Zend Server and Zend Framework on IBM i

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Long Island System Users Group (LISUG)
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• **IBM Business Partner**
  - Provides hardware, software development, consulting for IBM i
  - Developer of web apps on i since 1996
  - Based in Ramsey, New Jersey

• **Zend (“the PHP company”) partner**
  - Zend brought PHP to IBM i in 2006
  - We offer Zend’s training and software to complement our own consulting/development services
Alan Seiden

PHP on IBM i Developer / Consultant / Mentor

- Contributor to IBM’s Redbook *PHP: Zend Core for i5/OS*
- First IBM i developer certified in Zend Framework
- Developer of IBM/COMMON’s “Best Web Solution” of 2009

Contact: aseiden@sbsusa.com or 201-327-9400
Blog/articles: alanseiden.com
Informal presentation agenda

- PHP on i Overview
- Update on Zend Server (new PHP install for i)
- Zend Framework
- Answer any PHP questions
PHP’s growth as web dev language (as of 2007)

34% of the internet runs on PHP

37% growth in PHP developers


- Rasmus Lerdorf Introduces PHP/FT
- Zeev Suraski & Andi Gutmans lead the development of PHP 3
- PHP 4 Released
- 1M Internet domains
- Zend Engine
- Zend Founded
- Yahoo! Standardizes on PHP
- PHP Proliferation
- PHP 5.0 (XML, SOAP, OOP), Zend Studio
- IBM, Oracle Endorse PHP
- Zend Framework & Eclipse project (PDT) announced: i5/OS support
- ZF and PDT released, PHP 4 EOL announced

25M
20M
15M
10M
5M

37% growth in PHP developers
34% of the internet runs on PHP
Who uses PHP?

- Yahoo, eBay, Wikipedia, Facebook
- Open source developers – 10,000+ projects
- Strong community worldwide
- 7 million+ developers
- Growing community of IBM i shops
Reasons for PHP’s success

• **Easy way to get data to Web**
  ▪ Generates ordinary HTML, viewable in any browser

• **Cross-platform: also runs on Windows, Linux, any mainstream OS**

• **Open source**
  ▪ Managed by Zend, “the PHP company”
  ▪ Contributors from community and corporations
Free, open source apps (fine on IBM i)

- WordPress blog/CMS
- MediaWiki (Wikipedia)
- ZenCart e-Commerce
- Bug Tracking/Helpdesk (Mantis400.com)
- Sugar CRM
PHP on i—a short history

- 2004: i5php.net
  - Unofficial PHP binary for “i” available online

- 2005: IBM and Zend got together

- 2006: Zend Core for i5/OS
  - Official release with help from IBM
  - Professional technical support from Zend

- 2007: Zend Studio: IDE/code editor
- 2007: Zend Platform: performance booster and code tracer/monitor

- 2008: Zend Framework supports “i” variant of db2

- 2010: Zend Server for “i”
  - Combines the best of Core and Platform
• **Runs completely on your good old “i”**
  - Uses IBM’s native Apache web server
  - Backed by IBM, shipped with v5r4 and beyond
  - Connects directly to db2 database

• **Light on its feet**
  - Efficient—runs well out of the box
  - Create useful functionality quickly; start small and grow
    - Plenty of room for sophistication in larger apps
i5 Toolkit is included

• **i5 Toolkit lets you:**
  - re-use your RPG logic
  - call commands
  - access data areas and other resources

• **Documentation**

• **Samples**
i5 Toolkit functions to call CL/RPG

- **i5_connect(server, user, password, options)**
  - $conn = i5_connect("1.2.3.4", "MYUSER", "MYPWD");

- **i5_command(command, inputs, outputs)**
  - Good for commands/programs with no parameters
  - E.g. i5_command("call LIB_NAME/PROGRAM_NAME")

- **i5_program_prepare(name, description)**
  - Sets up parameter names and data types

- **i5_program_call(program, params, retvals)**
  - Calls program with parameter values
Zend Studio for Eclipse, IBM i Edition

- Better IDE than “Notepad”
- Free for IBM i customers
  - Look for “IBM i Edition”
- Alerts you to any syntax errors or other mistakes; offers interactive debugging and code completion (similar to how green screens provide an F4 prompt)
- For good performance, your PC needs 2GB RAM
What I’ve been doing lately with PHP and ZF
Wine distributor transaction search
Displaying scanned, signed invoices

Converted from single TIFF images into multi-page PDF for usability, all on the IBM i
Zend Server
Zend Technologies yesterday announced the general availability of Zend Server 5.0 for i/OS, bringing the most complete stack yet of PHP software to the IBM midrange platform. With Zend Server running under i/OS, customers gain more streamlined implementation and deployments, application monitoring and optimization, error detection, security, and compliance. Two editions of Zend Server are available for i/OS, and Zend and IBM will begin phasing out older PHP stacks.

