

PHP: Hypertext Preprocessor INTEGRATING with MySQL



by Bill Patterson

PHP is an open source object oriented scripting/programming language with strong database capability. It is a project of the Apache Foundation.

MySQL is a relational database management system. Its source is available for free. It is a product of MySQL AB, a Swedish company.

LAMP



- Linux
- Apache
- MySQL
- PHP

Linux



- We know that.
- Examples today will use Red Hat at a hosting service

Apache



- Apache [HTTP Server] has been the most popular web server on the Internet since April of 1996. The July 2003 Netcraft Web Server Survey found that 63% of the web sites on the Internet are using Apache, thus making it more widely used than all other web servers combined. -- <http://www.apache.org>
- The Apache HTTP Server is a project of the Apache Software Foundation.

Apache, continued



- “The Apache Software Foundation provides support for the Apache community of open-source software projects. The Apache projects are characterized by a collaborative, consensus based development process, an open and pragmatic software license, and a desire to create high quality software that leads the way in its field. We consider ourselves not simply a group of projects sharing a server, but rather a community of developers and users.” --
<http://www.apache.org>
- a ‘patchy’ server
- “The Apache HTTP Server Project is an effort to develop and maintain an open-source HTTP server for modern operating systems including UNIX and Windows NT. The goal of this project is to provide a secure, efficient and extensible server that provides HTTP services in sync with the current HTTP standards.” --
<http://httpd.apache.org>

MySQL



- “MySQL is the world's most popular open source database, recognized for its speed and reliability. MySQL AB, the company founded by the creators of the MySQL database, provides MySQL software development and related support and services.” --
<http://www.mysql.com>
- MySQL AB operates according to a business model that supports both profit and open source.
- More later.

PHP



- “PHP is a widely-used general-purpose scripting language that is especially suited for Web development and can be embedded into HTML.” --
<http://www.php.net>

PHP , continued



- The easiest “Hello World” ever, according to its initial developer, Rasmus Lerdorf

- “Hello World”

- and you don’t even have to include the quotes

- [bill@lynx bill]\$ php
- Hello World!
- Content-type: text/html
- X-Powered-By: PHP/4.3.2

- Hello World!
- [bill@lynx bill]\$

PHP, continued



- “PHP began as a simple macro replacement tool. ... On the hyperspeed development track of the Internet, PHP has become the equivalent of a 1960s muscle car. It’s cheap, it’s fast, and there’s plenty of room under the hood for you and your virtual wrench.”
 - Core PHP Programming by Leon Atkinson

PHP Overview



- PHP works on multiple platforms
 - Linux and other Unices
 - Windows
- When providing Linux Web service, PHP lives in the Apache HTTP Server, connects to favorite database management systems, reads and writes files, and especially likes to read posted variables and write HTML (and JavaScript) to web browsers.

PHP Overview , continued



- I describe PHP as what you get if you tear apart C++ and Perl, toss the pieces in the air, and scoop the crumbs off the floor.
 - Object oriented, C++ like programming language with extensive string manipulation capability and dynamic variables that all begin with a dollar sign ('\$').
- The latest release as of 30 July 2003 is PHP 4.3.3RC2 ("should be nearly bug free").

PHP Features & Benefits



- Interpretive (almost)
 - Actually, a just-in-time compile occurs when PHP pages are accessed
 - It can be encoded so that your source remains unavailable to the observer
- Object oriented
 - facilitates code reuse
- Variable names begin with a dollar sign

PHP More Benefits



- String types - many string functions
- All arrays are sparse (aka hash) - and you don't have to pre-define them (and therefore may use alphanumeric indices)
- Fully capable programming language
- Short time to deployment

PHP Web Applications



■ Web sites

- Forms that receive and enable processing of information
- Content management
- Personalization
- Can be very elaborate

■ Bulletin board

- Phorum available from <http://phorum.org/>

PHP Web Applications, continued



- Fast Template approach
 - to separate the management of the HTML and the programming in PHP
 - a mixed blessing
 - if you are interested:
<http://www.thewebmasters.net/>

PHP Batch Applications



- String and database capabilities make PHP a natural for some batch applications as well as web applications
- Examples
 - Screen scaping and emailing
 - SSL data retrieval
 - Data base maintenance

PHP Session Management



- Enables stateful processing
- Will use cookies if available, otherwise stores session identification (and other variables) in URL
- maintains session data on the server
- Useful for maintaining a dialog with the users without having to send data back and forth all the time between screens

PHP Session management, continued



- Can manage sessions without cookies and still use POSTed data (avoiding extensive URLs), but it is tricky as you need to keep the POSTed data alive.

