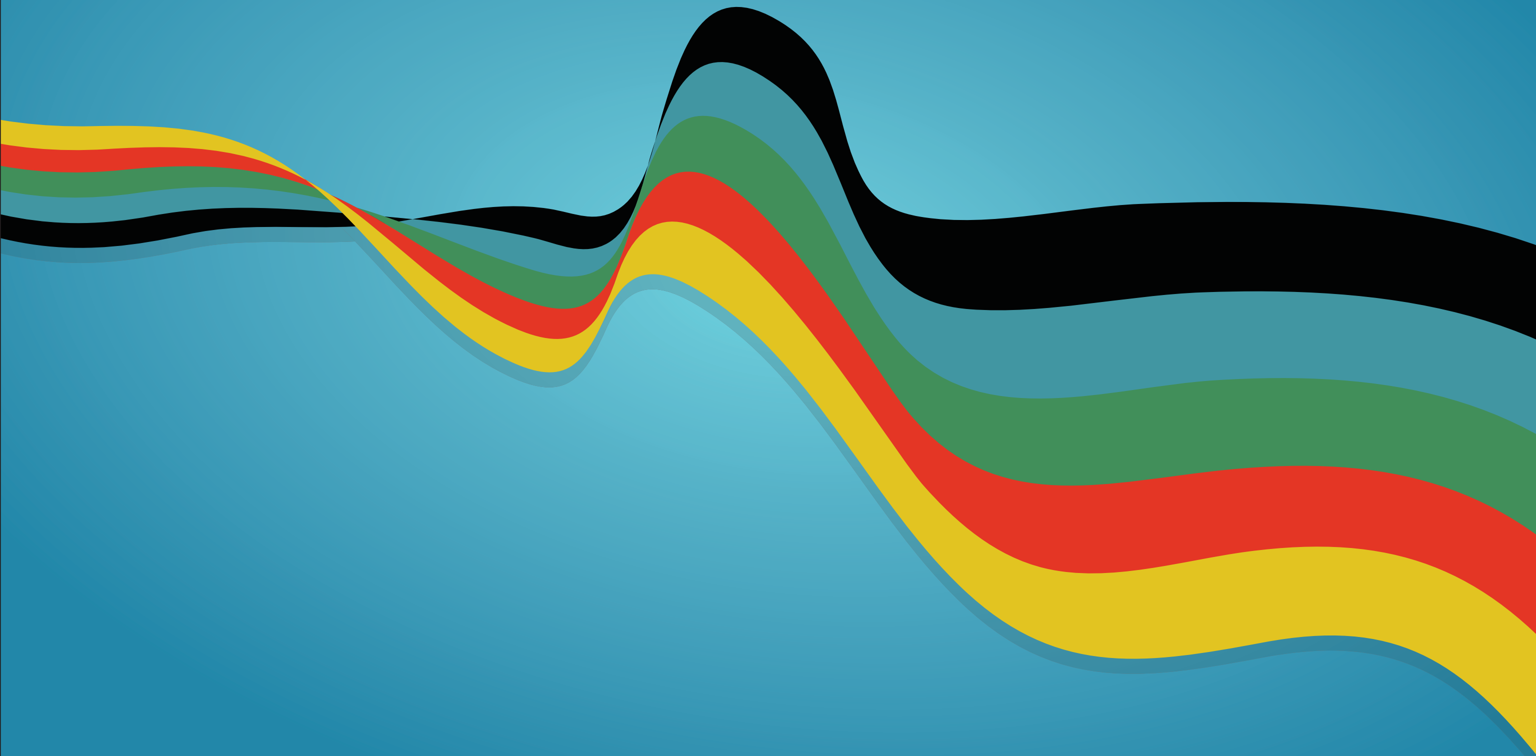
MODX: The Official Guide

Building dynamic websites with the
MODX content management platform.



Bob Ray

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MODX: The Official Guide

"No components should EVER alter core tables or files. That's all I'm gonna say on that one."
Jason Coward (OpenGeek) March 28, 2010

"The mantra we must remember in Open Source is that you get what you give."
Shaun McCormick (splittingred) July 21, 2010

"Unequivocably, there's no way anyone can now claim the documentation for MODX isn't up to snuff."
Ryan Thrash (rthrash) August 3, 2011

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Publisher: MODX Press
Editor: Haven Stephens
Technical Editor: Shaun McCormick
Cover Design: äkta
Interior Design: Ryan Thrash
Production Coordinator: Michael Hickey
Indexer: Bob Ray

ISBN: 978-0-9836194-0-6

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Dallas, TX 75205-2789
http://modx.com/press/

42 11 04 10 9 8 7 6 5 3 2 1

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Acknowledgments

Countless people have been invaluable in the production of this book. First and foremost, I owe a debt of gratitude to the founders and core developers of MODX: Ryan Thrash (rthrash), Jason Coward (OpenGeek), and Shaun McCormick (splittingred). They have developed a first-class Open Source CMS, and this book would not have been possible without their support and patience. Shaun served as the book's technical editor and deserves special credit for ensuring its accuracy. Haven Stephens, the book's editor, played a critical role in eliminating countless errors and making sure that the explanations in the book were as clear as possible.

I would also like to thank the many users of the MODX Forums, both those whose answers have taught me almost everything I know about MODX and those whose questions led to the creation of this book. In particular, I'd like to thank the following people (MODX Forum usernames in parentheses):

Susan Ottwell (sottwell), Jelle Jager (TobyL), (ganeshXL), David Molliere (davidm), (kongondo), (doze), (ZAP), Zaigham Rana (Zi), Andreas Wettainen (mrhaw), Jay Gilmore (smashingred), Shane Sponagle (dev_cw), (coroico), Kyle Jaebker (kylej), Garry Nutting (garryn), Jeff Whitfield (Bravado), (Everett), (flinx), Mike Reid (pixelchutes), Jared Carlow (jaredc), (Dr. Scotty Delicious), (Carsten), Steve Hamblett (shamblett), (NetProphET), Adam Crownoble (aNoble), (netnoise), (sirlancelot), Aaron Wardle (Onesmarthost), (Photowebmax), Erik Bjorn (Sylvaticus), (snop), (护ademyday), Keith Penton (kp52), (charliez), (bob1000), (Chuck), (therebechips), Dimitri Hilverda (Dimmy), (Soshite), Adrian Lawley (Taff), (sinbad), Bruno Perner (Bruno17), (Breezer), (mmjaeger), (AMDbuilder), (sharkbait), (chinesedream) (cipa), (ChuckTrukk), (Paprikas), David Bunker (bunk58), (samba), (paulp), (Byzantium), (SandersDesign), (virtualgadjo), James Ehly (devtrench), Mark Hamstra (Mark H.), (treigh), (hotdiggity), (ottogal), (anso), (pleth), (lossendae), (mconsidine), (Jul), (xdom), Luca Reghellin, (microcipcip), (Pandy06269), Helen Warner (Muggins), Ivan Salcedo (odeclass), Stefan Moser (stefan), Rob Backus (robb), John Hughes, Zuriel Andrusyshyn (zurie).

My apologies to the many others whose names I've omitted either from lack of space or memory lapse.

I'd also like to thank my cat, Cosmo, who spent many hours each day for over two years curled up next to me as I worked on the book at my computer. His comments on the book were invaluable.

Disclaimer of Warranty (Legal Mumbo Jumbo)

All of the information, instructions, and recommendations in this book are provided on a strictly "as is" basis without any warranty, expressed or implied. In particular, any and all warranties of fitness for use or merchantability are disclaimed. Neither MODX nor Bob Ray personally shall be held responsible for any direct, indirect, incidental, or consequential damages that may result from the use of material in this book or anything any reader does as a result of reading any part of the book or any associated web site. It is up to the reader to determine the suitability of any directions or information presented in the book. Furthermore, it is the responsibility of the reader to determine if any information, instructions, or recommendations given in the book are appropriate based upon his or her particular situation. The author and publisher cannot be held accountable for decisions made based upon material in the book.

MODX is an advanced Open Source Content Management System (CMS). If you are not familiar with the term CMS, think of a word processor for web sites, but on steroids. A CMS will usually provide you with a graphical view of your web site, a database that stores the site's content, and one or more editors for creating web pages and populating them with links, lists, headings, and formatted text.

Every CMS tries to provide a convenient and powerful user interface for creating and maintaining web sites, but to some extent, convenience and power are in opposition to one another. Some CMS platforms, like WordPress, put convenience above power. If you want a standard blog with a ready-made look and feel, WordPress provides a surprisingly friendly and intuitive user interface for creating and maintaining one.

MODX, on the other hand, leans more toward the power side of the equation. The learning curve is a little steeper, but MODX allows you much more freedom in the design of your web site, more powerful tools you can use to make the web site unique, and the ability to customize the CMS itself.

MODX is also a powerful Content Management Framework (CMF). This means that the building blocks of MODX can actually be used to create any number of different CMS platforms. We will cover customizing the MODX user interface in later chapters. For the most part, however, the use of MODX as a CMF is beyond the scope of this book, which is mainly about MODX the CMS.

One guiding principle of MODX is to put as few restrictions on the web developer as possible. MODX puts no limits on the CSS and HTML code you use to build your site, and you can easily add PHP or JavaScript code to meet any need. One illustration of this flexibility is that you can take virtually any existing web site and make a MODX web site out of it that looks exactly the same to a front-end visitor. Trying that with many other CMS platforms will leave you cursing and tearing your hair out.

By the time you've finished reading this book, you should be able to use MODX to create new web sites or to port existing web sites to MODX. It was my goal in writing this book to provide all the information you need to use the basic building blocks of MODX to meet your needs as a web designer/developer.

About This Book

Before we dive into MODX, we need to discuss a few things about this book. In the following sections, we'll look at who the book is for, how it is organized, and how the typography of the book can help you understand what you're looking at.

Audience

This book is for anyone who wants to use MODX for web site design, development, and maintenance. In order to get the most out of this book, you should have a basic familiarity with (X)HTML, CSS, and how the two interact in the rendering of web pages.

You will also see some PHP code in the book. You can do a lot with MODX without knowing PHP, but to get the most out of MODX, you really should have at least some knowledge of PHP. If you don't, never fear. PHP is a relatively easy computer language, and the PHP Primer in this book's Appendix will help you get started.

