programming language. A JDBC-compliant data source is any data source that has a JDBC driver developed for it.

Key Field – A field whose values (called **Key Values**) uniquely identify particular records. Used to establish relations between different tables. In Lasso, -KeyField is synonymous with -KeyColumn. For FileMaker Pro databases, -KeyField_Value is synonymous with -RecordID_Value.

Record – A unique collection of fields within a database distinguished by a unique key field value. In Lasso, record is synonymous with the SQL term row.

SQL or Structured Query Language – The language which is used to query and build SQL compatible databases. Lasso automatically creates SQL statements based on the criteria specified, or allows one to submit custom SQL queries.

Table – A collection of records that share common fields. Every Lasso action must be performed on a specific table within a database. In Lasso, table is synonymous with the FileMaker Pro term layout.

Extending Lasso

API or Application Programming Interface – A set of shared libraries, documentation, header files, and examples that allow a third party to create a tool which interacts with an existing application.

Lasso Connector Protocol – Defines the rules that govern communication between a Lasso Web server connector and Lasso Service. This protocol is documented in the Extending Lasso 7 Guide so third parties can create custom Lasso Web server connectors.

LCAPI or Lasso C/C++ API – This API allows third parties to develop Lasso tag modules or Lasso data source connectors using the C/C++ programming language. Available in the Extending Lasso 7 Guide.

LJAPI or Lasso Java API – This API allows third parties to develop Lasso tag modules or Lasso data source connectors using the Java programming language, and is available in the Extending Lasso 7 Guide.

B

Appendix B

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Base64 Encoding, MD5 Hash Function, and BlowFish Encryption

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Regular Expressions

PCRE code written by Philip Hazel <ph10@cam.ac.uk>

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Compression Algorithm

zlib.h – interface of the zlib general purpose compression library

version 1.1.3, July 9th, 1998

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The data format used by the zlib library is described by RFCs (Request for Comments) 1950 to 1952 in the files <ftp://ds.internic.net/rfc/rfc1950.txt> (zlib format), [rfc1951.txt](ftp://ds.internic.net/rfc/rfc1951.txt) (deflate format) and [rfc1952.txt](ftp://ds.internic.net/rfc/rfc1952.txt) (gzip format).

MD5 Message-Digest Algorithm

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Appendix D

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