

An administrator's guide to configuring, securing, customizing, and extending Moodle





An administrator's guide to configuring, securing, customizing, and extending Moodle

Alex Büchner



Copyright © 2008 Packt Publishing

All rights reserved. No part of this book may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, without the prior written permission of the publisher, except in the case of brief quotations embedded in critical articles or reviews.

Every effort has been made in the preparation of this book to ensure the accuracy of the information presented. However, the information contained in this book is sold without warranty, either express or implied. Neither the author, Packt Publishing, nor its dealers or distributors will be held liable for any damages caused or alleged to be caused directly or indirectly by this book.

Packt Publishing has endeavored to provide trademark information about all the companies and products mentioned in this book by the appropriate use of capitals. However, Packt Publishing cannot guarantee the accuracy of this information.

First published: September 2008

Production Reference: 1190908

Published by Packt Publishing Ltd. 32 Lincoln Road Olton Birmingham, B27 6PA, UK.

ISBN 978-1-847195-62-3

www.packtpub.com

Cover Image by Vinayak Chittar (vinayak.chittar@gmail.com)

Credits

Author

Project Manager Abhijeet Deobhakta

Reviewer Derrin Kent

Alex Büchner

Senior Acquisition Editor David Barnes

Development Editor Nikhil Bangera

Technical Editor Gaurav Datar

Copy Editor Sneha Kulkarni

Editorial Team Leader Mithil Kulkarni Project Coordinator Brinell Lewis

Indexer Rekha Nair Monica Ajmera

Proofreader Laura Booth

Production Coordinator Aparna Bhagat

Cover Work Aparna Bhagat

About the Author

Alex Büchner is the co-founder and technical lead of Synergy Learning, UK's largest Moodle partner. He has been involved in system and database administration for two decades and has been administering virtual learning environments of all shapes and sizes since their advent on the educational landscape.

Alex holds a PhD in Computer Science and an MSc in Software Engineering. He has authored over 50 international publications, including two books, and is a frequent speaker on Moodle and related open-source technologies.

The best learning experience in Moodle is provided when communication and collaboration is utilized. The same applied to writing this book, which would not have been possible without the tremendous support of the Packt editorial team. Whatever time zone you were in, you certainly kept me on my toes 24/7.

I would also like to thank John Isner and Derrin Kent for their constructive feedback provided during the reviewing process. This book would not be the same without your comments and suggestions.

Special thanks must go to all my colleagues at Synergy Learning. Your input to the book content has been invaluable.

Last but not least, I have to thank all our customers. Without you we wouldn't be aware of all the Moodle hitches and glitches that are out there. Keep them coming!

About the Reviewer

Derrin Kent describes himself as being a cross between a "trainer", a "manager" and a "geek". He lives in Worcestershire, UK and speaks Spanish at home with his Peruvian wife and two third-culture kids. Derrin has an NQF level 7 teaching qualification from Cambridge and is a member of the Association for Learning Technologies as well as being a Linux-certified professional (LPI).

Derrin is the leader of The Development Manager Ltd. (http://tdm.info), a UK-based company which specializes in *improving e-learning and e-business with open source*.

Table of Contents

Preface	1
Chapter 1: Introduction	7
Moodle's Rationale	7
Moodle Overview	9
The Moodle Model	9
The Moodle Development Model	10
The Moodle Business Model	10
Moodle Usage	11
VLE Administration	13
VLE Job Functions	13
Obligations and Skill Sets of a VLE Administrator	14
Moodle Administration	15
Summary	15
Chapter 2: Moodle Installation	17
Moodle Installation: An Overview	17
What is the Best Setup for Me?	17
Moodle Prerequisites	19
Hardware Requirements	19
Software Requirements	20
Installation in a LAMP Environment	20
Downloading Moodle	21
Creating the Moodle Database and the Data Directory	23
Using a Hosted Server	23
Creating the Moodle Data Directory	24
Running the Installer Script	26
Finalizing the Installation	33
Setting up the Cron Process	34
Installation in a Windows Environment	35

Table of Contents		

Installation in a Mac OS X Environment Updating Moodle Manual Update	37 39 40
Creating a Backup	41
Running the Update Script	42
Update via CVS	45
Summary	46
Chapter 3: The Moodle System	47
Moodle Architecture	47
The LAMP Architecture	48
The Moodle Layer	49
Code and Data Locations	50
Finding Your Way Around in Moodle	52
Breadcrumbs	52
Administrator Search Facility	53
Moodle Bookmarks	53
Moodle Docs and Help	54
File Management	55
Moodle File Management Interface	56
Web Host File Management	58
File Management via FTP	58
File Management via WebDAV	59
WebDAV Prerequisites	59
Setting up WebDAV	59
Summary	64
Oberten 4. Oserres Mansenerst	04
Chapter 4: Course Management	65
Course Categories	60
Course Categories Overview	60
Managing Course Categories	۲۵ 88
Course Sub-Categories	68
Deleting Course Categories	69
Organizing Courses	69
Creating Courses	71
Meta Courses—Sharing Enrolment across Courses	75
Course Requests—Enabling Teachers to Ask for New Courses	76
Forms of Enrolment	78
Internal Enrolment	79
Database-driven Enrolment	80
LUAP	80