Zend announced that its enterprise-strength Zend Server stack of PHP software would be coming to the System i server in October 2009, when the company launched Zend Server 5.0. While the stack has been available for Linux and Windows operating systems, the i/OS version has been in beta testing for the last six months.

Zend has built several PHP stacks for the IBM i/OS environment over the years, including Zend Core, Zend Studio, and Zend Platform. But with Zend Server, the company offers what it considers is the most feature-rich stack for developing and deploying PHP Web applications worldwide.
Zend Server for IBM i

- Next generation of PHP stack for IBM i
- Best of both Zend Core and Zend Platform
- Single Licensed Program Installation
- Two license levels
  - Zend Server for IBM i Community Edition (CE)
    - FREE per IBM partnership
    - Includes “Optimizer+” that speeds up code
  - Zend Server for IBM i
    - Subscription available
    - High value extra features: application monitoring, diagnostics, page caching, more
    - Higher Support SLAs
Included with Zend Server CE

• Everything you need to run PHP on your i
• Plus some goodies
  ▪ Java Bridge
  ▪ Zend Framework
  ▪ 5250 Bridge
  ▪ phpMyAdmin 3.2.0
  ▪ MySql and DB2 Storage Engine

• Non-free features (need regular Zend Server license)
  ▪ Job queue
  ▪ Code tracing/black box
  ▪ Other productivity tools
  ▪ Enhanced support options
Zend Server Installation

• **Click the green “Free Download” button here:**

• **Verify PTFs required by IBM’s FastCGI**
  - Current group for 57nnDG1 – IBM HTTP Server for i5/OS
  - **V5R4**
    - PASE – SI36004
    - HTTP – SI36026
  - **i6.1**
    - PASE – SI36005
    - HTTP – SI36027
Zend Server Installation (more)

- **Check the requirements/release notes**
  - [http://static.zend.com/topics/Zend-Server-for-IBM-i-Release-Notes-V5-0-1.txt](http://static.zend.com/topics/Zend-Server-for-IBM-i-Release-Notes-V5-0-1.txt)
  - i5/OS V5R4, v6.1, v7.1
  - PASE, Qshell, recent cumulative PTF package, more

- **Get Zend Server for i5/OS**
    - Free account required
    - Look for “IBM i” then “Zend Server for IBM i (PHP 5.3)”
  - Community Edition (CE) license is free
  - Choose Windows-based installer or *SAVF

- **Install on your i5**
  - If you need MySQL, can select it, too

- **Start Zend Server**: GO ZENDSVR/ZSMENU, Option 5 then 1
Zend Server Administration

- **Single interface for all controls**

- **Apache changes**
  - Single server (YAY!)
    - PASE server eliminated
  - IBM HTTP Server Powered by Apache
  - PHP implemented using Fast CGI developed by IBM
  - Restart button saves round trip to green screen!
Recommended (by me) changes to PHP.INI

Make changes to /usr/local/zendsvr/etc/php.ini (EDTF or text editor), then restart Zend Server

; Defines the default timezone.
date.timezone = America/New_York

; ensure that a session path is defined
session.save_path = "/tmp"

; Maximum allowed size for uploaded files.
; increase from 2M to whatever you see fit
upload_max_filesize = 10M
### Zend Server's Interface