PHP Pricing



■ FREE

PHP Availability



- Directly off the web at www.php.net along with much information about it
- Other RDBMSs can also connect.
 - PostgreSQL
 - Oracle
 - MS SQL Server

PHP Web Hosting



- Check online for host services and reviews
 - <http://www.webhostdir.com/>
 - <http://www.findmyhost.com/>
 - <http://www.hostsearch.com/>
 - <http://www.hostspot.com/>

PHP Web Hosting, continued



- I use
 - <http://www.phpwebhosting.com/>

PHP Web References



- <http://www.php.net/> (the official site)
- <http://www.nyphp.org/>
- <http://www.php-con.com/>
- <http://www.devshed.com/>
- <http://www.phpbuilder.com/>
- <http://www.phpusergroups.org/>
- <http://www.phpwizard.net/>
- <http://www.weberdev.com/>
- <http://hotwired.lycos.com/webmonkey/programming/php/index.html>

PHP Book References



- Atkinson, Leon: Core PHP Programming
- Castagnetto, Jesus et al: Professional PHP Programming
- Greenspan, Jay and Brad Bulger: MySQL/PHP Database Applications
(disclosure [or shameless plug]...I am tech-editor of the 2nd edition)
- Meloni, Julie: PHP Fast and Easy Development

MySQL (no one knows for sure where the name originated, there's a couple of ideas)

- “The derivation of the name MySQL is not clear. Our base directory and a large number of our libraries and tools have had the prefix ‘my’ for well over 10 years. However, co-founder Monty Widenius's daughter (some years younger) is also named My. Which of the two gave its name to MySQL is still a mystery, even for us.” -- MySQL AB

MySQL



- A relational database management system provides a means of storing and retrieving data according to a standard structure
- Why a database?
 - Because
 - | Problems will be solved before they occur
 - But not the ones you were thinking of, and there will be other problems but generally not as bad
 - | Applications will benefit for years to come

MySQL



- What is a relational database?
 - Dr. E. F. Codd's A Relational Model of Data for Large Shared Databanks, 1970
 - "The relational model is simple and elegant with sound underlying theory based on concepts of relational algebra and first order predicate calculus." (--Daniela Rosu)
 - Looks at the universe as consisting of tables, which in turn consist of rows and columns.

MySQL



■ Structured Query Language

- | specifies operations among tables' rows and columns
- | standardized by ISO
- | provides for
 - INSERT
 - UPDATE
 - DELETE
 - SELECTION
- | and much more

MySQL



- Relational Database Design Principles - Normalize - too brief a summary
 - Eliminate Repeating Groups
 - Eliminate Redundant Data
 - Eliminate Columns not Dependent on the Key
 - Perhaps...Isolate Independent Multiple Relationships
 - Perhaps...Isolate Semantically Related Multiple Relationships

MySQL



- “The rules leading to and including the third normal form can be summed up in a single statement: Each attribute must be a fact about the key, the whole key, and nothing but the key” -- Wiorkowski and Kull, DB2 Design & Development Guide

MySQL



■ Why normalize?

- “Normalization carries a number of benefits.
 - One of the most important is that its rules reduce data redundancy, in the process ensuring the data’s consistency by allowing for efficient, accurate updates and deletions.

MySQL



- Why normalize? (continued)
 - “A normalized design also lends itself to change.
 - Business Processes rarely remain constant after the logical design is complete.”
 - -- Wiorowski and Kull, DB2 Design & Development Guide

MySQL



- Provides a free open source relational database management system
- “MySQL is a polarizing piece of software in the applications development community. It has aspects that many developers like: it’s free, it doesn’t take up a whole lot in the way of resources, it’s very quick, and it’s easy to learn compared to packages like Oracle and Sybase.”
--Greenspan and Bulger

MySQL



- “However, MySQL achieves its speediness by doing without features common in other database[management systems].” --Greenspan and Bulger
- MySQL is behind the feature curve
 - version 3 lacks
 - | subselects
 - | referential integrity
 - | stored procedures

MySQL



- But since it has been designed by programmers it has nice features lacking in other systems
 - e.g. the ability in the monitor to recall the previous command entered by entering the up-arrow, which is lacking in Oracle's SQL*PLUS

MySQL



- and much information can be obtained from www.mysql.com
- *book references*
 - DuBois, Paul: MySQL
 - Greenspan, Jay and Brad Bulger: MySQL/PHP Database Applications (disclosure [or shameless plug]...I am tech-editor of the 2nd edition)
 - Meloni, Julie: PHP Fast and Easy Development

MySQL Pricing



■ FREE

PHP & MySQL Example



- Build a private database for a search engine
 - intended as an illustration of the power of these tools
- Search the database
- (code can be licensed under the GNU GPL)

Example - Build using Spider



- `<?php /* spider.php version 2.0
copyright 2001-2003 Stratford
Technologies, Inc.`
- This program is released under the
GNU General Public License
- at <http://www.gnu.org/licenses/gpl.txt>
*/

Spider



- /*
- This program accepts a URL as a starting point and builds a database for later use by a search engine.
- it starts by retrieving those URLs on the subjects page and repeating the process for those URLs. As it proceeds recursively, it saves each URL with a unique integer ID and further saves the words on the page in an index to that URL that also maintains the index of the word.