	Table of Contents
External Database	82
Flat File	84
IMS Enterprise File	85
Enrolment with Payment	86
PayPai Authorize net Payment Gateway	87 87
Summarv	88
Chapter 5: User Management	89
Authentication Versus Enrolment	89
User Profiles	90
Profile Fields	90
Category "General"	91
Category "Picture of"	94
Category "Interests"	96
Category "Optional" Creating Liner Defined Brefile Fields	96
Profile Categories	97
Profile Fields	98
Standard User Actions	103
Browsing Users	103
Filtering Users	104
Bulk User Actions	108
Manual Accounts	110
Adding Individual Users	110
Bulk-Uploading of Users and Their Pictures	110
Text File Format	111
Uploading Users	115
Setting Default Values and Templates	117
Loading of Data	119
Self-Registration	120
User Authentication	121
Common Authentication Settings	122
Manual Account Settings	122
Self-Registration Settings	124
I DAP Server Settings	126
LDAP Server and Bind Settings	120
User Lookup Settings	127
Password-Related Settings	128
Miscellaneous LDAP Settings	129
Data Field Mappings	130
External Database Settings	130
Data Field Mappings	132
Other Authentication Mechanisms	133
ſiii1	

Tabl	le of	Contents
1	001	0011101110

External Moodle Authentication Methods	133
Internal Moodle Authentication Methods	134
Username–Best Practices	135
Summary	137
Chapter 6: Roles and Permissions	139
Moodle's PreDefined Roles	139
Contexts	140
Assignment of Roles	142
Time for some action: Assigning Roles	142
Hiding Role Assignments	144 144
System Context	145
Course Category Context	146
Course Context	147
Module Context	147
Block Context	148
User Context	149
Front Page Context	150
Multiple Roles	151
Capabilities and Permissions	151
Role Definitions	152
Resolving Permission Conflicts	154
Permission Risks	155
Modifying Roles	156
	157
Creating Custom Roles	159
Parent or Mentor Role	160
Testing New Roles	162
Roles Management	162
Allowing Roles Assignments and Overrides	163
Assignment of Default Roles	164
Assigning Front Page Roles	165
Roles—Best Practice	165
	100
Chapter 7: Moodle: Look and Feel	<u> </u>
Look and Feel: An Overview	167
Customizing Your Front Page	169
Front Page Settings	170
Ananying From A Different Website	1/2
Other Front Page Items	173

	Table of Contents
Front Page Roles	174
Front Page Backup and Restore	174
Front Page Questions	174
Site Files	1/5
Allow Personalization via My Moodle	175
Mode Themes	176
Selecting a Moodle Theme	177
Theme Types	178
Theme Settings	180
Creating Your Own Theme	181
Theme Creation Basics	181
Moodle Theme Styles	184
Theme Design and Development	184
Look and Feel: Good Practice	188
Consistency	189
Supporting Different Browsers	189
Guaranteeing Accessibility	189
Summary	190
Chapter 8: Moodle Configuration	191
Accessibility	192
Accessibility Supported by the Moodle Editor	192
Screen Reader Support	193
Localization	194
Languages	194
Language Packs	194
Language Settings	196
Calendaric Information	201
Calendars	201
Time Zones	202
Module Configuration	203
Configuration of Activities	203
Configuration of Blocks	205
Configuration of Filters	207
Grades and Gradebook Settings	208
Miscellaneous Settings	210
Editing Options	210
Tags	213
Experimental	214
Summary	215

Table of Contents

Chapter 9: Monitoring User Activity	217
Monitoring Overview	217
Reporting	218
Livelogs	221
Error Reports	222
Exporting of Logs	222
	223
Statistics	225
Statistics Settings	226
Statistics View	228
Web Log Analyzers	229
Google Analytics	229
Privacy and Data Protection Issues	231
Summary	231
Chanter 10: Moodle Security	233
Security Overview	233
Security Notifications	234
User Security	236
Access to Moodle	236
Self-Registration	236
Guest Access	236
Protection of User Details	236
Moodlo Basswords	230
Socurity in Poloc	230
Role Definitions	239
Default Roles	240
Data and Content Security	240
Content Created Within Moodle	240
Visibility of Content	241
Site Policy	242
Antivirus	243
System Security	244
Configuration Security	244
Accessibility of Dataroot	244
Cron Process	244
HIPSecurity	245
Module Security	246
Summary	247
Chapter 11: Moodle Performance and Optimization	249
Performance and Optimization Overview	250
Moodle Content	251

