

Deploying PHP Open-Source Web Applications to the System i

A guide to installing several popular free packages

by Alan Seiden

PHP'S ARRIVAL ON SYSTEM I INTRODUCED more than a new web development tool. Immediately, System i users could select from thousands of open-source applications, free of charge.

This article provides tips for installing and configuring Zend Core for i5/OS — IBM's official PHP distribution — for successful use with open-source software. It shows, with special attention to System i concerns, how to install selected applications that manage web content, databases, and bugs. Because most open-source PHP programs use MySQL as their database, I also direct you to resources for installing MySQL.

Although you need no prior experience with PHP, you should have enough familiarity with the IFS to be able to connect to the IFS from a Windows workstation, copy files to the IFS, edit text files with EDTF or a text editor, and change file and folder authorities. You should also be able to extract files from zip and tar .gz compressed formats. One effective free program is ZipGenius (zipgenius.it).

All applications shown here are free of charge within the GNU General Public License (GPL — gnu.org/copyleft/gpl.html), which states that you may use the applications without restriction. If you modify the programs and then release them to the public, however, you must release them free under the GPL. This stipulation does not affect most of us who just want to use the software.

Start with a Solid PHP Installation

You will avoid many pitfalls if you start with these steps:

- Configure TCP/IP on your System i.
- Install current Portable Application Solutions Environment (PASE) PTFs (www-03.ibm.com/servers/enable/site/porting/iseries/pase/misc.html). This step is crucial for trouble-free functioning of Zend Core and MySQL.
- Verify Zend Core's prerequisites as listed in its release

notes. Click the "release notes" link on the Zend Core for i5/OS page (zend.com/products/zend_core/zend_for_i5_os). If the superseded program Crypto Access Provider 128 bit/5722ac3 is listed as a prerequisite, you can ignore it.

- Install Zend Core from the Zend i5/OS page. Click Download, register for the Zend Network, then download and install Zend Core according to its instructions.
- Update your Zend Core software by selecting
 1. GO ZENDCORE/ZCMENU
 2. Update via Zend Network menu (option 2)
 3. Change Network ID user/password (option 1) using Zend Network registration values
 4. Update Zend Core components (option 5)

Test Both Apache Servers

Zend Core includes two Apache web instances, one listening on port 8000 and another on port 89. Test them both. Start Zend Core and its PASE-based Apache server with GO ZENDCORE/ZCMENU, followed by Start Zend Core Subsystem (option 1). Zend's PHP-enabled Apache instance that resides in PASE starts in subsystem ZEND. The instance listening on port 8000 has the job name ZENDCOREAP. Ensure that your web browser can access the Zend administration GUI via your IP address or domain name (e.g., <http://www.example.org:8000/ZendCore>).

Next, start the Apache ILE (native i5/OS) Zend web server:

```
STRTCPSVR SERVER(*HTTP) HTTPSVR(ZENDCORE)
```

This Apache instance is a standard IBM i5 web server, residing in the ILE environment. Listening on port 89, its job name is ZENDCORE. According to Sam Pinkhasov, Zend's IBM System i project manager, IBM and Zend created this second instance so users could integrate PHP with existing System i features, such as SSL encryption. This instance connects to the PHP-enabled server via

reverse proxy. Ensure that your web browser can access the sample home page at your IP address or domain name (e.g., <http://www.example.org:89>).

Make Configuration Changes

I strongly recommend that you make several configuration changes to Zend Core to prepare for open-source applications. Figure 1 shows my recommendations, and Figure 2 shows the names and locations of primary configuration and error files associated with Zend Core.

PmWiki: Collaborative Wiki Software

PmWiki (pmwiki.org) uses wiki technology — which allows anyone to edit web pages by clicking an “edit” link on the page itself — to create custom websites. One example is WikiPublisher (wikipublisher.org). As with most wikis, PmWiki remembers the history of changes. It also lets users search the site for any desired text. Wikis are valuable tools for collaborative documentation and project management, as well as other uses.

Because PmWiki stores all data in flat files, not in a database, it is relatively easy to install.

1. At pmwiki.org, click Download and select the latest stable or beta release. I chose pmwiki-2.2.0-beta15.zip.
2. Within `/www/zendcore/htdocs/` on your System i's IFS, create the folder pmwiki.
3. Extract the zip file's contents. Inside one or two

subdirectory layers, you will find cookbook, docs, and other files and folders. Copy this content to `/www/zendcore/htdocs/pmwiki`.