There are many excellent PHP tutorials on the Web, and lots of expert MODX users knew no PHP when they started out. Often, they created a web site with no PHP, and then learned PHP, a little bit at a time, as they began to make their web site more and more interesting and easier to maintain.

This book is perfectly suitable for MODX beginners but contains plenty of in-depth information for power users as well. If you are brand new to MODX, some parts of the book may go over your head the first time you read them. Over time, however, you will grow more familiar with how MODX works, and they will gradually begin to make sense to you.

At first, I tried to put material for beginners at the beginning of the book and save the more advanced information for later. Because of the way MODX works, however, it just wasn't possible. As a result, you'll see things that may confuse you on the first pass. You should be able to ignore them and create a perfectly good web site using the things you do understand. Later, as things make more sense to you, you'll be able to refine your site to take advantage of MODX's more advanced features. The book is also meant to serve as a reference manual for both beginners and experts.

Organization of The Book

Generally, the book is organized on the basis of MODX objects, such as resources, chunks, snippets, plugins, placeholders, etc. If you are new to MODX, you won't be familiar with these at first. After reading Chapter 1, however, you should have a fair idea of what they are and how they work together. Later in the book, we'll look at each MODX object in depth. Because the objects constantly interact with each other, you'll be learning about them all bit-by-bit as we go along.

Conventions

A number of typographical conventions are used throughout the book to make it easier to understand what you're looking at. There are two main typefaces for content in the book: The regular font (used for this sentence) and the code font. The code font looks like this when it appears in a regular font paragraph: `This is the inline code font`. When it appears in a separate paragraph, it looks like this:

```
This is the code snippet font.
```

The code font is used for all (X)HTML, CSS, and JavaScript code and for all MODX tags and their contents. It is also used for file and directory names and for path names and for text to be entered in a field in the MODX Manager.

MODX internal variables such as system event names, settings, and resource/template variable field names will also be in the code font, but to make them distinguishable, they will be in boldface type wherever they appear:

> **`OnManagerFormSave`**, **`site_start`**, **`pagetitle`**.

Key terms will generally be in the regular font in italics when they first appear. Terms referring to MODX objects (snippets, template variables, chunks, plugins, categories, placeholders, etc.) will be in lowercase when they appear in text except at the beginning of a sentence.

Names of resources or elements that you will be creating and editing yourself, will be in italics in the code font when they first appear, then in the regular font in roman type, usually in CamelCase:

> Create a chunk called *`FooterChunk`*. The FooterChunk will contain code for the page footer.

Terms referring to specific areas of the MODX Manager or to form fields in the Manager will generally be in initial caps and in the regular font:

> Create/Edit Resource panel, Long Title, Alias, Package Manager

Shorthand references to Manager commands that use menus for navigation will be in bold and have arrows between them:

> Go to **Tools → Package Management**

Longer descriptions of Manager actions in the text will use initial caps and quotation marks around buttons and menu choices that you are meant to select:

> Select "System" on the Top Menu, then click on "Package Management."

Field names and tab names used in the MODX Manager will be in initial caps when referring to the specific area of the Manager, but in lowercase when discussing them as general objects. They will be enclosed in quotation marks when they are included in directions to click or select them, but used without the quotation marks in general discussion:

> Click on the "Elements" tab.
>
> Chunks are listed on the Elements tab.
>
> Chunks are classified as elements.

The names of specific resources and elements will generally be in CamelCase in the text. They will usually be in the code font and italics when they first appear (especially in directions to create them):

> Create a resource called *`News`*.
>
> Let's create our *`ShowList`* snippet.

Later references to them will be in the regular font in CamelCase:

> The FooterChunk contains all the elements shown in the footer of the page.

They will be enclosed in quotation marks in instructions to click or select them in the Manager:

> Click on the "ShowList" snippet on the "Elements" tab.

Variable names (including snippet properties) will generally start with a lowercase letter and have the first letter of each following word capitalized. They will be in the code font: `$wordLength`, `$fontColor`, `$textHeight`, though there are some exceptions to this rule. Property names, MODX settings, and placeholder names, for example, are often in all lowercase with an underscore character between words: **`site_start`**, **`blocked_until`**. MODX system event names are in CamelCase and begin with a capital letter. All start with "**`On`**": **`OnManagerFormSave`**. Resource field names are in all lowercase, and a few have underscores while most don't: **`pagetitle`**, **`longtitle`**, **`pub_date`**, **`unpub_date`**.

As mentioned earlier, MODX settings and system event names will be in the code font in bold. For resource field names, the caption used in the Manager will be in initial caps in the regular font (e.g., Page Title, Publish Date). The actual field names used internally by MODX (and by users in tags and snippets) will be in the code font and bold (e.g., **`pagetitle`**, **`pub_date`**).

When a MODX tag or example contains a name that the user will supply, the term will be in italics:

```
[[SnippetName? &property1=`value1` &property2=`value2`]]
```

In the above example, the user is expected to replace all the words in italics. This is important because new users sometimes type in the example exactly as it is written and are surprised when it doesn't work.

I've tried to be as faithful to these conventions as possible, but this is a long book with many complicated references. I hope the reader will forgive the inevitable errors in typography.

Because the page width of this book is limited, some lines of PHP and HTML code that should be on a single line are broken into two or more lines. I tried to break them in a way that doesn't harm the user's understanding of what the code does, but it wasn't always possible. The extra lines of code created will always be indented.

The only time the lines must be combined is for Input Option Values of template variables. Here's an example:

```
Red==Red as a rose||Blue==Blue as the sky||
    Green==Green as the grass
```

The lines above must be entered as a single line, but MODX won't let you use a carriage return for Input Option Values anyway, so the need to combine them should be obvious.

In all other cases that I'm aware of, the code can be entered as written and no harm will be done — the PHP and HTML parsers are very forgiving about formatting — but you should feel free to combine the split lines to fit your coding style. Generally, the only negative effect of the split lines will be on the formatting of some raw HTML code you'll see if you select "View Source" in your browser.

About MODX

In the following sections, we'll look at whether MODX is a good choice for you, learn a little bit about the history of MODX, and discuss the various versions of MODX. We'll also take a look at the architecture and key features of MODX.

Is MODX for you?

MODX is designed to be useful to everyone from beginning web designers to advanced Content Management System developers, but it is somewhat difficult for the former. If you are looking for a system that will do everything you want out-of-the-box and let you produce a finished web site without getting your hands dirty, MODX is probably not for you. For a standard blog, for example, WordPress might be a better choice. You install it, select a theme (or use the default one), and begin entering your posts.

Where MODX shines is in cases where you want a unique web site with active pages that you design yourself. Its flexibility and power are unequalled in the CMS world. If you can describe what you want your web site to do, the odds are good that you can do it in MODX.

My first MODX web site, for example, was a site I designed for a local political organization. The site had the usual pages: a page describing the organization's officers, a volunteer page, a page for the local elected officials with links to their web sites, a page containing the organization's bylaws, a page where users could download issues of the organization's newsletter, etc. The site also had a front page with excerpts from news posts, each with a link to the full post.

Next, I added a series of photo galleries for various events and put a random photo from one of the galleries under the menu on the front page that served as a link to the photo's gallery. Then came a fundraising thermometer that showed the current level of contributions.

I set up one user as the photo editor who could easily create new galleries and upload photos in the front end. I set up a news editor who could write new articles that would automatically show up in the news section and be excerpted on the front page. I set up a newsletter editor who could upload new newsletters in .PDF format. Each editor had access to only his or her own section of the site.

I learned MODX, created the site, and wrote simple instructions for each user in a surprisingly short time — less than a week. The site has been rock-solid ever since with almost no intervention on my part.

On one of my next MODX sites, the client wanted a page with seasonal photos and a discount coupon that changed automatically four times a year, with the seasons. I was able to add this in MODX using a simple custom snippet in about an hour. Doing this on most other CMS platforms would have taken much, much longer and would have been extremely frustrating.

In order to use MODX at all, you'll need some basic familiarity with CSS and (X)HTML. It's best if you have created a few web sites before diving into MODX. You don't need to know PHP to use MODX, but it definitely helps. Many MODX users end up learning PHP a little bit at a time as they attempt to get the most out of the CMS.

If you don't know any PHP at all, don't be put off by the examples of PHP code in the book. They are there for advanced users, and you can still do quite a lot with MODX without knowing PHP. The odds are that you will pick it up as you develop your MODX skills and can then go back and read over any sections that confused you at first. There is a PHP Primer in the Appendix at the end of the book that will help get you started.

A Brief History of MODX

In 2004, Ryan Thrash and Raymond Irving started working on what was later to become MODX. The initial MODX project was a combination of the DocVars add-on for the Etomite CMS and Raymond's web-user add-on. There was resistance to the MODX project at Etomite, and the two eventually left that community to work on MODX as a separate CMS.

MODX 0.9.0 began as a fork of Etomite but has developed into an independent CMS platform, and as of the release of MODX 2.0 Revolution, all references to Etomite are gone from the MODX code.

In May of 2005, Jason Coward joined the project, and in 2007, Raymond Irving left (amicably). Jason became the principle architect of the MODX core code. In 2008, Shaun McCormick joined the project and is now primarily responsible for the MODX Manager interface. MODX has an extremely creative and responsive user community, and countless MODX users have contributed to the development process over the last few years.

In 2009, MODX Version 0.9.6 was supplanted by two new versions. The 0.9.6 designation was misleading — by that time, MODX was a very robust and mature product. As of this writing, MODX exists in two forms: MODX 1.x.x Evolution and MODX 2.x.x Revolution.

Versions of MODX

In 2009, both MODX 1.0.0 Evolution and MODX 2.0.0 Revolution were released. If you visit the MODX Forums, you may see them referred to as "Evo" and "Revo" for short.

There are many similarities between the two, especially from the point of view of the user. Under the hood, the two are quite different. We'll look at some of the similarities and differences in the following sections. For now, we'll say that the main components of MODX discussed in this book (chunks, snippets, templates, template variables, plugins, resources, settings, and tags) exist in both versions and play the same role in each.

The MODX Manager user interface has been redesigned for MODX Revolution but is similar enough that most users have little or no trouble making the transition from one to the other.

This book is written primarily from the perspective of MODX Revolution since that is the future of MODX. That said, most of the content in the book will apply equally well to either version, and there is a section at the end of each chapter describing how the content of that chapter applies in MODX Evolution.