#### Recent Events

<table>
<thead>
<tr>
<th>Id</th>
<th>Generated by Rule</th>
<th>Count</th>
<th>Last Occ.</th>
<th>Severity</th>
<th>Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>000001</td>
<td>Severe Slow Query Execution</td>
<td>1</td>
<td>05-Jan 06:22</td>
<td>Critical</td>
<td>db2_exec</td>
</tr>
<tr>
<td>000002</td>
<td>Severe Slow Request Execution (Absolute)</td>
<td>1</td>
<td>05-Jan 06:22</td>
<td>Critical</td>
<td><a href="http://192.168.15.203:10098/imap/ak/customers/partnerroad/showzandoustlist1">http://192.168.15.203:10098/imap/ak/customers/partnerroad/showzandoustlist1</a></td>
</tr>
<tr>
<td>000002</td>
<td>PHP Error</td>
<td>4</td>
<td>05-Jan 06:28</td>
<td>Warning</td>
<td><a href="http://www.ZendSrvnldocs/imap/ak/customers/partnerroad/showzandoustlist1func1.s">www.ZendSrvnldocs/imap/ak/customers/partnerroad/showzandoustlist1func1.s</a></td>
</tr>
<tr>
<td>000004</td>
<td>PHP Error</td>
<td>7</td>
<td>05-Jan 06:28</td>
<td>Warning</td>
<td><a href="http://www.ZendSrvnldocs/imap/ak/customers/partnerroad/showzandoustlist1func1.s">www.ZendSrvnldocs/imap/ak/customers/partnerroad/showzandoustlist1func1.s</a></td>
</tr>
<tr>
<td>000005</td>
<td>PHP Error</td>
<td>7</td>
<td>05-Jan 06:26</td>
<td>Warning</td>
<td><a href="http://www.ZendSrvnldocs/imap/ak/customers/partnerroad/showzandoustlist1func1.s">www.ZendSrvnldocs/imap/ak/customers/partnerroad/showzandoustlist1func1.s</a></td>
</tr>
</tbody>
</table>

#### System Overview

- **PHP Version**: 5.2.11
- **Zend Framework Version**: 1.9.6

#### Zend Server

- **Zend Code Tracing**: ON
- **Zend Data Cache**: ON
- **Zend Debugger**: ON
- **Zend Guard Loader**: OFF
- **Zend Java Bridge**: OFF
- **Zend Job Queue**: ON
- **Zend Monitor**: ON
- **Zend Optimizer+**: ON
- **Zend Page Cache**: ON

### Tasks

- Learn how to start with Zend Server and PHP
- Configure Zend Server Extensions

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Your license will expire in 29 days. Click [here](#) to update your license.
Zend Server’s Code Tracing (non-CE)
Zend Server for debugging

Drill down to find the cause of performance lags or errors
Some Zend Jobs run in ZENDSVR

- Look in ZENDSVR subsystem for Zend jobs

```
Subsystem .................: ZENDSVR

Type options, press Enter.
  2=Change  3=Hold  4=End  5=Work with  6=Release  7=Display message  8=Work with spooled files  13=Disconnect

<table>
<thead>
<tr>
<th>Opt</th>
<th>Job</th>
<th>User</th>
<th>Type</th>
<th>------Status-----</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>__</td>
<td>15.COMD</td>
<td>QTCP</td>
<td>BATCH</td>
<td>ACTIVE</td>
<td>PGM-EASYCOMD</td>
</tr>
<tr>
<td>__</td>
<td>ZSJAVACRG</td>
<td>QTMHHTTP</td>
<td>BATCHI</td>
<td>ACTIVE</td>
<td>PGM-watchdog</td>
</tr>
<tr>
<td>__</td>
<td>ZSJAVACRG</td>
<td>QTMHHTTP</td>
<td>BATCHI</td>
<td>ACTIVE</td>
<td>JVM-com.zend.j</td>
</tr>
<tr>
<td>__</td>
<td>ZSJAVACRG</td>
<td>QTMHHTTP</td>
<td>BATCHI</td>
<td>ACTIVE</td>
<td>PGM-watchdog</td>
</tr>
<tr>
<td>__</td>
<td>ZSMONMNG</td>
<td>QTMHHTTP</td>
<td>BATCHI</td>
<td>ACTIVE</td>
<td>PGM-jqd</td>
</tr>
<tr>
<td>__</td>
<td>ZSMONMNG</td>
<td>QTMHHTTP</td>
<td>BATCHI</td>
<td>ACTIVE</td>
<td>PGM-watchdog</td>
</tr>
</tbody>
</table>

Parameters or command

万股 Exit  F4=Prompt  F5=Refresh  F9=Retrieve  F11=Display schedule data
F12=Cancel  F17=Top  F18=Bottom
```
Web server jobs run in QHTTPSVR