4. Verify that your browser can access PmWiki. Go to <http://www.example.org:89/pmwiki/pmwiki.php>.

If an error occurs, you probably need to give the default user (NOBODY) more authority. If you see the default PmWiki home page, congratulations! You installed PmWiki successfully.

You are now ready to edit the pages on your PmWiki site. Here are a few tips to get you started:

- Triple quotes create “bold text.”
- Braces and plus signs {+make underlined text+}.
- Percent signs with the name of a color will %red%add color%%.
- Double brackets produces a link that, when clicked, creates a [[Alan.NewPage | new page]].

Figure 3 shows a sample PmWiki page after editing.

MySQL Open-Source Database

Before installing the other applications in this article, you must install the MySQL database server. PHP can work with most common databases, including DB2 for i5/OS. Because of MySQL's good reputation in the open-source world and licensing that permits free use, most open-source PHP applications use MySQL.

FIGURE 1

Zend Core configurations

File to Edit	Recommended Settings or Directives	Notes
HTTP config file for ILE (i5/OS) Apache instance <code>/www/zendcore/conf/conf.httpd</code>	<code>ProxyPreserveHost On</code>	Tells proxy server (:89) to pass <code>SERVER_NAME</code> , <code>HTTP_HOST</code> variables to PASE server (:8000), where applications run. Web programs rely on these variables.
PHP's configuration file (PHP.INI) <code>/usr/local/zend/core/etc/php.ini</code>	[Date] <code>date.timezone = America/New_York;</code> or whatever your time zone is	Defines the default time zone that PHP's date functions will use. All supported time zones, formatted properly, are listed in the PHP manual: php.net/manual/en/timezones.php .
PHP.INI (again) <code>/usr/local/zend/core/etc/php.ini</code>	[mail function] <code>SMTP = mail.example.org</code> <code>smtp_port = 25</code> <code>sendmail_from = admin@example.org</code>	PHP's mail() function, as implemented in Zend Core, sends messages using SMTP. Any application that sends e-mail needs to know which SMTP server to use. PHP.INI contains three settings that control mail, all under the [mail function] heading. <ul style="list-style-type: none"> • SMTP: Name of an SMTP server, such as System i's included SMTP service, to send mail through; the name SMTP must be in all capital letters • smtp_port: Port number used by SMTP server (default: 25) • sendmail_from (optional): Default “from” e-mail address

Note: The mail settings can also be entered with the Zend Core Administrative GUI.

FIGURE 2

Useful files and locations

Setting	Default
Document root (where to put web content, such as PHP files)	/www/zendcore/htdocs
PHP configuration file, php.ini	/usr/local/zend/core/etc/php.ini
HTTP config file for PHP-enabled (PASE) Apache instance	/usr/local/zend/apache/conf/conf.httpd
HTTP config file for ILE (i5/OS) Apache instance	/www/zendcore/conf/conf.htpd
Error log for PHP (look here first for errors)	/usr/local/zend/core/logs/php_error_log
Error logs for PASE Apache server	/usr/local/zend/apache2/logs/error_log.*
Error log for MySQL	/usr/local/mysql/[datadir]/[hostname].err Where [datadir] is either "data" or "var," and [hostname] is your fully qualified hostname, such as myi5.example.org

operating system, MySQL has its own set of authorized users, separate from the operating system on which it runs. MySQL's superuser — its equivalent of i5/OS's QSECOFR — is called "root." By default, root has no password. You should create a password (instructions given during installation) and remember it, because you use it to sign in to MySQL applications.

Enable the MySQL Extension in Zend Core

Zend Core includes many optional components, called PHP extensions. The MySQL extension is disabled by default. To allow PHP to access MySQL data, enable the extension as follows:

1. From your browser, launch the administration site running on your server (*http://www.example.org:8000/ZendCore*).
2. Click Configuration/Extensions.
3. Scroll down until you see "MySQL" (Figure 4). You will see small images of a light bulb and a red or green switch. If the light bulb is yellow, the extension is enabled. If it's white, click the red switch, turning the switch green. Click Save settings.
4. Restart Apache from a command line by typing `GO ZENDCORE/ZCMENU` and selecting ReStart Apache server instances (option 6).