MODX Evolution

MODX 1.0.0 Evolution is a mature, stable release of the original MODX codebase with a set of standard add-ons for things like menus, photo galleries, user management, and content aggregation. It provides a fairly seamless upgrade for all legacy MODX sites.

The version numbers of earlier versions of MODX (e.g., 0.9.2, 0.9.6) are somewhat misleading. The version numbers imply that they were beta versions. In fact, they were (and still are) very mature and used in thousands of production web sites.

MODX Evolution has been around longer, and as of this writing, is more familiar to most MODX users than Revolution and has more available add-ons. Evolution also has a smaller footprint and takes somewhat less memory to install and use. Revolution, however, is more robust and more secure. Revolution is a significant technical advance compared to Evolution and represents the future of MODX.

MODX Revolution

MODX 2.0.0 Revolution (which appeared briefly as version 0.9.7) is a complete re-write of the MODX core code and Manager with a new tag syntax and many revolutionary features (hence the name). The Manager is somewhat easier to navigate and has a number of extremely convenient features like drag-and-drop editing and the ability to create new elements and resources and clear the cache in pop-up windows without leaving your current work. Revolution also introduces convenient grids for editing language strings, system settings, and snippet properties.

By far the most "revolutionary" feature in Revolution from the average user's perspective is the Package Management system. In Revolution, add-ons can be downloaded from the

MODX repository and installed with a few clicks in the Package Manager. In Evolution, you have to download a .ZIP file for each add-on, unzip it, and cut and paste code into MODX elements and resources you create yourself — a much more time-consuming and error-prone process.

There is also much for the developer/web programmer to love in MODX Revolution. There is a completely new database API based on xPDO, which provides an efficient and easy-to-use way to read, create, and update all MODX objects. It also allows you to easily pull data from multiple MODX tables (with one query) in a single, elegant line of code.

Which Version Should I Use?

If you are upgrading an existing site that you don't work on very often, MODX Evolution may be a better choice for you. Evolution is also a better choice if you need to install and run your web site with limited memory. As I write this, Revolution needs at least 32M of memory to install (although there are plans to remedy this), so if your web host restricts you to 8M or 16M of memory and you are not allowed to change that, Evolution is the better choice. Most web hosts have higher limits, and many allow you to modify the amount of available memory.

Many of the concepts described in this book are relevant for either version. If you will be working through the examples in the book, however, MODX Revolution is really your only choice. All of the tags and much of the code presented in the book's examples will only work as written in MODX Revolution.

In other situations, the key to making the choice is the available add-ons. At this writing, some of the add-ons available for MODX Evolution have not been ported to Revolution — though most of the important ones have. By the time you read this, there will certainly be more of them available in Revolution, but some less-popular third-party components may still not be available. Many of the standard MODX snippets and plugins have been replaced by faster and better versions for Revolution, and some have also been integrated into the MODX Manager. You should assess your needs and examine the available components (ask in the MODX Forums, if necessary) before making your decision.

Another consideration is the permissions system. MODX Revolution offers much more sophisticated and find-grained control over what users can do and see in the MODX Manager. The price of that control, however, is a steeper learning curve. Once the permissions for Revolution are set correctly, you can usually forget about them, but the initial process can be somewhat frustrating and time-consuming. If you will be the only user of the site, Revolution's default settings will be fine for you. If you have several users with different access rights and the permission system is relatively simple, Evolution may be a better choice. If you need to have users who will belong to more than one user groups and want them to have different capabilities for each group's documents, then Revolution is the better choice.

Assuming that the add-ons you need are available in Revolution (or you are capable of developing or adapting them yourself) and the Revolution permission system meets your needs, I would recommend it for everyone, including beginning MODX users. Revolution is a robust CMS platform and has many features that make it a superior choice.

Architecture and Key Features

The overriding principle in the design of MODX is freedom for the user. To the best of the designers' abilities, MODX puts no restrictions on what you can put in your web site. MODX users are free to use any (X)HTML, CSS, PHP, or JavaScript code to meet their needs.

You could port most existing web sites to MODX simply by pasting the code from each page into a MODX template, moving any PHP code into snippets, and creating an empty document for each page that uses that page's template. Doing this would be a horrible misuse of MODX's power, but the fact that it's possible shows how few restrictions MODX places on the user.

If you are not a power user/developer, you probably won't care what's under the hood in MODX. For those who do care, here is some information about the structure and design of MODX. Don't be put off if some of the following material goes over your head. You can create very impressive MODX web sites without knowing any of it.

xPDO

MODX's data handling is based on xPDO. Created by MODX core developer Jason Coward, xPDO is a PHP-based object-relational bridge that is designed to provide object-oriented access to a variety of underlying database platforms such as MySQL, SQLite, and PostgreSQL.

Both lightweight and robust, xPDO now requires PHP 5.1.1 or higher. It is significantly faster now that it no longer has to support PHP 4. It allows simple file-based result-set caching and custom cache implementations that can be optimized for particular needs. It also supports JSON caching for optimizing Ajax applications.

Using xPDO allows advanced MODX web site developers to easily integrate custom databases into a MODX install using built-in MODX methods. It also provides a relatively simple API that developers can use to obtain information from the MODX database.

At this writing, xPDO supports MySQL and Microsoft SQL databases, with more to follow.

User Interface

The MODX Manager is an Ajax-based user interface implemented with Smarty and ExtJS. In the Manager, users can create and edit content as well as perform a wide variety of administrative tasks like user management, publication scheduling, generating reports, installing add-on components, and adding user-created custom snippets and plugins. The MODX Manager is designed to be productive and intuitive.

In MODX Revolution, (unlike Evolution) many Manager tasks can be performed in pop-up windows, so users can create and update resources and elements and clear the MODX cache without leaving their current location in the Manager. Drag-and-drop functionality also increases productivity and reduces potential errors in the Manager.

Because the Manager is a web-based application, users can manage their MODX site from anywhere they have web access using no tools other than a web browser. MODX supports a wide variety of web browsers.

The Manager can be easily customized, and it can look very different for different users. Users can be restricted to certain areas of the Manager, and the areas they see can be customized for their particular needs and abilities. Multiple editors can be easily plugged into the Manager for use in creating and editing content as well as for managing various kinds of code.

Design Philosophy

MODX is designed around several basic principles. These include security, robustness, speed and efficiency, object-oriented design, core independence, and fine-grained cache control and user management.

Security

MODX is designed to be as secure as possible. All user input is analyzed for potential hazards, and no PHP code is allowed or executed in most MODX resources and elements. PHP code can only appear in snippets and plugins, and its execution is carefully regulated. All PHP code in the system can be contained in the database or in the MODX core, which can be shielded from web access. The user security system is also extremely tight and prevents unauthorized users from accessing sensitive areas of the Manager.

Robustness

MODX is designed from the core outward to be solid and fault-tolerant. Changes are evaluated and tested to ensure that they cause no problems in the operation of the system. MODX sites are generally rock-solid with virtually no downtime due to errors in MODX.

Speed and Efficiency

The developers of MODX are constantly profiling and refactoring MODX objects and their methods to make MODX as fast and efficient as possible. The caching process ensures that frequently accessed content and code are cached for maximum performance.

MODX is also designed to be a lightweight platform. Users install only the components they need for a particular site, and components are designed to be flexible and powerful enough that users can meet their needs with a small number of add-on components.

Object-oriented Design

MODX Revolution is object-oriented from the ground up. Every MODX object is a true PHP object, and all use of objects is through their properties and methods. Chunks, snippets, templates, and template variables, for example, are all subclasses of the `modElement` class. The MODX parser makes full use of the object methods available through the basic class. This makes the MODX core both efficient and easily extendable.

MODX also makes it easy to adhere to the principles of the model-view-controller (MVC) design philosophy by facilitating the separation of content, logic, and presentation.

Core Independence

Another principle is the complete separation of the MODX core from the content of the site. The core can be located in a directory that is not accessible from the Web for security. One MODX core can also support more than one web site.

Central to the separation of the core is a wide variety of built-in ways to extend and tap into the core processes. There is a well-developed API for accessing core methods and a comprehensive list of system events that fire at various points in the operation of the core.

Users can create PHP snippets that use the API to get information from the core and the database. They can also create PHP plugins that listen for the appropriate system event and step in to alter the processing at that point. The main purpose of these capabilities is to give the user the ability to do anything he or she can think of in MODX without touching the core code. When users upgrade to a new version of MODX, none of their custom work has to be done over again. Advanced developers can even create a custom parser class to override or extend the behavior of the MODX parser. Custom elements and resources are also a possibility for users with particular needs.

Fine-grained Cache Control

Another key principle is granular control of the MODX cache. Parts of the core are cached as needed, and various parts of each front-end page can easily be designated as cached or uncached by the user. In MODX Revolution, any element or resource can be designated as cached or uncached. As a result, nothing is cached but content and code that needs to be rapidly accessible. Because of MODX's xPDO base, database result-sets are also cached on an as-needed basis. In addition, there are a number of system settings that control whether certain MODX objects are cached and for how long.

Fine-Grained User Management

Like the caching process, user management is extremely granular in MODX Revolution. Since resources such as documents are in a hierarchical structure on the Resources tab, users can be limited to particular branches of the Resource tree shown on the Resources tab. In addition, individual resources can be placed in resource groups and individual elements can be placed in categories. Specific resource groups and categories can be made accessible only to members of specific user groups. Users can have designated roles that restrict them to specific actions in the Manager such as viewing, saving, editing, publishing, and unpublishing documents. Finally, the MODX Manager can be customized so that each user sees a completely different version of the Manager.

How MODX Works

Using a Content Management System (CMS) is quite a bit different from just creating web pages and linking them together to make a site. A CMS takes a while to learn (and one as flexible and powerful as MODX takes a little longer). The time you spend getting familiar with MODX, however, will pay off many times over. It will make maintaining web sites easier and faster. It will also allow you to easily create web-site features that would be extremely difficult and time-consuming to produce without a CMS backing you up.

While many CMS platforms make life easy by severely restricting what you can do (with structured templates, built-in and add-on components that are hard to modify, hard-coded entity and directory names, etc.), MODX does just the opposite. Letting users do whatever they want is a primary goal of the MODX development team. The flexibility and freedom of MODX come with a price, however. Because there are fewer rules, it's harder to know how to solve any given problem. It's also a little easier to shoot yourself in the foot.