	Table of Contents
Content Creation	251
Content Volume	251
Content Types	252
Moodle System Settings	253
Path Settings	253
Caching Settings	254
Module Settings	255
Gradebook Optimization	256
Chat Optimization	256
Forums	258
Miscellaneous Settings	258
Language-Related Settings	258
Earge Log mes Filter Settings	250
Search Settings	260
Course Backups	260
Cron Optimization	260
Roles	261
Moodle Performance Profiling and Monitoring	261
Summary	262
Chapter 12: Backup and Restore	263
Course-Level Backup and Restore	263
Course Backup	264
Backup Options	264
Content-Only versus Full-Course Backups	266
	207
Course Import	200
Site Level Beckupe	27 1
	213
Backup Sellings	273
Drowbacke of Site Level Backupa	2/4
Drawbacks of Sile-Level Backups	270
System-Level Backups	276
Moodle Backup	2/6
Moodle Data	270
Snanshot Creation	277
Summary	278
Chapter 12: Installing Third Party Add One	270
Third Party Software: An Overview	2/9
Cood Add One and Bad Add One	219
GUUU AUU-UIIS AIIU DAU AUU-UIIS Dopular Add Opo	201
ropular Add-Uns	283
Instailing Third-Party Add-Ons	284

Tuble of Contents	Table	of	Contents
-------------------	-------	----	----------

Installing the Feedback Module	285
Installing Other Add-Ons	287
Uninstalling Third-Party Add-Ons	288
Summary	288
Chapter 14: Moodle Networking	289
Networking Overview	290
Networking Prerequisites and Security	292
Required PHP Extensions	292
Networking Security	292
Peer-To-Peer Networks	294
Adding a Peer	294
Peer Services	295
Peer Themes	297
Peer Logs	297
Network Authentication	298
Allow Roaming	299
Network Server Block	299
Network Enrolment	300
Networking Enrolment Plug-In	301
	301
Community Hubs	30Z
Mahara Integration	303
Manoode!	303
	304
Adding Manara to Moodle	306
Summary	307
Appendix A: Moodle Health Check	309
Moodle Health Check: Performance	310
Moodle Health Check: Security	315
Functionality	321
Core Functionality	321
Accessibility	325
System	326
Operating System	327
Database	327
PHP	330
Web Server	331

Table of Contents

Appendix B: Configuration Settings Reference	335
Configuration Reference: An Overview	335
Configuration Reference: Administration Settings	336
Configuration Reference: System Settings	338
Compulsory Parameters	338
Optional Parameters	339
Configuration Reference: Theme Settings	343
Index	347

Preface

What This Book Covers

Part I: Getting Started

Chapter 1 provides you with a brief overview and some background of Moodle. The Moodle business model and its development process is covered, along with the sectors in which Moodle is utilized. You will then learn about the job functions related to VLE administration alongside their responsibilities and skill sets, before some Moodle-specific administration tasks are covered.

Chapter 2 tells you the most suitable Moodle setup for your organization, including software and hardware requirements. You will the learn how to install Moodle in three environments, namely LAMP/UNIX, Windows and Mac OS. Finally, Moodle manual and semi-automatic updates are covered in detail.

Chapter 3 covers the building blocks of the learning platform. First, we cover the Moodle architecture, that is, the main Moodle components and where its data and code is stored. We then provide you with the skills to find your way round in Moodle via its intuitive user and administration interface. Finally, we deal with the management of files, which includes Moodle's standard file management and file management via web hosts, FTP and WebDAV.

Part II: Moodle Configuration

Chapter 4 tells you how to set up new courses and how to organize them in categories. This is followed by introducing meta-courses and course requests. The remainder of the chapter deals with an array of enrolment options, covering Moodle's internal enrolment, database-driven enrolment, for instance via LDAP and payment-driven enrolments.

Preface

Chapter 5 explains how to manage users on your system. This includes browsing and filtering users as well as bulk user actions. We then cover a number of mechanisms of how to add users to Moodle, one-by-one, in bulk and by self-enrolment. Finally, you will learn about different authentication mechanisms provided by Moodle.

Chapter 6 guides you regarding how to manage roles and grant permissions to users in different contexts. We will cover the assignment of roles, the modification of existing roles and the creation of new roles before we deal with any role-related settings.

Chapter 7 tells you how to adapt your Moodle system to bring it in line with the corporate branding of your organization. We will cover the customization of the front page and the creation of Moodle themes.

Chapter 8 brings you up-to-date with the vast array of Moodle options. The areas covered are accessibility, localization, module configuration, grades and gradebook settings, and miscellaneous parameters.

Part III: Moodle Maintenance

Chapter 9 will equip you with the tools you require to interpret and analyze the vast amounts of usage data Moodle is collecting. You will first learn about the monitoring facilities provided by Moodle that include activity reporting, user tracking and some basic statistics. Then, we will take a look at third-party monitoring tools that cover web log analyzers and live data trackers such as Google Analytics.

Chapter 10 would focus on ensuring that the data in your Moodle system is protected from any misuse. You will learn about security notifications, user security, data and content security, and system security.

Chapter 11 makes sure that your Moodle system runs to its full potential. We will cover configuring, monitoring and fine-tuning your virtual learning environment for maximum speed. You will learn how to optimize Moodle content before we focus on system parameters, namely path settings, caching settings, module settings and miscellaneous settings.

Chapter 12 focuses on ensuring that in the event of a disaster, your data would not be lost. We are covering course backups, site backups, system backups and restoring data from the taken data archives.

Part IV: Enhancing Moodle

Chapter 13 explains in detail how to extend your Moodle system. You will be able to distinguish between good add-ons and not-so-good add-ons, before we cover extensions that are popular with other users. We will then cover how to install, configure and un-install third-party add-ons.