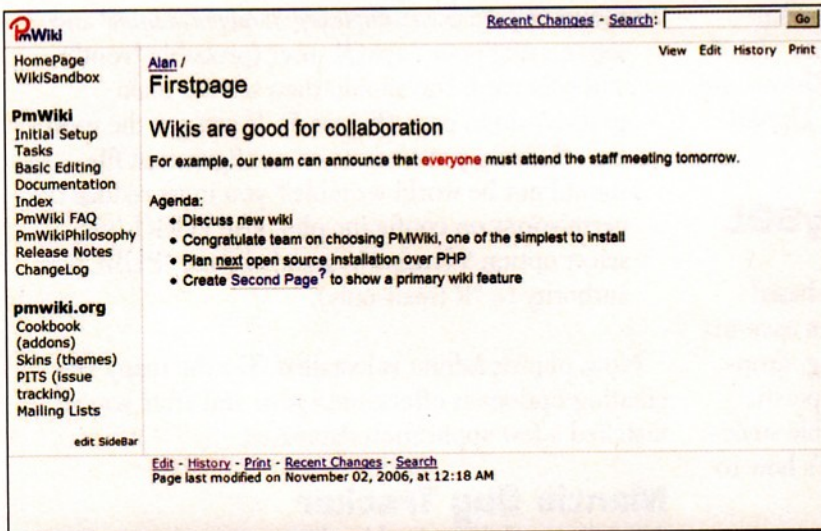
Install MySQL

For administrators willing to work with the PASE command line, MySQL is easy to install. To manage (i.e., start and stop) MySQL from the ILE (i5/OS) environment, though, requires extra work. Thankfully, a shortcut is available.

Rob Ward, a pioneer in bringing PHP and MySQL to System i, has created an installation wrapper for MySQL. Ward, director of IT at M-C Industries, Inc., a custom manufacturing and embroidering company, provides this free download at *i5php.net*. The software installs

MySQL v4 on i5/OS V5R3 and later. Here are the main installation steps:

1. Install current PASE PTFs from *www-03.ibm.com/servers/enale/site/porting/iseries/pase/misc.html*.
2. Go to *i5php.net*. Click Downloads | MySQL. Choose MySQL Server for i5/OS v4.x (where x is the minor version number), then click Download Now.

**FIGURE 3**

Web page created with PmWiki

Neither Zend nor IBM supports MySQL, but they do provide a convenient environment for it. Zend Core for i5/OS has a MySQL extension, permitting PHP to use MySQL, which Zend uses as the internal database for Zend Platform, an add-on tool made and sold by Zend to enhance the performance and reliability of PHP.

MySQL Security

Although DB2/i5 inherits its security scheme from the

- Download the zip file to your PC. The file that I downloaded is called `i5os-mysql-4.1.21-32bit.zip`.
- Extract the zip file's contents: `i5osmysql.savf` and `ReadMe.txt`.
- Open `ReadMe.txt` and follow its instructions, which direct you to FTP the save file to your System i and run several commands.

At the end of the process, the commands `MYSQLIB/STRMYSQL` and `ENDMYSQL` become available. Direct any questions to the MySQL forum at i5php.net.

If you need the features of MySQL v5 (e.g., stored procedures), you enjoy working in the PASE environment, or you want to learn more about the software, you might prefer to install it manually. Refer to "MySQL On i5/OS Example" at the Zend Developer Zone (devzone.zend.com/node/view/id/609).

If you encounter any problems with MySQL, review its error log. The log is located at `/usr/local/mysql/[datadir]/[hostname].err`, where `[datadir]` is either "data" or "var," and `[hostname]` is your fully qualified hostname (e.g., `myi5.example.org`). Find security tips at kitebird.com/articles/ins-sec.html.

phpMyAdmin: Web-based MySQL Administration

The phpMyAdmin (phpmyadmin.net) is a web-based administration tool for MySQL. It provides an easy-to-use graphical interface for tasks such as adding, dropping, and renaming databases; searching for specific text in a database; browsing data; changing table structures; and viewing connection statistics. Here's how to install phpMyAdmin.