In this chapter, we'll touch on the various parts of MODX and how they work together to let you manage web sites. In later chapters, we'll cover the mechanics of using the MODX Manager, and the details of the various parts of MODX such as web resources, content elements, and files. This chapter is just to get your feet wet, introduce these elements, and give you an overall sense of how MODX does its job.

The MODX Database

If you are coming to MODX from another ***Content Management System*** (***CMS***) such as Drupal or Joomla!, you probably already have some sense of how such systems work. If, instead, you're used to working in straight (X)HTML and CSS, you may not be aware of how a CMS like MODX stores and presents the site's content. New users of MODX sometimes install the MODX sample site then look (unsuccessfully) for the HTML page files.

The reason they don't find the HTML files is that MODX, like most other CMS platforms, stores the page content in a MySQL or Microsoft SQL database (although future versions of MODX will be able to use a variety of other database platforms and will allow you to store web resources and content elements in files rather than the database if you wish).

When a user visits one of your pages, MODX goes to the MODX database, gets the information it needs for the requested page, assembles it, and sends it off to the user's browser for display. This all happens behind the scenes. Many MODX users create sites without ever dealing with the database or the process of saving and retrieving the information. To really make MODX sing, however, you'll eventually want to learn about how some of the behind-the-scenes processes work. For now, we'll just say that you create ***web resources*** (most of which will be ***documents***) in the ***MODX Manager*** (also called the ***back end***) and save them. When a user visits a particular web page at your site, MODX retrieves the appropriate content and sends it off to the user's browser for display. A lot can happen to that content before the user sees it, but we'll get to that later. First, let's look at the differences between MODX and its add-on components and between the back end and the front end of a MODX site.

MODX vs. Third-Party Components

In MODX Revolution, there has been a very determined effort to separate ***MODX*** itself from ***components*** contributed by others that extend or add to the functionality of MODX. A number of ***third-party components*** (also called ***add-ons***, ***3PC***s, ***extras***, ***add-on components***, or just ***components***) were distributed and installed with earlier versions of MODX as a convenience to users. They added functions like custom menus, aggregated content display, text editors, photo galleries, etc. People often assumed that these were part of MODX itself, and when problems occurred, people complained about bugs in MODX. The MODX core developers would have to explain, over and over, that these were not part of MODX.

With MODX Revolution and future versions, only MODX is installed to begin with. It includes just three directories: `/core`, `/connectors`, and `/manager` (a `setup/` directory is present at first but is usually removed after a successful install). Users are also free to move and rename those three directories if they wish or even to install a different or customized manager to administer their sites.

Once you've completed the MODX base install, you can then easily add whatever third-party components meet your needs. This helps keep your MODX site from being loaded down with components you don't need. The download and install process for components is all done in the Manager, and it allows you to browse through the available components, download them, and install them with a few mouse clicks.

If you find you need more components later, new components become available, or new versions of existing components are released, it's a simple matter to browse the package repository and install them. Another advantage of this separation of the base install from third-party components is that the base install can remain "pure." It is unaffected by the installation and upgrading of components, and conversely, updating the base install to a new version of MODX is unlikely to affect any installed components.

Although the base MODX install contains no third-party components, by the time you read this, there may be additional distribution versions of MODX available that include various third-party components tailored to a specific purpose, such as a blog site, a photo gallery site, etc.

MODX Itself

The heart of MODX is in the `/core` directory (although you are free to rename and/or relocate that directory during the install, this is not recommended for new users). The `/core` directory contains the essential parts of the MODX content management engine. You could create a working web site with the tools available in the initial install, but it would have no dynamic menus, no WYSIWYG editor, no content aggregators — none of the things that really make MODX worthwhile for users. In order to gain those features, users need to add third-party components.

MODX Third-Party Components

The official term for anything added to the base MODX install is ***third-party component***. "Third-party component" is kind of a mouthful, so they are often referred to as ***3PCs***, ***extras***, or just ***components*** for short. At this writing, "components" is the more common term, but "extras" is gaining ground. Components are usually installed with a few mouse clicks in the Package Management section of the MODX Manager.

Components are divided into two groups: add-ons and core extensions. ***Add-ons*** do not modify or extend the MODX core but provide extra functionality for MODX. ***Core extensions*** (sometimes referred to as just "***extensions***") actually change or extend the MODX Core.

An extension might, for example, replace the MODX user class with a class that contains the same methods and member variables but adds some new ones (e.g., the user's astrological sign or income level). Another way to think about add-ons and extensions is that add-ons work with MODX and extensions change MODX. Most of the components you might install are add-ons. MODX is designed to make use of a wide variety of add-ons that can use a combination of ***chunks***, ***snippets***, and ***plugins*** (more on these later in this chapter) to do almost anything you want without altering MODX itself.

For most MODX users, the difference between add-ons and core extensions is not important. Users install components that meet their needs and don't really care about what goes on under the hood. For advanced MODX developers, however, the difference is an important one.

Even beginning users of MODX should know that components of all kinds are not officially part of MODX. Third-party components are contributed by volunteers of varying abilities. Some are carefully constructed and highly robust while others are less so. You should also be aware of the term "Sponsored Extras." ***Sponsored Extras*** are third-party components that have been created, edited, or reviewed by the MODX core programmers to assure that they adhere to MODX coding standards and will not interfere with the MODX core.

The Back End vs. the Front End

MODX is divided into two basic parts: the back end and the front end. The ***back end*** is another name for the MODX Manager. The ***front end*** is what visitors to your site see in their browsers.

The Back End

The ***MODX Manager*** (or ***back end***) is where you do the main work of building and managing your site. In the ***Manager***, you can create and edit content. You can also perform a whole array of administrative tasks such as creating users and controlling what those users can do and see at the site. You can create administrative users who can share the workload with you. You can also create and edit any of the various MODX objects such as resources (including documents), templates, template variables, snippets, chunks, plugins, lexicons, namespaces, categories, property sets, system settings, etc.

This list of MODX objects is often daunting for newcomers to MODX, but each of them has a useful part to play in the development of your site, and together, they'll let you do things with your site that you never thought possible. They'll also make your life as a web developer much easier and more productive (trust me). We'll cover each of them in depth, and by the time you finish the book, you should be comfortable with all the ones you need for your site.

The Front End

The ***front end*** is the part that visitors to your site see. There may be parts of your site that only logged-in users can see, but after logging in, they're still in the front end of the site. Depending on how you set things up, front-end users may still be able to add or edit site content and perform specific administrative tasks, but the key difference is that they are not in the ***MODX Manager*** — they are in the ***front end*** of the site. Because they are not in the Manager, what they can do is strictly limited (unless you create and implement code that bypasses the restrictions). This protects the security of your site. It also lets users contribute without learning the Manager interface.

If you have naïve users who need to perform administrative tasks but would be intimidated by the MODX Manager, you have two options. You can customize the MODX Manager to simplify and/or hide the intimidating parts, or you can install or create add-on components that let them perform their administrative tasks in the front end of the site.

Basic Building Blocks

The basic building blocks of a MODX site are web resources, content elements, and files. ***Web resources*** include documents, weblinks, symlinks, and static resources. ***Content elements*** include templates, template variables, chunks, snippets, and plugins. ***Files*** are just plain old files. We'll look at how to manage these things in more depth later in the book, but first, let's take a brief look now at what they are.

Web Resources

Web resources (usually referred to as just ***resources***) are the easiest to define of the MODX objects: They're simply things that can be accessed via a URL. The most commonly used resources, by far, in MODX are documents. In fact, the document is the default resource type. Many MODX users never create a symlink, weblink, or static resource, but everyone creates lots of documents. The most convenient way to create a resource is to right-click somewhere in the Resource tree (on the Resources tab at the left side of the Manager) and hover over Create. This will open a flyout with four choices:

- Create a Document Here
- Create a Weblink Here
- Create a Symlink Here
- Create a Static Resource Here

Clicking on one of the choices will open the Create/Edit Resource panel. On the right side, you'll see the Create/Edit Resource panel showing some of the various resource fields for the resource and several tabs at the top for accessing others. We'll discuss these in more detail later.

You can also create new resources by clicking on "Site" in the Top Menu and selecting the type of resource you want to create. There is also a small icon at the top of the Resource tree that will do the same thing. Doing this will create the resource at the top level of the Resource tree (under the web context icon). Usually, you'll want to put new resources at a particular place in the Resource tree, so right-clicking on the resource or folder that you want as the parent of your new resource is often a better method.

Documents

Before getting into the details of documents, let's take a moment to look at an important distinction that trips up some new MODX users: the difference between a ***document*** and a ***web page***. In MODX, a ***web page*** is what the user sees in the browser window at any given time when visiting your site. The web page is rendered by the browser, which bases the rendering on the information sent to it by MODX. That web page may involve any and all of the basic building blocks we listed above, although the visitors won't know that because all they see is the final rendering.

A ***document***, on the other hand, is a specific MODX object created in the MODX Manager. If you have used a word-processing program such as Microsoft Word, you've already created documents. Those documents had a title, some content, a creation date, an author, etc. Documents in MODX are very similar but are adapted for use in web pages. For example, they have more than one title. There is a short title (Title), a longer title often used as a page heading (Long Title), a title for use in menus (Menu Title), and a title for use in URLs that link to the document (Alias).

These characteristics of a MODX document are called "resource fields" (formerly "***document attributes***"), and they also include a Template, a Publish and/or Unpublish date, a Description, a Summary, etc. Some of these resource fields may be blank, but the document still has them.

There is another distinction we should mention. Many of the resource fields are known by two names. One is the actual name of the field in the MODX database. This is the name that must be used in code or in MODX tags (more on those later). The other is the general name for the field, usually taken from the Create/Edit Resource panel in the Manager where you actually fill in the values for the resource fields. One field, for example, is referred to on the Create/Edit Resource panel as "Summary," but it sets the **`introtext`** field in the MODX database. When we're talking about the general name for the field, we'll use the regular font and capitalize the first letter of each word in the field name (Summary, Menu Title, Long Title). When we're talking about the specific field in the database, we'll use bold type, lowercase, and a different font (**`introtext`**, **`menutitle`**, **`longtitle`**). There are no capital letters in any field name. This difference is not that important now, but will be critical when we talk about setting these fields in later chapters.

In the book, we'll often refer to documents as resources (which they are). The document is the default type of resource and the most often used, but it is not the only one — weblinks, symlinks, and static resources are also resources. So all documents are resources, but not all resources are documents.