Chapter 14 tells you how to connect disparate Moodle systems either in a peer-to-peer setup or via a community hub. You will also be able to apply the learned networking techniques to connect the popular open-source e-portfolio system Mahara to Moodle.

Part V: Appendices

Appendix I equips you with a battery of over 100 diagnostic tests you should run against your system. It covers four main areas: performance (speed-related issues such as response times and load), security (covering all safety-related topics), functionality (enabling features and guaranteeing accessibility), and system settings (looking at Moodle's underlying components – operating system, database, PHP and web server).

Appendix II provides you with a list of parameters that can be modified in Moodle's *configuration file* and the impact each of the values will have. The areas covered are Administration Settings, System Settings and Theme Settings.

What You Need for This Book

For Moodle, you must have the following components up and running on your server:

- Database: MySQL (version 4.1.6 or later), PostgreSQL (version 7.4 or later), Microsoft SQL Server (version 2005 or later), Oracle (version 8 or later).
- Web server: Apache is the preferred web server.
- PHP: PHP 4.30 is required to run Moodle. But it is advisable to use PHP 5.24 or higher, which will be necessary in the forthcoming 2.0 version of Moodle.
- PHP extensions: Moodle makes use of number of PHP extensions most of which are compiled into PHP by default.

Depending on your specific setup, additional software and hardware might be required.

Preface

Who is This Book For

This book is written for technicians, systems administrators, as well as academic staff, that is, basically for anyone who has to administer a Moodle system. Whether you are dealing with a small-scale local Moodle system or a large-scale multi-site Virtual Learning Environment (VLE), this book will assist you with any administrative tasks. Some basic Moodle knowledge is helpful, but not essential.

Conventions

In this book, you will find a number of styles of text that distinguish between different kinds of information. Here are some examples of these styles, and an explanation of their meaning.

Code words in text are shown as follows:

If the cron.php script is invoked over HTTP (either using wget or curl), more memory is used than calling directly via the php -f command.

Any command-line input and output is written as follows:

There are two ways you can create a so-called database dump from a MySQL database, either via command line or via Moodle's optional database interface.

The simplest syntax for the command line tool is:

mysqldump -u <user> -p <database> > backup.sql

New terms and **important words** are introduced in a bold-type font. Words that you see on the screen, in menus or dialog boxes for example, appear in our text like this:

There are two unrelated search settings in Moodle, both of which are still in an experimental stage. You can find them at **Miscellaneous | Experimental**



Important notes appear in a box like this.



Tips and tricks appear like this.

Feedback from our readers is always welcome. Let us know what you think about this book, what you liked or may have disliked. Reader feedback is important for us to develop titles that you really get the most out of.

To send us general feedback, simply drop an email to feedback@packtpub.com, making sure to mention the book title in the subject of your message.

If there is a book that you need and would like to see us publish, please send us a note in the **SUGGEST A TITLE** form on www.packtpub.com or email suggest@packtpub.com.

If there is a topic that you have expertise in and you are interested in either writing or contributing to a book, see our author guide on www.packtpub.com/authors.

Customer Support

Now that you are the proud owner of a Packt book, we have a number of things to help you to get the most from your purchase.

Errata

Although we have taken every care to ensure the accuracy of our contents, mistakes do happen. If you find a mistake in one of our books — maybe a mistake in text or code — we would be grateful if you would report this to us. By doing this you can save other readers from frustration, and help to improve subsequent versions of this book. If you find any errata, report them by visiting http://www.packtpub. com/support, selecting your book, clicking on the **let us know** link, and entering the details of your errata. Once your errata are verified, your submission will be accepted and the errata added to the list of existing errata. The existing errata can be viewed by selecting your title from http://www.packtpub.com/support.

Preface

Piracy

Piracy of copyright material on the Internet is an ongoing problem across all media. At Packt, we take the protection of our copyright and licenses very seriously. If you come across any illegal copies of our works in any form on the Internet, please provide the location address or website name immediately so we can pursue a remedy.

Please contact us at copyright@packtpub.com with a link to the suspected pirated material.

We appreciate your help in protecting our authors, and in our ability to bring you valuable content.

Questions

You can contact us at questions@packtpub.com if you are having a problem with some aspect of the book, and we will do our best to address it.

1 Introduction

Welcome to Moodle Administration!

Moodle stands for **Module Object-Oriented Dynamic Learning Environment**. We will begin with the principles of Moodle, followed by these introductory topics:

- A very brief overview of Moodle
- The Moodle model, covering development and business aspects of the software
- An overview of sectors in which Moodle is used, and the types of users who are using Moodle
- Job functions that have recently emerged in relation to VLE administration, their responsibilities, and the skill sets required
- Some Moodle-specific administration tasks

Moodle's Rationale

Learning and teaching has been changing dramatically in the last decade. The shift from class-based environments to blended and online settings has been driven by the advent of new ubiquitous and internet-driven technologies such as cell phones, MP3 players, personal digital assistants, digital cameras, games consoles, interactive TV, and so on.