- From phpmyadmin.net, click Download for the version that you want.
- Within `/www/zendcore/htdocs`, create a folder called `phpmyadmin`.
- Extract the contents of the downloaded file. Copy them into your new `phpmyadmin` folder.
- Create a configuration file. Although phpMyAdmin offers a setup script, I found it easier to create the file manually. Copy `config.sample.inc.php` to `config.inc.php`.
- Choose an authentication method. The cookie method does not seem to work on System i yet, perhaps due to an unsupported type of encryption. I chose the



FIGURE 4
Partial list of PHP extensions

HTTP authentication method. My `config.inc.php` file has a section that I edited to look like this:

```
$cfg['Servers'][$i]['auth_type'] = 'http';
// comment out the next two lines
// because user will log in each time
$cfg['Servers'][$i]['user'] = '';
$cfg['Servers'][$i]['password'] = '';
```

- Save `config.inc.php`.
- Go to <http://www.example.org:89/phpmyadmin/> and log in using your MySQL user (probably "root") and password. You should then see the main phpMyAdmin page (Figure 5). If you get the message "Wrong permissions on configuration file, should not be world writable!" you must reduce the permissions on `config.inc.php`. Use `WRKLNK`, select option 9 (authority), and change *PUBLIC's authority to *R (read-only).

Now, phpMyAdmin is installed. Try the many fascinating options it offers, both now and after you've installed a few application databases.

Mantis Bug Tracker

According to Ed Kietlinski, solutions consultant at Zend, Mantis Bug Tracker (mantisbugtracker.com), a web-based bug tracking system, is the most popular, best-documented open-source PHP help desk application. Mantis is so widely accepted, says Kietlinski, that it is commonly used as a benchmark to test PHP environments.

Mantis helps IT departments track their bugs and proposed enhancements in a visible way. The Mantis website even tracks its own issues at bugs.mantisbugtracker.com. Here's how to install Mantis Bug Tracker:

- Go to mantisbugtracker.com and click Download. The file will be named something like `mantis-1.0.6.tar.gz`.
- Create a folder called `mantis` in `/www/zendcore/htdocs`.

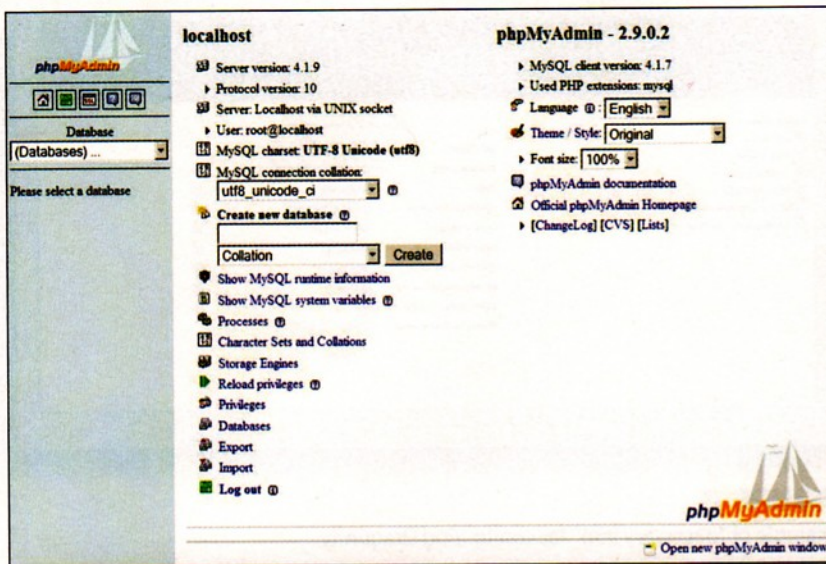


FIGURE 5

phpMyAdmin main page

3. Extract the contents of the tar.gz file. Inside the mantis-1.0.6 folder are a number of files and folders. Copy them into the mantis folder that you created.
4. Go to <http://www.example.org:89/mantis/admin/install.php>. Leave the type of database = MySQL, hostname = localhost, username = root. Enter the Password (for Database), if any, that you set for MySQL's root user. Leave Database name as "bugtracker." For Admin Username & Admin Password, use "root" and root's password (again). Make sure that the *Print SQL Queries instead of Writing to the Database* check box is clear. Click Install/Upgrade Database.
5. Check and install the database. With luck, the next page will repeat the word "GOOD" on a green background all the way down the page for each item.
6. At the bottom of page, you should see "Install was successful." Click Create to log in as administrator and create your first project. The user name is administrator and the password is root.
7. For security's sake, delete the /www/ZendCore/htdocs/mantis/admin directory and provide a new password for administrator.

The URL for your Mantis installation is something like <http://www.example.org:89/mantis>. To learn how to create projects in Mantis, I recommend the tutorial at ferdychristant.com/blog/articles/DOMM-6TGGY4.