When users visit a web page at your site, the URL they are visiting is associated with a single document. The web page does more than just display the document's content, however. It will usually also show the document's content embedded in the template associated with that document (we'll discuss templates in the section below). It may also show the document's Title or some of the other resource fields. If the document is not currently published, the browser may not show it at all.

To complicate things slightly, a web page may be associated in various ways with more than one document. It might show a document that contains the summary fields of a number of other documents with links that will send the viewer to a full version of each document. A blog web page in MODX, for example, might show several different blog posts, each listing the author and date. Each of those posts is the **`content`** field of a separate document, and the author and date come from the **`createdby`** and **`createdon`** resource fields of that particular document. The summary presented for each item normally comes from the **`introtext`** resource field.

Given the complex relationships possible here, you can see why it's important to understand that web pages and documents are very different things in MODX. When we talk about documents in the book, we're always referring to the MODX document object created in the Manager, not to a web page viewed by a site visitor. We'll always refer to a single page displayed in a browser as a "web page."

Weblinks, Symlinks, and Static Resources

A ***weblink*** is a MODX Resource that contains a URL (also called a ***link***) in its **`content`** field. With a weblink, the URL can be to a page at the MODX site or any other site on the Web.

In MODX, a ***link*** can be expressed as a full URL like this:

```
http://yoursite.com/home.html
```

If, instead, it is a link to a page on your own MODX site, it can be expressed as a ***link tag*** (e.g., `[[~1]]`). If your Home page is resource 1 on your site (in other words, its Resource ID number is 1), MODX will replace the link tag with a full URL that will take users to your Home page.

You should use link tags whenever you can because they will take you to the same page even if the title of the page changes or it is moved to another location in the Resource tree.

A ***symlink*** is also a MODX resource that refers to another document, but the Symlink field contains only the Resource ID of the document being referred to, and it must refer to a page on the MODX site.

The main use of weblinks and symlinks is to serve as links in a MODX menu. This is a somewhat advanced topic, and we'll cover it in more detail later in the book.

Static resources are resources that contain a file path in their **`content`** field. Most MODX pages have dynamic content because they contain elements, such as snippets and chunks, which may change over time. That means that the content of the page will be created on the fly before being seen by the site visitor. When you have content that you know won't change unless you edit it yourself, however, you can save it as a file and use a ***static resource*** to display it. The page will display faster and will put less strain on MODX and the Database.

Static Resources may also contain links to files you want to deliver to the visitor such as .PDF files or .DOC files for display or download. You can even use PHP code to create dynamic .PDF files, for example, that the user can view or download by following a link to the static resource. This also allows you to control access to the files so that some users can reach them and others can't.

Content Elements

Content elements (usually referred to as just "elements") in MODX are just what their name suggests: they are MODX objects that create, control, format, organize, and/or contain content. The phrase "content element" is somewhat flexible, and as MODX evolves, new elements are created, and sometimes things that were formerly resource fields may become elements. Sometimes elements can lose that status and be reclassified as something else. The best working definition of content elements is: "things that appear in the Element tree on the Elements tab at the left side of the MODX Manager."

The section below discusses the elements that existed at the time this book was written: templates, template variables, chunks, snippets, plugins, and categories. You should be aware, however, that a few of them may not be found in the Element tree in your version of MODX.

Templates

Most businesses have a standard letterhead they use when sending letters. It gives every letter the same look and saves time since the letter writer doesn't have to type the company name, address, and telephone/fax numbers on each letter. A MODX ***template*** performs the same function. It contains the basic information that will appear on a number of different web pages. It will usually contain the basic (X)HTML for a web page (`DOCTYPE`, `<head>`, `<body>`, etc.) as well as the banner at the top of the page and the footer at the bottom. It may also contain other MODX objects, as we'll see in the section below.

Like the company letterhead, the template will probably contain a header and footer (possibly with images) that will appear on every page that uses the template. Unlike a letterhead, however, a MODX template can also contain other MODX objects. It might contain a document's Title (and/or Long Title) and a menu. These will change on every page, but they will always appear in the same place and with the same styling for every page that uses that template.

When MODX receives a request for a web page from a browser, it finds the appropriate resource (usually a document), then checks to see what template is attached to that resource. The template contains (X)HTML code interspersed with MODX tags. MODX retrieves the template from the database and begins filling it with the appropriate content (by replacing the MODX tags) as the first step in preparing the web page to be returned to the browser.

Beginning MODX users sometimes create more templates than they need because they don't fully understand how flexible MODX templates can be. Some MODX sites (but not all) can get by with a single template even though there are things that will appear on some pages but not others. We'll look at templates in more detail later in the book.

Template Variables

"Template variable" is a confusing phrase for some users because it hasn't always been used consistently. Sometimes, the resource fields we discussed above (Title, Menu Title, Alias, etc.) have been referred to as template variables, even in the official MODX documentation. This is incorrect, however. Those things should be called "resource fields." ***Template variables*** are always created by a user who needs additional resource fields.

Template variables (often called ***TV***s for short) provide a way of extending the list of resource fields. Imagine that you let registered users create some content on your site. When a page created by a user is displayed, you could show the document's Title and the date it was posted by using the document's **`pagetitle`** and **`createdon`** resource fields. What if you also wanted to show the author's astrological sign? You need another resource field. Luckily, you can easily add a TV called "Sign" to hold that information (we'll talk about exactly how to do this in a later chapter). Now, when someone edits the document in the MODX Manager, they'll see an extra field labeled "Sign" with a blank space for entering the user's astrological sign.

Template Variables are very flexible and can be used to hold many things such as text, images, (X)HTML code, dates, directory contents, etc. In fact, we could easily present our "Sign" TV as a drop-down list of the twelve astrological signs or as twelve radio buttons. This is quite easy to do in MODX, and we'll discuss how later in the book.

At this point, you might be wondering how the content of the "Sign" TV gets on the web page. The easiest way is just to place a ***resource tag*** in the template associated with that document (we'll discuss tags in more detail later in this chapter). A resource tag looks like this: `[[*`*`Field/TvName`*`]]`. Both template variables and resource fields can be displayed using resource tags. The following code in the template would display the title, date, and sign, on the page:

```
<p>Post Title: [[*pagetitle]]<br />
Created on: [[*createdon]]<br />
Author's sign: [[*sign]]</p>
```

Template variables are a powerful and underused part of MODX. They can hold strings of text, such as a person's sign, but they can also hold other objects you might want to put on a web page such as drop-down lists, date pickers, and even the content from other documents on the site. We'll talk about how to create them and use them in more detail later in the book.

Chunks

A MODX ***chunk*** is just a piece of reusable content. The key thing to remember about chunks is that they can't contain raw PHP code (that's the job of snippets). Many chunks are just bits of content embedded in (X)HTML code that you want to appear on multiple pages. The banner at the top of a page, the footer at the bottom, and the menu are often contained in chunks. That way, if you edit the chunk, it changes things on every page.

Special-purpose chunks called Tpl chunks are used as mini-templates. They usually contain text and placeholder tags (more on those later) and are used format output. Here is a simple example that could be used to display the name of the current president and vice-president of a company:

```
<h3>Officers</h3>
<p>President: [[+president]]</p>
<p>Vice-president: [[+vice-president]]</p>
```

Typically, code in a snippet would set the values for the two placeholder tags above so that the appropriate names would appear when the chunk is rendered.

Tpl chunks are also used for web forms and as mini-templates for the output of standard add-on components. Tpl chunks are sometimes referred to as "templates," but this is incorrect.

The content of a chunk makes it into a page in various ways. The most common method for displaying chunks is to put a ***chunk tag*** in the template or the **`content`** field of a document. A chunk tag looks like this: `[[$ChunkName]]`. We'll see some other methods of injecting chunk content later in the book, and we'll discuss tags in general a little later in this chapter.

Snippets

A ***snippet*** is simply a piece of executable PHP code. If your users can submit content (such as blog comments) that immediately appears on the site, what happens if a malicious user puts PHP code that erases your hard disk in a comment? In an unprotected site, the first time someone visits the page that shows that comment, it's goodbye site. In MODX, however, nothing happens at all because PHP code in a page's content is stripped out. To be executed, the code must be in a snippet. What appears in the page content, then, is the ***snippet tag*** (sometimes called a ***snippet call***). A snippet tag looks like this:

```
[[SnippetName]]
```

or

```
[[SnippetName? &firstName=`John` &lastName=`Doe`]]
```

In the second example above **`&firstName`** and **`&lastName`** are just pieces of information called ***snippet properties*** (formerly called parameters) that we want to send to the snippet being called. Whatever is returned or printed by the snippet will replace the snippet tag in the page sent to the browser for display.

Important: Note that the values of the snippet properties are enclosed in back-ticks, not single-quotes. This allows you to use single- and double-quotes in your snippet properties (e.g., `&lastName=`O'Connor``). The back-tick is under the ~ at the upper-left on most keyboards.

Using single-quotes, double-quotes, or nothing at all around snippet properties is the most common error made by new users of MODX. If you do that, your snippet simply won't work. Other common errors are forgetting the question mark after the snippet name or the ampersand before every snippet property, and misspelling the name of the snippet or a snippet property (the names are case-sensitive, so type carefully). One last common snippet error to check for is that a Rich Text Editor like TinyMCE may be changing the ampersands in your snippet tags to the "`&amp;`" entity every time you save your work. To fix this, click on the "HTML" button in the editor and convert `&amp;` or `&amp;&amp;` to a single ampersand character inside snippet tags.

Although we often put spaces around equal signs in PHP code to improve readability, we don't do it with snippet tags because it can confuse the parser in some older versions of MODX Evolution.

We'll discuss snippets and snippet tags in detail later in the book. If you don't know PHP, you won't be writing or editing snippets, but you'll still need to understand a little bit about how snippets do their jobs and how to work with snippet properties.

Many beginning MODX users know no PHP at all and have no intention of learning it. Some of them are able to create very sophisticated MODX sites without using PHP code. Many others, however, learn PHP gradually as they continue to use MODX, and some become quite good at it and begin writing their own snippets and plugins. As we said earlier, PHP is not a difficult language, and there is a short MODX PHP Primer at the end of the book to get you started. One of the great things about MODX is that no matter how much you know, there's always more to learn.

Plugins

Plugins are kind of an anomaly among the MODX elements. They often alter content, but you don't display them on a web page using tags. Plugins are used to interrupt the processing of the MODX engine and add custom functions.