Marc Prensky has coined the terms **digital natives** (people who have grown up with these technologies) and **digital immigrants** (people who grew up without them and adapted them later). The problem that has arisen in educational settings is that the immigrants are often teaching the natives! This disconnection causes friction among all participants and now there is a need for technology to close this gap as much as possible.

Introduction

A plethora of new assisting technologies has been introduced in recent years, which helps to supplement the existing learning and teaching environments. Examples are interactive whiteboards, classroom response/voting systems, rapid e-learning authoring tools, and **virtual learning environments**. Wikipedia defines a **Virtual Learning Environment (VLE)** as follows:

A virtual learning environment is a software system designed to support teaching and learning in an educational setting. [...] A VLE will normally work over the Internet and provide a collection of tools such as those for assessment (particularly of types that can be marked automatically, such as multiple choice), communication, uploading of content, return of students' work, peer assessment, administration of student groups, collecting and organizing student grades, questionnaires, tracking tools, etc.

The following diagram depicts the schematic components of a typical virtual learning environment:



The figure shows the main building blocks of VLE, each of which has its counterpart in non-virtual settings. The key to a good learning experience is good learning resources; the same applies in physical learning environments. Secure and flexible access is granted to learners, teachers, and administrators as well as to other users such as parents, inspectors, visitors, and so on. VLE can also be described as: "a content management system with an educational and pedagogical wrapper".

Moodle is one of the most popular virtual learning environments in this vastly growing market. First of all, let's provide you with a very brief overview of Moodle.

Moodle Overview

Moodle stands for Modular Object-Oriented Dynamic Learning Environment.

The section about Moodle on its website www.moodle.org also defines to moodle [verb]:

The process of lazily meandering through something, doing things as it occurs to you to do them, an enjoyable tinkering that often leads to insight and creativity. As such it applies both to the way Moodle was developed, and to the way a student or teacher might approach studying or teaching an online course.

The original version of Moodle was developed by Martin Dougiamas as part of his research on social constructionist pedagogy or, for us mere mortals, learning by doing, communicating, and collaborating. If you wish to learn more about Moodle's underlying pedagogical framework, please refer to http://docs.moodle.org/en/Philosophy.

In a nutshell, Moodle is a web-based software system that facilitates learning and teaching. It is **learning-centered and not tool-centered**, which appeals to educationalists as well as learners. Moodle is now the most popular open-source virtual learning environment worldwide, and its uptake is growing steadily. Its modularity (remember, that's what the "M" stands for) allows us to configure the system flexibly and also to extend it if we wish to do so.

Before we cover Moodle in more detail, let's have a look at its unique development and business model.

The Moodle Model

Moodle is open-source software that has been released freely under the GNU Public License. This means that you are allowed to copy, use, and modify Moodle, provided that you agree to: *provide the source to others; not modify or remove the original license and copyrights, and apply this same license to any derivative work.*

However, the name Moodle is copyrighted which means only authorized companies are allowed to sell related services.

The questions frequently asked are:

- How is Moodle being developed?
- How does Moodle make money?

Let us shed some light on these two valid questions. At the core is the Moodle Trust, set up by Martin Dougiamas, that manages the Moodle project.

Introduction

The Moodle Development Model

The Moodle Trust employs a number of full-time software developers who are implementing and co-ordinating the development of the software. Programmers around the globe contribute to the development. Some are core developers; some contribute through testing, while others offer small-scale patches and amendments. While some are paid by employers who benefit from Moodle such as universities or companies, others are volunteers who are enthusiastic about Moodle, or programming, or both.

A roadmap exists for Moodle, which is driven by feature requests from the Moodle community. These are users who either post requirements on tracker.moodle.org or who provide feedback at Moodle conferences called MoodleMoots. Some features are paid for (see Business Model section), for example, Microsoft part-financed the development of the XMLDB database abstraction layer.

The Moodle Business Model

The Moodle trust has three main revenue-generating channels:

Moodle Partners (www.moodle.com)

Moodle Partners are companies that have been authorized by the Moodle Trust to carry out Moodle services (such as hosting, support, training, branding, development, and so on) in a particular territory, and use the Moodle trademark. It is similar to a franchise model, where each franchisee pays an annual fee and a commission on its revenue to the franchiser. There are approximately 40 Moodle partners world-wide, which displays the highest professional standards.

Clients

Institutions, companies, and individuals contract the Moodle Trust to implement functionality to its product. Most of these new features will then be made available to the community.

• Donations

Many Moodle users including businesses, educational establishments, and individuals have funded the Moodle project through donations.

The two main expenses of the Moodle Trust are staff salaries and the maintenance of its community site www.moodle.org, which includes free forum-based support, full documentation, a bug tracking facility, and many more features.

If you want to deepen your knowledge on development and business models of open-source software, *The Cathedral & the Bazaar* by Eric S. Raymond is a must-read. For more information on the Moodle model, search for *Moodle: a case study in sustainability* by Martin Dougiamas who is Moodle's benevolent dictator.