- QHTTPSVR is normal subsystem for web servers
Differences:
Core / Server
# Differences: Zend Core and Server

<table>
<thead>
<tr>
<th></th>
<th>Zend Core</th>
<th>Zend Server</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Installation folder</strong></td>
<td>/usr/local/zend/core</td>
<td>/usr/local/zendsvr</td>
</tr>
<tr>
<td><strong>PHP.INI</strong></td>
<td>/usr/local/zend/core/etc</td>
<td>/usr/local/zendsvr/etc</td>
</tr>
<tr>
<td><strong>Web server root(s)</strong></td>
<td>/www/zendcore and /usr/local/zend/apache2</td>
<td>/www/zendsvr</td>
</tr>
<tr>
<td><strong>Document root</strong></td>
<td>/www/zendcore/htdocs</td>
<td>/www/zendsvr/htdocs</td>
</tr>
<tr>
<td><strong>Zend Framework</strong></td>
<td>/usr/local/Zend/ZendFramework</td>
<td>/usr/local/zendsvr/share/ZendFramework</td>
</tr>
<tr>
<td><strong>PHP binaries folder</strong></td>
<td>/usr/local/zend/core/bin</td>
<td>/usr/local/zendsvr/bin</td>
</tr>
<tr>
<td>where php resides</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PHP Log files</strong></td>
<td>/usr/local/zend/core/logs</td>
<td>/usr/local/zendsvr/var/log</td>
</tr>
<tr>
<td><strong>Web user profile</strong></td>
<td>NOBODY</td>
<td>QTMHHTTP</td>
</tr>
<tr>
<td>(assign authority to it)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Default HTTP Port</strong></td>
<td>:89</td>
<td>:10088</td>
</tr>
<tr>
<td><strong>Admin Interface URL</strong></td>
<td><a href="http://yourIBMi:89/ZendCore/">http://yourIBMi:89/ZendCore/</a></td>
<td><a href="http://yourIBMi:10088/ZendServer/">http://yourIBMi:10088/ZendServer/</a></td>
</tr>
</tbody>
</table>
Review: PHP basics on i
Review of PHP basics: Step 1

• **Learn some basic HTML**
  - Try http://w3schools.com/html
  - Tables (<table>,<tr>,<td>) useful for business data
  - “View Source” in browser to borrow bits of HTML

• **Optional: learn as needed**
  - Javascript
    - Adds dynamic functionality to pages
  - Cascading style sheets (CSS)
    - Modern way to specify colors, fonts, and other attributes of how a site looks
Step 2: Try a simple PHP script

- PHP scripts are text files that reside in the IFS
- Save script in /www/zendsvr/htdocs/helloworld.php
- Run in browser URL: http://i5system:10088/helloworld.php

```php
<?php
    // simple script to test PHP
    echo "Hello, world!";
?>
```
“Hello, world!” in browser

- The output of helloworld.php

Hello, world!
Step 3: Access db2

- **Example:**
  - Connect to db2 on i
  - Select records from a db2 table
  - Load the records in an HTML table
  - Display the output

**Customer list for a company**

<table>
<thead>
<tr>
<th>Customer Number</th>
<th>Customer Name</th>
<th>Address Line 1</th>
<th>Address Line 2</th>
<th>City</th>
<th>State</th>
<th>Zip Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jimmy Buffet</td>
<td>5555 Candy Lane</td>
<td>Apt. 2</td>
<td>Chicago</td>
<td>IL</td>
<td>60694</td>
</tr>
<tr>
<td>2</td>
<td>Sherlock Holmes</td>
<td>221 Baker Street</td>
<td>Apt. B</td>
<td>London</td>
<td>EN</td>
<td>22101</td>
</tr>
<tr>
<td>3</td>
<td>Gregory House</td>
<td>221 Baker Street</td>
<td>Unit B</td>
<td>Newark</td>
<td>NJ</td>
<td>07114</td>
</tr>
<tr>
<td>4</td>
<td>Dexter Morgan</td>
<td>666 Collins St</td>
<td>Apt 13</td>
<td>Miami Beach</td>
<td>FL</td>
<td>33109</td>
</tr>
<tr>
<td>5</td>
<td>Mary Shannon</td>
<td>200 Laredo Dr</td>
<td></td>
<td>Albuquerque</td>
<td>NM</td>
<td>87104</td>
</tr>
</tbody>
</table>
Connection to DB2 for i