There are a number of hooks into the MODX engine (called system events) that let you perform just about any kind of operation at key points in the processing. As MODX goes about its job, it periodically "fires" one of a number of system events. There are events that fire just before a page is rendered in the browser, just after a user attempts to log in, and just before a document or user is saved in the Manager, for example. Each system event has a name, and MODX plugins can listen for a particular system event and act when it fires.

A ***plugin***, then, is just a bit of PHP code that listens for a particular ***system event***. When that event "fires," the plugin's code executes. For example, a plugin can give you access to a document's content just before it is rendered as a web page by having it listen for the `OnWebPagePrerender` event. You could translate the document's content, emphasize key words, strip out HTML comments, turn some items into hyperlinks, etc.

You can also use a plugin to process documents before they're saved in the Manager, process a user's information during the process of logging in, or do any number of other transformations. Plugins are written in PHP code, and you can do anything with them that you can write code for.

The beauty of plugins is that they allow you to put custom processing in place without hacking the MODX core. That means your work will be unaffected by upgrading to newer versions of MODX. Because of the many built-in ways of expanding and extending MODX, you can do almost anything you can think of without touching the MODX core code.

Categories

Categories are basically just labels that you can apply to elements to help you organize them and control access to them. When you create or edit a snippet, plugin, chunk, template, or template variable, you can assign it to an existing category or create a new category for it. When that element is shown in the Element tree in the Manager, it will appear below its category name.

In MODX Revolution, you can assign elements to categories by dragging and dropping them onto the category folder at the bottom of the Element tree.

Note that categorized elements will not show in the Category section of the tree (even though that's where you dragged them). Instead, they'll show under a category folder in their respective sections. For example, a snippet added to the category MyCategory will appear in the Element tree in a MyCategory folder that appears in the Snippet section of the tree.

Resources and files don't have categories. Resources in the Resource tree are organized into a hierarchy under their respective parents and files are organized by the physical directories in which they are stored.

You can have as many categories as you like, and you can have categories within categories. You might, for example, have a category called *MyChunks* to keep the chunks you create separate from the ones used by various MODX components. If you create a lot of chunks, you might have subcategories under MyChunks.

Once elements are placed in a category, you can hide them or control what users can do with them by creating Element Category Access ACL entries in the Manager (see Chapter 10 for more details on MODX security).

If you don't use categories to control access to elements, they are just there for your convenience in organizing your elements and making them easier for you to find when you want to edit them. Categories are completely optional. Some people don't use them at all. Others, especially those with very complex sites, use lots of them. As with so many things in MODX, it's up to you.

Other Elements

The following elements are not found in the Element tree, but they serve to store and present content on your site. They include placeholders, links, settings, tags, and files.

Placeholders, Links, and Settings

Placeholders are not shown in the Element tree in the Manager, but they qualify as elements because they hold content and can be displayed using resource tags. The reason they don't show in the Element tree is that their value is always set in snippets or plugins rather than being entered in the Manager. A snippet or plugin sets a placeholder by using the following bit of PHP code:

```
$modx->setPlaceholder('placeholderName','value');
```

Once the placeholder has been set, its value will replace any instance of the corresponding ***placeholder tag***:

```
[[+placeholderName]]
```

Many MODX snippets set placeholders. You can display the values set for those placeholders with placeholder tags. The tags can go in a resource's content field, in a chunk, or in a template variable or template. If you have a snippet (let's call it *SetAuthor*), for example, that sets a placeholder called `author_name` to the name of the author of the current document, you could put the following snippet tag in your template: `[[SetAuthor]]`. The snippet tag would produce no output because your snippet neither prints anything nor returns anything — it just sets the placeholder. Anywhere in the content of your document, then, you could insert a placeholder that would be replaced by the author's name:

```
The author of this document is [[+author_name]].
```

Note that for the `[[+author_name]]` tag to work, the snippet tag must come before it in the code so that the placeholder will be set.

MODX does set a couple of placeholders for you on every page request that you can use to display the ID or username of the currently logged-in user (if any).

```
ID of the current user: [[+modx.user.id]]
Username of the current user: [[+modx.user.username]]
```

Links are a MODX shorthand for a URL to a page at the site and are based on one of the resource fields — the ***Resource ID***. Most of the time, links are used to refer to documents. The Resource ID of a document is sometimes called the document ID or document identifier, but the correct term is "Resource ID." The ID is shown in parentheses in the Resource tree in the Manager following the resource's name. You can place a link pretty much anywhere by using the ***link tag***:

```
[[~##]]
```

In the code above, you would replace ## with the Resource ID of the resource (document) you want a link to. That may sound complicated, but it's really pretty simple. Let's look at an example. Suppose you have a page about aardvarks that has a Resource ID of 12. You would see the number 12 in parentheses next to the name of the document in the Resource tree (on the Resources tab) in the Manager. Anywhere you would put **`http://mysite.com/aardvark.html`**, you could put `[[~12]]` instead. The name of the document might change, and its location on your site might change, but `[[~12]]` will always provide a reliable link to it because its Resource ID will never change. You should always use a link tag when creating a link to any page at your site.

Like placeholders, settings don't show in the Element tree but can be displayed using tags (***setting tags***, to be precise). A ***setting*** is essentially a variable whose value is available across the MODX site. They include system settings, context settings, and user settings (more on these later in this chapter). All are displayed with a setting tag:

```
[[++setting_name]]
```

You can use setting tags freely to display or use the values of any system, context, or user settings. Some system settings are critical to the operation of MODX, however, so don't change a system setting unless you're sure of what it does.

Tags

We've already seen some MODX ***tags*** in this chapter, but let's look at them a little more closely. All MODX tags are replaced by the object they represent. Here is a quick list showing what each tag will be replaced by:

- **Chunk tag** — Contents of the chunk
- **Resource tag** — Value of the resource field or template variable it represents
- **Snippet tag** — Output or return value of the PHP code in the snippet
- **Link tag** — The URL of the resource it refers to
- **Placeholder tag** — The value of the placeholder (often set in a snippet or plugin)
- **Setting tag** — The value of the context, user, or system setting
- **Language tag** — A particular language string from the current lexicon

In MODX Revolution and beyond, all tags begin with `[[` and end with `]]`. We've discussed most of the tags, but Table 1-1 gives a summary of the new tag style used in MODX Revolution and later and the tags used in earlier versions of MODX:

Table 1-1: Old and New Tag Styles

Tag Type	MODX Evolution (old)	MODX Revolution
Resource	`[*`*`ResourceField/TvName`*`*]`	`[[*`*`ResourceField/TvName`*`]]`
Chunk	`{{`*`ChunkName`*`}}`	`[[$`*`ChunkName`*`]]`
Snippet	`[[`*`SnippetName`*`]]`	`[[`*`SnippetName`*`]]`
Setting	`[(`*`SettingName`*`)]`	`[[++`*`SettingName`*`]]`
Placeholder	`[+`*`PlaceholderName`*`+]`	`[[+`*`PlaceholderName`*`]]`
Link	`[~`*`ResourceId`*`~]`	`[[~`*`ResourceId`*`]]`
Language	No Tag	`[[%`*`LanguageStringKey`*`]]`

Note that those symbols after the opening braces (`$`, `+`, `++`, `*`, `~`, and `%`) are called ***tokens*** in MODX. They tell MODX what kind of tag is being processed.

New users of MODX often don't realize that tags can be used almost anywhere in MODX and that you can nest them. A snippet tag can contain a chunk tag as a property, and the chunk could contain resource tags that might contain link tags.

Here's an example of a setting tag nested inside a link tag. It will display a link to the site's Home page:

```
[[~[[++site_start]]]]
```

Let's break that down and look first at the outer tag, which is a link tag.

`[[~X]]` is a link tag where *X* is the Resource ID of the document you want to link to. It will be replaced by the URL associated with that document. In other words, the tag `[[~12]]` will be replaced by the URL of the document whose Resource ID is 12.

There is nothing special about the Home page of a MODX site. The **`site_start`** system setting can point to any page on the site and MODX treats the page like any other when it is rendered.

`[[++site_start]]` is a setting tag that will be replaced by the Resource ID of your site's Home page. So if the Resource ID of your site's Home resource is 1 (and it often is), this tag will be replaced by the number 1.

So `[[~[[++site_start]]]]` will be replaced by `[[~1]]` which will be replaced by something like **`http://`***`yoursite.com`***`/home.html`**. For an actual link to your Home page, you'd want something like the following (X)HTML code:

```
<a href="[[~[[++site_start]]]]">Home</a>
```

When creating nested tags in MODX, always count the number of left and right brackets. The two numbers must be equal, and in MODX Revolution, each must be an even number.

For the more technically minded, here is a specification of the MODX tag syntax:

`[[` — opening brackets.

`!` — (optional) do-not-cache flag.

elementToken — token identifying the element type if it's not a snippet:

> **no token** — snippet.
> **`$`** — chunk.
> **`*`** — resource field/template variable (TV).
> **`+`** — placeholder.
> **`++`** — setting.
> **`~`** — link.
> **`%`** — language.

`elementName` — name of element (e.g., Wayfinder, MyChunk).

`@propertysetName` — (optional) property set identifier.

`:`*`modifierName=`*`` ` ``*`modifierData`*`` ` ``:…` — (optional) one or more output modifiers.

`?` — indicates that properties are coming; required if there are properties.

**`&`*`propertyName=`*`` ` ``*`propertyValue`*`` ` `` &…`** — properties prefixed with `&`

`]]` — closing brackets.

Here is a complex tag example with every possible type of tag element:

```
[[!getResources@propset1:default=`No resources found.`? &parents=`1`
&sortby=`RAND()`]]
```

The tag above tells MODX to process the getResources snippet uncached specifying `propset1` to override the default properties. The `:default` output modifier will produce a message if getResources returns nothing. Two properties, **`&parents`** and **`&sortby`** will be sent to the snippet and will override any other properties with the same names.

Files

In MODX, ***files*** are simply files that exist within the MODX site. As we've seen in the sections above, much of the content and format of a MODX web site is contained in documents, chunks, templates, and other MODX objects that exist in the MODX database. Files still play a role, however. You will probably have some files of your own. You might have image files, CSS files, JavaScript files, or other files that are used in your site. In addition, many MODX components have **`readme.txt`** files, class files, CSS files, example files, etc.