Moodle Usage

Like so many technologies related to teaching and learning, most VLEs, including Moodle, were initially tailored towards the needs and requirements of academia. While the core educational sector is still the largest consumer in the market, other verticals are now making use of Moodle. This has been reflected in the provision of a more flexible functionality. The main groups of users can be categorized in the following four sectors:

1. Core education

Here core education means state-funded or private schools, colleges, academies, polytechnics, universities, and so on. Basically, any organization where learning and teaching (and optionally research and technology transfer) is at its core and qualifications in academic and vocational subjects are being offered.

VLEs are crucial to these organizations whether they are used to supplement face-to-face learning in a blended environment or if a pure e-learning approach is taken. There exist very few core educational organizations today that do not have a VLE.

2. Industry

There are two types of organizations in this group: The first type includes companies that specialize in delivering courses across industry sectors. This ranges from micro-businesses providing training in a niche sector such as helicopter maintenance (we have a Moodle customer who does exactly that!) to large corporations offering hundreds of courses (for example, languages, IT, and business subjects) to individuals and other companies. The second type involves businesses that use VLEs internally for their staff training.

In both cases VLEs play a crucial role as they reduce cost, increase flexibility, and cater for a multitude of learning styles, pace, and methodologies.

Introduction

3. Public sector

More and more public sector organizations are using VLEs for a range of activities. Examples are continual professional development, dissemination of information, and citizen consultation. Special role play bodies that are responsible for organizations in the core educational sector such as education boards, qualifications and curriculum authorities, skills councils, and so on. In addition to using VLEs internally, they often act as an intermediary between policy makers and these individual organizations.

4. Not-for-profit organizations

NPOs, voluntary organizations, and charities utilize VLEs to disseminate information, provide support to its service users, and offer self-help courses among other activities.

Independent of the sector in which VLEs are deployed, there are three main types of Moodle users:

1. Learners

These are the most important users of Moodle! They are the **consumers** in any learning environment, whether it is physical or virtual. Depending on their status, they might be called pupils, students, participants, staff members, and so on.

In addition to providing learning resources (text, audio, video, animation, simulation, and so on), good VLEs support a wide range of learning activities as well as collaboration and communication facilities for its learners.

2. Teachers

These are the **producers** in a learning environment. There are two key roles: creation of learning content and the delivery thereof. Again, depending on the organization, you might call them teachers, lecturers, instructors, staff, trainers, coaches, and so on.

3. Administrators

That's us! We are the ones who have to make sure that everything is working the way it is supposed to. Learners have to be given access to their courses or classes, and teachers have to be given facilities they need to carry out their duties. In addition to these key tasks, there is a plethora of responsibilities that have to be carried out. We will provide an overview in this introduction before we go into the details on a chapter-by-chapter basis. There are additional types of users who will be able to access your Moodle system. Examples are external examiners, inspectors, parents, visitors, alumni, librarians, and so on. We will come across those user types later on while dealing with roles in Moodle.

VLE Administration

A Moodle administrator is basically a VLE administrator who manages a Moodle system. We first look at the job functions, responsibilities, and necessary skill sets in general before understanding any Moodle-specific duties.

VLE Job Functions

A quick search through recruitment agencies specializing in the educational sector reveal a growing number of dedicated job titles that are closely related to VLE administration. A few examples are:

- VLE Administrator (or LMS Administrator or MLE Administrator)
- VLE Support Officer
- VLE Architect
- VLE Engineer
- VLE Coordinator

The list does not include functions that regularly act in an administrative capacity such as IT support. It also does not include roles that are situated in the pedagogical field, but often take on the work of a VLE administrator such as learning technologists or e-learning coordinators.

A VLE administrator usually works very closely with the staff who have responsibility for the administration of IT systems, databases and networks. It has proven beneficial to have some basic skills in these areas. Additionally, links are likely in larger organizations where content management systems, student information management systems, and other related infrastructure is present.

Given this growing number of VLE administration-related roles, let us look at some key obligations of the job function and what skills are essential and desirable.

Introduction

Obligations and Skill Sets of a VLE Administrator

The responsibilities of the VLE administrator differ from organization to organization. However, there are some obligations that are common across installations and setups:

- User management (learners, teachers, and others)
- Course management (prospectus mapping)
- Module management (functionality provided to users)
- Look and feel of the VLE (sometimes carried out by a web designer)
- Year-end maintenance (if applicable)
- Beginning-of-year setup (if applicable)
- Support teaching staff and learners

In addition to these VLE-specific features, you are required to make sure that the virtual learning environment is secure, stable, and performs well. Backups have to be in place, monitoring has to be set up, reports about usage have to be produced, and regular system maintenance has to be carried out.

If you host your own system, you will be responsible for all of the listed tasks and many more. If your VLE is hosted in a managed environment, some of the tasks closer to system level will be carried out by the hosting provider. So it is important that they have a good understanding of Moodle. Either way, you will be the first person to be contacted by staff and learners if anything goes wrong, if they require new functionality, or if some administrative task has to be carried out.