Dragonfly CMS Content Management System

Dragonfly CMS (dragonflycms.org), one of many content management systems written in PHP, is the software behind Rob Ward's venerable PHP/System i

site, i5php.net. Ward chose Dragonfly because it was a PHP5-compatible successor to his site's previous software, CPGNuke. Dragonfly and CPGNuke strive for a high level of security, crucial where members of the public can post content.

I tried installing the latest stable version (9.0.6.1) but found that its cookie/session handling failed with my configuration. A search of Dragonfly's user forums indicated that a newer version in the concurrent versions system (CVS) — code still under development — might work better. It was true: Version 9.1.0.9 from the CVS had no cookie problems. It automatically created a configuration file too. If, when you read this,

the stable version is at level 9.1.0.9 or better, I suggest that you download and install that version. For this article, however, I refer to the CVS version. Here's how to install Dragonfly CMS:

1. From dragonflycms.org, click Downloads | Core | CVS Snapshots. Click HTML [tar.gz]. Although the entry was dated Sun May 01, 2005 2:05 a.m., hardly a recent date, the software itself was new.
2. Click Download Now, then save html-latest.tar.gz to your hard drive.
3. Create a folder called dragonfly in /www/ZendCore/htdocs.
4. Extract the contents of html-latest.tar.gz. Inside a subfolder is a group of files and folders; copy these into your dragonfly folder. If this were a "stable" release, you would copy only the contents of public_html.
5. In your web browser, go to <http://www.example.org:89/dragonfly/install.php>. If everything is set up correctly, you will see the Dragonfly license agreement/installer. Click Next on the next couple of screens, assuming no errors. On the Database Configuration page, leave the default values: SQL layer: MySQL; Hostname: localhost; Database name: dragonfly; Table prefix: cms; and Users table prefix: cms. Update the login name with "root" and the login password with the password for MySQL's root user. Click Next.
6. The script tries to add a MySQL database called dragonfly. If it fails, you can create it with phpMyAdmin. If the database was added, you will see the message, "Database connection succeeded." Click Next | Let's build the database. Choose the defaults

DEPLOYING PHP OPEN-SOURCE WEB APPS

on several screens until you come to "The database has been properly installed, now let's set up some necessary information!" Click Necessary info. A list of settings appears, headed by "Let's set up the necessary info:" (Figure 6). The only settings to change should be Site Name (any name you like), Administrator E-mail (a valid e-mail address), and Cookie domain, which defaults to something like example.org:89. Remove the :89, leaving example.org.

7. Test settings, especially cookie settings.
If your tests are successful, you get prompted to create your administrator's account. Choose a user name and password for the administrator. The password must include at least one uppercase letter, one lowercase letter, and one numeral. Choose a time zone, and select *Yes, create regular user with data*.
8. Following the security advice of the on-screen instructions, remove install.php and the install folder. Next, click "Enter my site to set everything up" to get to the administration page (<http://www.example.org:89/dragonfly/admin.php>).

Now you can customize your site. Find more instructions in the Dragonfly tutorial at cpgnuke.com/News/article/sid=213.html.

FIGURE 6

Example of "necessary info" for configuring Dragonfly

Find Open-Source Treasure

When choosing open-source software, look for packages that are updated frequently and have large, active communities surrounding them. Good places to start are hotscripts.com and sourceforge.net.

Take this opportunity to combine the reliability of System i with the abundance and flexibility of PHP open-source applications. Use the software, learn from it, and participate in its vibrant community. ■

► **Alan Seiden** is a consultant and developer at a northern New Jersey IT firm, where he enjoys his role as a creative software catalyst for clients. A member of New York PHP, he has written extensively about PHP on System i. Alan is vice president of the New York City Usability Professionals Association. E-mail: alan@alanseiden.com. Website: alanseiden.com.

**Become a
System iNEWS
author & share
your System i
knowledge ...**

Each year, readers like you contribute many of the great articles in *System iNEWS*. You could be one of those *System iNEWS* authors.

System iNEWS invites you to submit proposals for articles about

- how to use language or database features
- new System i technologies
- performance, work management, or security functions
- programming tips and techniques
- connecting a System i to other systems
- networking and the Internet

Or send us your favorite System i utility.

Writer's guidelines and payment rates are located at SystemiNetwork.com (click "WriteforUs" at the bottom of the Nav bar). Or you can contact Vicki Hamende, acquisitions editor, at (800) 621-1544, (970) 203-2824, or editors@SystemiNetwork.com.