The files used by components are generally found in one of two places. Files that need to be web-accessible are located below this directory (where *`component_name`* is the name of the component):

```
assets/components/component_name
```

Files that don't need to be web-accessible are located below this directory:

```
core/components/component_name
```

The files for the Wayfinder snippet, for example, will be in these two directories:

```
assets/components/wayfinder/
core/components/wayfinder/
```

In MODX Revolution, the **`/core`** directory containing all of the critical MODX PHP files can be located outside of the **`public_html`** directory so that its files can't be accessed directly from the Web. This makes MODX much more secure. A good security principle for files is that files containing executable code (e.g., executable PHP files) or sensitive material like Social Security Numbers should go under the relocated **`/core`** directory so they can't be reached directly via the Web.

New users of MODX are often confused about where to put their own files. The official MODX answer is an emphatic, but somewhat unhelpful, "anywhere you want." It is a guiding principle of MODX not to restrict users in any way unless it's absolutely necessary for MODX to function correctly (and MODX is designed so that there are very few restrictions). As long as you know where the files are and you tell MODX where they are, anything goes.

Some users like to put the files in, or just under, the root directory for faster loading in **`/images`**, **`/css`**, **`/js`**, etc. Another good place to put them is somewhere under the MODX **`/assets`** directory (i.e., **`assets/images`**, **`assets/css`**, **`assets/js`**). Properly written third-party components always refer to the assets directory by the `MODX_ASSETS_PATH` setting, which you can set.

The **`/assets`** directory is never used directly by the MODX core. Because of the way the **`/assets`** directory is handled by MODX, you can be confident that it won't be touched when you upgrade your MODX installation to a new version. If all of your personal files are below the **`/assets`** directory, you can be certain that they won't be touched by an upgrade. Placing them there also makes it possible to rename, relocate, or re-upload the other MODX directories without worrying about your own files.

How MODX Delivers a Web Page

Now that you have some sense of the basic building blocks MODX uses to create a web page, let's look briefly at how MODX does the job.

When a user's browser requests a web page from the site, MODX first checks to make sure that the page exists. If it does not, the user is forwarded to the site's `Error` (page not found) page. Next, MODX checks to make sure that there are no security restrictions that would prevent the current user from viewing the page. If there are, the user is forwarded to either the `Error` page, or the site's `Unauthorized` page (depending on the security settings) and processing stops.

Assuming that there are no security restrictions that would prevent the user from seeing the page, MODX retrieves the document associated with that URL and checks to see what template is associated with that document. It then gets the template, and the MODX ***document parser*** goes to work.

The document parser loads the template into its own internal text editor. The template will contain tags identifying the various building blocks. The document parser replaces those tags with the things they represent. For example, a chunk tag will be replaced by the contents of the chunk and a snippet tag will be replaced by the output of the snippet. Once that replacement has been made, there may be some tags left in the page (the chunk might contain some tags, or the snippet might put some tags in the output it returns). The snippet might also pull content from another snippet or chunk or from a file and insert it into the output it returns.

The parser continues replacing tags until there are no more left. If any plugins are listening for the events that fire during this process, they may also alter the page content at various points in the process. In addition, if some of the content is cached, the parser will get the content from the MODX cache instead of the database. When the process is complete and there are no more tags to process, MODX delivers the page to the web browser for display. If the resulting page contains a reference to a file to be included (such as a CSS file, a JavaScript file, or an image file), the browser will handle that appropriately and then, finally, show the page to the user.

Transport Packages

Transport packages are new in MODX Revolution and are one of the best reasons to upgrade to the new version. A ***transport package*** is a .ZIP file that can contain files, MODX objects, and PHP scripts packaged for automatic installation in a MODX site. The most common transport package is used to install a specific third-party component, but transport packages can contain core extensions, updates, templates, simple collections of files, or even an entire MODX site.

In earlier versions of MODX, in order to install a third-party component, you needed to download the component, unzip the files in the appropriate directory at the MODX site, create elements, and cut-and-paste code from the component files into the elements. Sometimes the process was not very well-documented and it was easy to make mistakes that would make the component unusable. With Transport packages, you go to Package Management in the MODX Manager, search for available packages, download them, and click on "Install." All the work is done for you and done without errors.

Even better, Transport packages can interact with the user during the install process, so you can often set configurations and preferences during the install. The SPForm package, for example, creates a simple, spam-proof contact form for your site. During the install, you're asked for your return email address and you specify whether you want the sample `Contact` page installed. If you say yes, the package automatically installs all the necessary resources, elements, and files. It creates a `Contact Us` page and a `Thank You` page. At the end of the installation, you have a working contact form on your site that automatically appears in your menu.

The downside of Transport packages is that they are more work for developers who have to learn how to create them. This means that it may be a while before some of the existing components for MODX are available as Transport packages. Fortunately, the old installation method will still work as long as the component has been rewritten to work with MODX Revolution.

If you try to install a MODX add-on component in Revolution the old-fashioned way by downloading and cutting and pasting, make sure it has been rewritten to work with MODX Revolution.

Other MODX Concepts

In this section, we'll look at some other MODX objects: namespaces, the lexicon, topics, settings, workspaces, properties, and the MODX cache. With the exception of properties, they are less likely to be used by beginning users than the topics we discussed earlier in the chapter, but it's still useful to know a little bit about them.

Namespaces

A ***namespace*** is like a category tag for MODX components. It allows component developers to identify the various MODX objects that go with their component, such as topics in the MODX lexicon, resources, elements, and transport packages. The namespace also contains the path where the component can be found. For low-level development, the most important use of namespaces is with the MODX lexicon. We'll explain that when we discuss the lexicon in the next section.

If you are not developing components for distribution to other users, you probably won't need to know anything about namespaces. We'll discuss namespaces in more detail in later chapters.

The MODX Lexicon, Namespaces, and Topics

In MODX, the ***lexicon*** is just a dictionary of words and phrases that can be used in the MODX Manager or in web pages at your site. Entries in the lexicon (called ***language strings***) are read from ***language files***. Each language string has a key (used to retrieve it), a namespace, a language, and a topic. That way, third-party components can load the language strings they need into the lexicon and their keys can be used to retrieve them.

The term "language" is somewhat misleading since what constitutes a language in MODX is actually based on a particular culture rather than a language. That is, you could specify British English or American English as the language to be loaded into the lexicon. You could even have a "beginning user" language and an "advanced user" language if you wanted to. In some cases, you will see the word "culture" instead of "language." The system setting that controls the lexicon strings used in the front end of a MODX site, for example, is called **`culture_key`**.

As you might imagine, the lexicon is a great tool for internationalizing your site. You can change the language used in the MODX manager just by changing the lexicon used without directly altering the content of any panels, forms, or menus.

When you are using some part of the Manager, each word or phrase on the screen has its own lexicon entry. They all come from the language specified by the `manager_language` setting in the System Settings grid. If you change this system setting and the appropriate language is available, all the text in the Manager will change to the new language (you may have to log out and log back in to have this take effect).

Note that using the lexicon doesn't mean that MODX will translate your site for you. It will just replace language tags on a web page or Manager page with the appropriate content from whatever language is currently loaded in the lexicon.

A namespace, when used with the lexicon, is just a group of language strings used for a specific purpose. All the strings used with a particular add-on component, for example, will usually be in their own namespace. A ***topic*** is just a subdivision of a namespace.

The MODX ***core*** namespace contains all the language strings used in the Manager. The core namespace has a different topic for each part of the Manager (e.g., a snippet topic, a chunk topic, etc.). Language strings from the snippet topic, for example, are used as prompts when you are creating or editing a snippet in the Manager.

MODX Revolution only loads the topics it needs for a specific page to make things faster and more efficient. When you are editing a chunk in the Manager, for example, MODX loads the chunk topic and knows that it only has to search that topic for the language strings on the page.

If you don't like the wording of any string printed in the Manager or by a component, you can go to the lexicon grid in the Lexicon Management section of the Manager and change it. Your changes will survive upgrades to MODX or to any add-on components.

We'll discuss the lexicon in more detail later in the book.

System Settings

A ***system setting*** is a site-wide variable available across a particular MODX site. Sometimes a system setting contains a string of text such as the site name (contained in the **`site_name`** system setting). Others contain a value that controls some aspect of MODX such as the number of times a user can enter incorrect login information before being blocked (**`failed_login_attempts`**) or for how many minutes the user will be blocked after exceeding the number of failed attempts (**`blocked_minutes`**). System settings are divided into areas for your convenience in finding them.

Every system setting has a description that explains what it does and what the acceptable values are, and you can search for system settings by any key word in their names or descriptions. All system settings can be changed in the System Setting grid in the Manager. As you might guess, if you have no idea what a system setting does, it's best not to modify it. System settings are overridden by context settings and context settings are overridden by user settings — more on those later.

If you go to **System → System Settings** in the Manager Top Menu, you will see the System Settings grid. You can also edit any of the system settings there. Sometimes, you want to show a system setting on a web page. To do that, you simply put a setting tag on the page where you want the information to appear:

```
[[++site_name]]
```

The setting tag above would be replaced by the value of the **`site_name`** setting in the System Settings grid.

Context Settings and Workspaces

Contexts are a new concept in MODX Revolution. Many MODX users will not deal with contexts at all. Contexts are somewhat difficult to explain but are very useful in certain situations. The main thing to understand about contexts is that a context has its own resources and settings. If you want to host two different sites within one MODX site that share the same MODX database, you could create a new context for the second site. The second site could use a different language, for example, but would still be able to use the MODX core and any installed components. It could also have the same users but with different privileges and settings (e.g., the same user could have a different personal Home page in each context).

When you are using the MODX Manager, you are in the `mgr` context. The default front-end context is called `web` in MODX Revolution, and you can see it at the top of the Resource tree. All resources in that context will appear below `web`. For many sites, this is the only context you need.

If you are using an early release of MODX Revolution, you probably won't see workspaces at all. In later releases, each ***workspace*** will provide an area where you can work on the settings, lexicons, components, and resources for a particular context. MODX Revolution has a "core workspace," but since there is only one, you probably won't know it's there.

To modify or create context settings for a particular context, go to **System → Contexts**, then either click on "Create New" or right-click on an existing context and select "Update Context," then click on the "Context Settings" tab. Any context settings you create here will override any system settings with the same key (name). Creating new contexts complicates things in many ways, so be sure you really need a new context before creating one.