While a range of e-learning related activities are now taught as part of some academic and vocational qualifications (for instance, instructional design or e-moderation), VLE administration per se is not. Most VLE administrators have a technical background and often have some system or database administration knowledge. Again, it entirely depends on whether you host your VLE locally or it is hosted externally. The administration skills of a remotely hosted system can be learned by anybody with some technical knowledge. However, for an internally hosted system you will require good working knowledge of the operating system on which the VLE is installed, the underlying database that is used, the network in which the VLE has to operate, and any further components that have to work with the learning system.

Moodle administration essentially covers all the aspects mentioned in previous sections. But since Moodle is very open, flexible, and modular, it provides some additional layers of functionality that other systems lack. These extra options sometimes require further tasks to be carried out. Some examples are:

- Integration with other systems holding information about your learners and course participation (for example via LDAP).
- Installation of third-party add-ons: There are well over 350 non-core modules that can be installed and which will then have to be looked after.
- Networking: Moodle provides a unique feature to network Moodle systems across the Internet.
- Integration with ever more popular e-portfolio systems, for instance Mahara.
- Moodle can be skinned via themes. To create themes you need to have good HTML and CSS knowledge.

It is not necessary to have any programming skills to administer Moodle. However, if you wish to change any of the functionalities of VLE, it is necessary that you know PHP, the programming language in which Moodle has been developed. It is further recommended to be familiar with HTML and CSS. However, we won't cover any programming aspects of Moodle in this book.

Along with the tasks that have been mentioned in this introduction, some more will also be covered in great detail in this book.

Summary

Moodle is a VLE that is innovative and flexible. It is able to cater to the needs of modern online learners. In this chapter we have provided a brief overview of Moodle per se as well as its development and business model, before describing the sectors in which Moodle is employed and the types of users that are using it.

Administering Moodle is not a straightforward task, which is why more and more organizations have dedicated resources to manage their learning environment. The first task of a Moodle administrator is to install the software, which we will go through step-by-step in the next chapter.

2 Moodle Installation

Now that you have gathered some background knowledge about Moodle, let's get started by installing the virtual learning environment. After providing an overview that describes what setup is most suitable, software as well as hardware requirements are outlined. We will then cover the following installations:

- Installation of Moodle in a LAMP / Unix environment
- Installation of Moodle in a Windows environment
- Installation of Moodle in a Mac OS X environment
- Upgrading Moodle manually and via CVS

You will only need to study the section(s) of the operating system(s) you are planning to use. As mentioned in the Introduction, Moodle can be scaled from a single instructor to an entire institution. We will only be able to cover the most popular installations and present solutions to some common problems. We also have to assume that you are familiar with the basic system administration of the operating system on which you will be installing Moodle.

Moodle Installation: An Overview

Before we start installing Moodle, you have to decide which setup is right for your organization. Once you have come to a conclusion, there are a number of prerequisites that you have to provide before we can get started.

What is the Best Setup for Me?

There are quite a few different environments in which you can set up Moodle. The three main criteria that should dictate the choice of the correct setup are:

• Flexibility

If you want to have full control over your system, be able to tweak system settings, and make frequent changes to the setup, you are best hosting your own server. However, if your preferred choice is to administer only your system while somebody else is looking after the operating system, the web server, and backups, you are better off with a professionally hosted setup.

• Scalability

This is entirely driven by the number of concurrent users, that is, the number of learners and teachers logged in to Moodle at the same time. A Moodle on a USB memory stick or on a single processor desktop computer will not be able to cope with hundreds of simultaneously logged-in users. A load-balanced cluster, on the other hand, would be overkill for a small institution with a handful of learners. The following table provides some indicative setups for different types of educational organizations and is by no means complete:

Organization	Likely Setup			
Single Instructor	Desktop, laptop, memory stick			
Small school	Shared server			
Large school	Dedicated server			
Medium to large college	Dedicated application and database servers			
University	Load-balanced cluster			

Organizations require a server (either dedicated or shared) that is either hosted in-house or externally. If you decide to go down the hosted route, it is highly recommended to avoid a "cheap hosting" package as its systems are not optimized for Moodle usage. It will have a significant impact on the performance of the system, especially with an increasing number of users.

Cost

Budgetary constraints will certainly play an important role in your setup. Unless you already have the appropriate infrastructure in place, it is likely to be more cost-effective to host your Moodle system externally. It saves you from purchasing servers and providing a 24x7 data connection that caters to your learners' needs. Licensing cost is significantly higher if you use commercial operating systems, web servers, and database systems; but your organization's IT policy might not allow the usage of Linux.

In addition to these three key criteria that usually influence the decision of the underlying infrastructure, there are other factors that will have an impact on your decision such as in-house expertise, compatibility with other systems, and existing resources.

We will cover the three most popular operating systems for hosting Moodle, that is, Linux, Windows, and Mac OS. For other setups such as on a memory stick or a larger multi-server cluster, please consult your local Moodle Partner (http://www.moodle.com). Some hosting companies offer quick one-click installations (often via the Fantastico installer, which usually doesn't contain the latest version). While the resulting Moodle system is sufficient for experimental sites, it is certainly unsuitable for production environments.

Moodle Prerequisites

There are a number of hardware and software requirements that have to be satisfied before we can start installing Moodle.