Spider



- URL references found in a given web page, and in turn
- follows those URLs if fully qualified, to an arbitrary level of depth--
- in this example that level is 3. */

Spider



- `require 'spiderlib.php';`
 - this gets us a small database access library
 - let us digress a moment:

Spider Library



- `<?PHP /* spiderlib.php part of spider.php
version 2.0 copyright 2001-2003 Stratford
Technologies, Inc.`
- This program is released under the
GNU General Public License at
`http://www.gnu.org/licenses/gpl.txt */`

Spider Library



```
■ function myconnect() {  
■     require_once '../..../dbx_pass.php';  
■     | (note this keeps my passwords out of view)  
■  
■     mysql_connect("$host", "$user", "$pass");  
■     mysql_select_db ("dbname");  
■  
■ }
```

Spider Library



```
■ function myquery($query) {  
■ #echo "query: $query<BR>";  
■     $result=mysql_query($query);  
■     return ($result);  
■ }
```

Spider Library



```
■ function myfetch($result) {  
■     if($result)  
■  
    $row=mysql_fetch_array($result,MYSQL_  
    ASSOC);  
■     return ($row);  
■ }
```

back to Spider.php

- // Here is a function to check to ensure a destination is worth reviewing -- this function could be expanded to filter more
- function valid(&\$dest) {
- \$good=eregi('(http://)',\$dest);
- return (\$good);
- }

Spider.php



- // This function allows printing of desired output when debugging
- function debug_echo (\$output) {
- // echo "\$output"; // this can be uncommented to allow debug output to print
- }

Spider.php



■ function

```
spider($dest,$count,$parent_dest="") {
```

- `// This is the main program, the spider() function. It hunts for`
- `// http:// references in the document that it is handed as`
`$dest,`
- `// and in turn calls itself when it finds any so that it can follow`
- `// a reference chain for $count links.`

Spider.php



- See code for exact logic and further comments of the spider function.
- Note that the function is recursive, calling itself but decrementing a count so that when the count reaches zero it no longer calls itself
 - Recursive functions have to have ways of stopping themselves from nesting too far
- // Writes HTML

Spider.php



- myconnect();
 - // uses the library for a standard connect to the database

Spider.php



- `echo "<html><body><form
method=post name=my_form>";`
 - `// simple web page display HTML`

Spider.php



- `$supplied_url = $_POST['supplied_url'];`
 - `// some configurations of PHP require this process to obtain POSTed data`

Spider.php



```
■ if ($supplied_url) {  
■     echo "checking  
    $supplied_url<BR><BR>";  
■     spider($supplied_url,3);  
■ }
```

Spider.php



- `if (!isset($_POST['supplied_url']))`
`$supplied_url = 'http://'; // set the value`
`received from previous screen`

Spider.php



- `echo "

Enter URL to check
<input type=text size=50
name=supplied_url
value='$supplied_url'>";`

Spider.php



- `echo "
…<input type=submit>"; // submit button`
- `echo "</form></body></html>"; // close the HTML`
- `?>`

Search.php



- `<?PHP`
- `/* search.php version 2.0 copyright 2003
Stratford Technologies, Inc.`
- This program is released under the
GNU General Public License at
<http://www.gnu.org/licenses/gpl.txt>

Search.php



- It is designed to provide a window into the searchable Web database generated by spider.php.

Search.php



- It gives the user the opportunity to enter search terms in a style suitable for the MySQL MATCH() function.
-
- */

Search.php



- Two variables needed from input:
 - `$match_phrase=$_POST['match_phrase'];`
 - `$in_boolean=$_POST['in_boolean'];`

Search.php



- `require 'spiderlib.php';`
- `echo "<HTML><BODY><FORM
method=post action=$PHP_SELF>";`

Search.php



- `if (isset($match_phrase))`
- `{`
- `$match_phrase =`
`strip_tags($match_phrase); // keep`
`people from crossing you up`
- `myconnect(); // standard connect`

Search.php

```
echo "<table border=1><tr><th
width=5%>score</th><th width=30%>url</th><th>found
matches to \"\$match_phrase\"</th></tr>";
$result=myquery("select *, match (url, webtext)
against ('$match_phrase') as score
from SPIweb where match (url, webtext)
against ('$match_phrase') order by score
desc");
```


Search.php

```
if ($result) while ($row=myfetch($result))
{
    $found_string=substr(strip_tags($row[webtext]),0,100);
    if (strlen($row[webtext])>100) $found_string
    .= '...';
    $score=number_format($row[score],3);
    echo "<tr><td width=5%>$score</td><td
width=30%><a href='$row[url]'>$row[url]</td>
    <td>$found_string</td></tr>";
}
```

Search.php



- `echo "</table>";`
- `}`

Search.php

- echo "Enter a match phrase <input type='text' name='match_phrase' value='\$match_phrase'>

- <input type=submit></FORM></BODY></HTML >" ;
- ?>

Demonstration



In conclusion



- PHP and MySQL constitute a powerful set of tools for dynamic Web site building.
- The ability to work with strings in a generic way and to use relational database power to strengthen your Web site enable more applications more easily.
- --Bill Patterson
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