User Settings

User settings are just system settings that only apply to a particular user. When you create a new user at your site, that user has no user settings. All the site's system settings apply to that user (unless overridden by context settings). If you add user settings for that user that have the same names as system settings, those user settings will override both system settings and context settings for that user alone. To create user settings for a particular user, go to **Security → Manage Users**, right-click on a user and select "Update User," then click on the "Settings" tab.

Suppose that the Manager Language system setting (**`manager_language`**) is set to *`en`* in the System Settings grid. All the strings used in the Manager will be in English. If you have a user that speaks German, though, you can create a user setting for that user called **`manager_language`** and set it to *`de`* so that user will see nothing but German in the Manager. The user setting will override the system setting.

A user could also have a particular Home page on the site. If you create a **`site_start`** user setting and set its value to the Resource ID of a particular page on the site, when a user is logged in, any page that contains a MODX tag with a link to the Home page of the site will show a link to that user's particular Home page:

```
[[~[[++site_start]]]]
```

User Setting names don't have to match any of the system settings. You can add any settings you need. You could add user settings that stored a user's height and weight, for example, and they could be displayed on any page that the user visited at the site using a standard setting tag. For that particular example, though, it is more likely that you would put that information in an extended field of the user profile.

Properties

Most of the elements described earlier in this chapter can have properties. ***Properties*** are a lot like the settings we described in the three previous sections. They are a collection of variables each with a name (technically called the ***key***), a value, and a description. Like settings, they can be created and edited in a grid in the Manager. Properties are most often used with snippets, but are also used with plugins, chunks, templates, and template variables.

This might make properties sound redundant, but there is an important difference between properties and settings. Settings are available to every page in the site. Properties, in contrast, are attached to individual MODX elements (chunks, snippets, plugins, templates, and template variables), so their scope is limited to the element they are attached to. This makes them a more efficient choice when you want a value available in a single element or a group of elements but not across the whole site.

When properties are attached to a snippet or plugin, the property values can contain information used in the element. When properties are attached to another element, the values are available in that element via placeholder tags.

Properties exist in three forms. They can be defined in an element tag, in the element's default properties, or in a property set. In all three cases, the properties serve the same function: to provide a set of key/value pairs that can be used with specific elements.

When sent in a tag, properties are always preceded by an ampersand character and their values are surrounded with back-ticks. The following example shows two properties sent in a snippet tag:

```
[[SnippetName? &color=`red` &size=`large`]]
```

In the example above, the value of the `color` property is set to "`red`" and the value of the `size` property is set to "`large`." Many standard MODX snippets use properties to provide information the snippet needs to do its job and to control the actions of the snippet.

A snippet like Wayfinder that produces a menu, for example, might have a property that determines whether the menu shows unpublished resources. That property might look like this in the snippet tag:

```
&showUnpublished=`1`
```

In addition to being sent in tags, properties can be created and edited in the **Tools → Property Sets** section of the Manager. They can also be created and edited on the Properties tab of any element they are attached to. The second method is usually a much better choice if you intend to use the property set with a particular element. If you just want to override a few default properties, it's easiest just to send them as properties in the element tag.

In earlier versions of MODX, properties sent in a tag were referred to as *parameters*. You may still see that term used in older documentation and MODX forum posts.

We'll discuss properties and all their uses in much more detail later in the book.

The MODX Cache

MODX keeps much of the content of a site in the ***MODX cache***. This makes web page access much faster because MODX doesn't have to query the database for the content. Very few users will deal with the MODX cache directly, but you still need to know a little about it because you can control what content is cached.

The rule for what to cache is simple: Let MODX cache content that doesn't change often. If you have a web page that shows the current time and the page is cached, every visitor to the site will see the time that the page was first visited instead of the current time. This will continue until the MODX cache is cleared. Then a new time will be cached until the next time the cache is cleared.

Caching is controlled in two ways. The caching of MODX resources is controlled by two checkboxes on the Page Settings tab of the Create/Edit Resource panel in the Manager. If you uncheck the "Cacheable" checkbox, MODX will get a new version of the page every time someone visits it. If the "Empty Cache" checkbox is checked (which it is by default), the cache will be cleared when you save the page.

For all MODX tags (including those for snippets, chunks, and template variables), the format of the tag controls whether caching will be in effect. Putting an exclamation point after the opening braces of the tag will make the object uncached; leaving it out will make it cached. The exclamation point means "get me a fresh version of this." If the contents of a chunk seldom change, for example, you can let MODX cache it by using this tag:

```
[[$ChunkName]]
```

You can clear the MODX cache manually whenever you change the chunk's content. Snippets often produce different output at different times. In those cases, you'll want to have them uncached:

```
[[!SnippetName]]
```

Remember that the caching of different things in MODX Revolution is independent. For our example above about a page that shows the current time, the time would probably be calculated, formatted, and displayed by a snippet (let's call it *ShowTime*). If the rest of the page never changed, you could leave the page itself cached but call the snippet with this tag:

```
[[!ShowTime]]
```

That way, the page content would be cached, but the snippet's output would always be fresh because the snippet is called uncached.

The cache is also a source of confusion for some users because if the content is cached, changes they make may not show up when they view the site. MODX may be showing you the old cached content. Remember, too, that your browser may be showing you a cached version of a page you have visited before. When you make changes and can't see them, or correct a problem but still see it, clear the MODX site cache and your browser cache and check again.

Summary

By now you should have a basic idea of how MODX stores the information for a web site and transforms that information into finished web pages. Don't worry if some of the details aren't completely clear. We'll be covering all the topics in more detail later in the book.

Although you could create a fairly polished site using the techniques described in this chapter, we've only just scratched the surface of the power and flexibility MODX brings to web design.

Once users master the basic techniques involved in creating a MODX web site, they soon discover that they want more. They begin thinking about their site (or sites) in new ways and considering things like allowing subsets of users to access certain parts of the site (or certain functions in the Manager), letting users create and edit pages in the front end without logging in to the Manager, customizing pages for individual users, or automatically highlighting certain key terms on various pages. They wonder if what they're thinking of is possible in MODX, and the answer is almost always "yes."

MODX Evolution Notes

If you are using a pre 2.0.0 version of MODX, most of the sections of this chapter will still apply. The core of MODX has been completely rewritten for MODX Revolution. From the user's point of view, however, it still has much in common with previous versions. There have been a few minor changes in the database, but the table names and structures of the tables are unchanged for the most part.

General Differences

MODX Evolution and earlier versions still store information in the database and still have a front end and a back end (MODX Manager). The Manager interface is different, but most of the same functions are there and most users switching from one to the other have little trouble finding the familiar areas of the Manager.

As we mentioned earlier in this chapter, there is still a distinction between MODX itself and the third-party components that extend and expand it. In MODX Evolution, however, the distinction is somewhat blurred by the fact that a number of third-party components are included in the base install. There is also an option to install a complete sample MODX site, which includes a template, user permissions, user logins, and a working blog.

Terminology

If you are using a version of MODX prior to Version 1.0.0 (e.g., MODX 0.9.6), there is also a difference in the terminology used for various resources and components between the two versions (in fact, the meanings of the terms "resource" and "element" are different).

In earlier versions of MODX, documents were historically called "documents" and elements such as snippets, chunks, and files were referred to as "resources." That terminology has shifted to match that of MODX Revolution, but not all the documentation has caught up.

In current versions of MODX (both Evolution and Revolution), documents are classified as resources; chunks, snippets, plugins, templates, and template variables are classified as elements; and files are just files.

The new terminology does a better job of matching the way the resources and elements are actually used and how they exist in the database and in the MODX code. This switch sounds confusing, but in practice, people have little trouble making the transition.

Navigation

Navigation in the Manager is a little more cumbersome in Evolution. In order to edit a chunk, for example, you have to go to **Elements → Manage Elements → Chunks** and then select the chunk name. In Revolution, you simply expose the Element tree (by clicking on the "Elements" tab) and click on the chunk you want to edit.

Content Elements

As for the elements themselves, they are largely unchanged. Chunks, snippets, plugins, placeholders, links, and system settings are essentially the same, although there are minor changes in the tags used to insert them (see the table earlier in this chapter), and there is no language tag in Evolution.

Core Code

The code that MODX uses to deliver a document has been revamped in Revolution, but on the surface, the process is much the same. The Evolution parser still cycles through the content replacing the tags until they're all replaced. One change is that all tags can be cached or uncached in Revolution. In Evolution, only snippets can be designated as cached or uncached. In addition, the caching process has been made much more consistent in Revolution.

Language

MODX Evolution has no lexicon or topics. It simply has language files that are pulled in explicitly in the code of components or the Manager. Loading of these files is not automatic as it is in Revolution, and creating and changing language strings in Evolution involves editing the physical language files in a text editor — there is no option to override the strings in the Manager. Evolution also has no namespaces.

System Settings

System settings are essentially the same in Evolution, but editing them is more cumbersome. In Revolution, they all appear in the System Settings grid, organized by areas, and can be searched for using key terms. In Evolution, they are spread across five different tabs with no search function. Individual settings can sometimes be difficult to find. The system settings in Evolution are reached by going to **Tools → Configuration** on the Top Menu.

Context, Settings, Workspaces, and Add-ons

Evolution has no context settings, user settings, or workspaces, and probably the most important difference in terms of convenience, no transport packages. In Evolution, you must install third-party components by manually copying files to the correct locations, creating new chunks, snippets, and documents, and pasting the code from the source files directly into them. Usually, the third-party component will come with a `readme.txt` file explaining how to perform the installation. It's easy to make a mistake during this process, and it's often difficult to discover what mistake you have made.

In Revolution, you can install any third-party component that has a transport package by selecting it in the Repository, waiting a few seconds for it to download, and then clicking on the "Install" button. All this is done without leaving the Manager. In Revolution, transport packages can automatically create any necessary elements, tags, resources, system settings, etc. Transport packages can also interact with the user to allow you to set configuration options during the install.

Properties and Caching

There are properties in Evolution, but in practice, they are only used with snippets. They are almost always sent in snippet tags. Snippets can have default properties in Evolution, but they are somewhat cumbersome and are seldom used.

The MODX cache performs the same function in both Evolution and Revolution. The only differences are that in Revolution more elements can be designated as cached or uncached, the tag usage for caching varies slightly, and the Revolution cache is more consistent.

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