Hardware Requirements

These requirements apply if you host Moodle on your own, and if it is hosted on an external server (shared, virtual, dedicated, or clustered). Especially on cheaper hosting packages, the hardware requirements are often insufficient to run Moodle efficiently.

• Disk space

Moodle takes up between 150 to 200MB disk space. However, this only provides you with an empty system and does not take into account the space you require for any learning resources. The faster the disks, the better the performance. RAIDed disks are recommended, but are not essential on smaller installations.

• Memory

The minimum requirement is 256MB for a single-user instance, but more is necessary in a concurrent user setup. A good estimate is to have 1GB of RAM for each 50 concurrent users. You have to double this rule of thumb on Windows-based systems due to the higher overhead of the operating system.

The more the RAM the better, the faster the RAM the better!

Network

While Moodle can run on a standalone machine, its full potential is in a networked environment. A fast network card is essential, as is good upload and download speed, if the VLE is accessed over the Internet.

Moodle Installation

Software Requirements

For Moodle 1.9, you must have the following components up and running on your server:

• Database

Moodle supports a number of database systems including MySQL (version 4.1.6 or later), PostgreSQL (version 7.4 or later), Microsoft SQL Server (version 2005 or later), and Oracle (version 8 or later).

Web server

Apache is the preferred web server option, but Moodle works well with any other web server that supports PHP such as Microsoft Internet Information Server.

• PHP

PHP 4.30 is required to run Moodle 1.9. But it is advisable to use PHP 5.24 or higher, which will be necessary in the forthcoming version 2.0 of Moodle. Also, some experimental features already in Moodle 1.9 such as global search will not work with PHP 4. There are a number of PHP settings that you might have to change in the php.ini or the .htaccess file (see http://docs.moodle.org/en/Installing_Moodle for more details).

• PHP extensions

Moodle makes use of a number of PHP extensions, most of which are compiled into PHP by default.

- ° Compulsory extensions: ctype, FreeType 2, and GD library
- Recommended extensions: curl, iconv, mbstring, tokenizer, and zlib
- Conditional extensions: mysql, pgsql, odbc (depending on database), ldap, and so on (depending on authentication mechanism used), openssl and xmlrpc (for networking).

Depending on your specific setup, additional software and hardware might be required. It is assumed that the database, web server, PHP, and its extensions have been installed correctly. Once this is the case, we are ready to go.

Installation in a LAMP Environment

Moodle is developed in Linux using Apache, MySQL, and PHP (also known as the LAMP platform). If you have a choice, this is the preferred environment to be used.

Downloading Moodle

Go to http://download.moodle.org to download Moodle. As you can see, there are quite a number of distributions to choose from:

	Generic	Packages	Windows Packages	Mac OS X Packages	Modules and Plugins	Language Packs			
Moodle is Free, Open Source software (read our GPL licence). Choose from the following official Moodle packages to install Moodle on your own server. Other ways to get Moodle include downloading Moodle via CVS and via a third-party integrated distribution such as Debian or Cpanel. Please help us promote education and develop Moodle further by donating to the Moodle project or by choosing one of the many Moodle Partners for added services such as hosting or consulting.									
Standard Moodle Distribution Version / Date Information .tgz .zip CVS tag Date Information format									
Latest Stable Build	Moodle 1.9.1+ MOODLE_19_WEEKLY	Built Weekly	BEST CHOICE FOR A NE bug fixes since the last week, we conduct a wee may have caused (regre detailed changes in the can!) in the Moodle Tra Last build: 2 days 11 ho	W SERVER! The 1.9 sta release (but not new fe ekly code review of each essions). Here is the list CHANGES file). Please I cker. purs ago.	ble branch is continually atures). Just before this new fix to help us find a of all bugs fixed SINCE thelp us by reporting bugs	eeing improved with new package is created each ny new problems they ne 1.9 release (with (and solutions if you	Download 11.2MB 258 today	Download 13.5MB 784 today	
Latest Official Release	Moodle 1.9.1	15th May 2008	Our latest release with those who want a partic DEFINITELY better for a features but some very sites upgrade to 1.9.1 o in some areas. See the upgrading to Moodle 1.1	an official number on it. cular labelled version (wi n new server. The Mood large performance impr or later as soon as pract release notes for full de 9.	This release is only a "rr th known bugs!). The we a 1.9 series not only has ovements over Moodle 1. ical, especially if you are tails, and also see these	eference version" for ekly release above is lots of requested new 8. We recommend all seeing poor performance helpful notes on	Download 11.2MB 71 today	Download 13.5MB 180 today	

For the current version of Moodle, there are two releases: the latest stable build and the latest official release. The **latest stable version** is created weekly (every Wednesday) and is the best choice for a new server. The **latest official release** contains the stable build as well as new fixes, but the version will not have gone through the weekly code review and might contain unresolved issues.

Versions that are older than the current one are maintained by the Moodle development team, and bug fixes are back-ported. Sometimes newly added functionality is back-ported. Currently, the oldest supported version is 1.6, but this will certainly change in the future. For older versions, a stable build and the last release are made available.

Moodle (that is http://download.moodle.org) also offers you to download beta releases of the software (if available) and also the latest development release. These should only be downloaded for testing or development purposes, and never used in production environments.