• Need three things (OK to leave blank for default):
  - Database name
  - User ID
  - Password

// Standard DB connection to DB2...
$conn = '*LOCAL'; $name = ''; $pwd = ';

$i5link = db2_connect($conn, $name, $pwd);
if (!$i5link)
  echo 'Connection failed: '.db2_stmt_error().' : '.db2_stmt_errormsg();

$sql = "SELECT * from prodlib.customer";

$stmt = db2_exec($i5link, $sql)
or die("Failed query:".db2_stmt_error().":".db2_stmt_errormsg());
?>
Reading data

Loop through record set

```php
<h1> Customer list for a company</h1>
<TABLE BORDER="10" BORDERCOLOR="blue"><TBODY BGColor="DEB887">
<TR><TD>Customer Number</TD><TD>Customer Name</TD><TD>Address Line 1</TD><TD>Address Line 2</TD><TD>City</TD><TD>State</TD><TD>Zip Code</TD></TR>
<?php
foreach ($row as $k => $v) {
    echo "<TR><TD> $row['CUSTNUM'] </TD>
<TD>$row['CUSTNAME']</TD><TD>$row['CUSTADDR1']</TD><TD>$row['CUSTADDR2']</TD><TD>$row['CUSTCITY']</TD><TD>$row['CUSTSTATE']</TD><TD>$row['CUSTZIP']</TD></TR>
";
}
echo ' </table> ';
db2_close($i5link);
?>
```
PHP Resources

- **Webinars:**
  - Zend’s pre-recorded webinars: http://www.zend.com/resources/webinars/i5-os
  - My basic PHP presentation: http://www.sbsusa.com/php/

- **Support:** Zend Server includes one year of “silver” support

- **Forums and lists**
  - forums.zend.com (look for IBM i forums)
  - lists.nyphp.org (general PHP questions)

- **Books (online and print)**
  - Zend Core for i5/OS Redbook
  - PHP on IBM i book by Jeff Olen & Kevin Schroeder (MC Press)

- **PHP User Groups**
  - nyphp.org, liphp.org
  - COMMON has lots of PHP
Zend Framework
Zend Framework

- **A starting point for your applications, providing**
  - Security features
  - Modular design

- **A collection of over 70 PHP components to simplify common tasks, including some for:**
  - Form creation (and reuse)
  - Logging
  - Database access

- **A demonstration of PHP 5 best practices**

- **It provides standards and great functionality but will not cramp your style. Your development is not limited in any way**
Why ZF’s time is right

- PHP is being used for critical apps on IBM i
- Managers, CIOs, technology architects are taking notice
- It’s time for professional practices
  - Standards and consistency
  - Awareness of security
  - Reuse and easy maintenance of code
    - Leverage your software investments
  - Training and support
  - Doing it “right”
- ZF gets you there—“Enterprise PHP”—faster—and keeps you in control
Why I use it

• As I learn what it can do, the less boring code I write
  ▪ I can write less “plumbing” code

• Use ZF’s code however you like
  ▪ http://framework.zend.com/license
  ▪ Safe for corporate use

• It keeps up with trends and APIs
  ▪ Compatibility with diverse database systems, and APIs (authentication, web services, more)
Zend Framework Community

• Contributors include individuals and companies. Companies include:
  ▪ Zend (of course)
  ▪ IBM
  ▪ OmniTI

• Technology partners:
  ▪ Adobe, Google, IBM, Microsoft, nirvanix, StrikeIron
Here’s why ZF reminds me of the i5 world

- **Appreciation of standards: naming, parameter lists**

- **The tools you need are already integrated**
  - Common components (template system, emailer, etc.) are there for you; no need to research/download/install
  - Upgrades like a “cume tape”—all components upgraded as a well tested unit

- **ZF support available from Zend**
  - Similar to phoning IBM about i5/OS
ZF’s birth, early years, and maturity on i5

• **2005: PHP Collaboration Project at ZendCon**
  ▪ Started as collection of components but coalesced
  ▪ PHP 5, object oriented (OO) from the start
  ▪ Set example of OO design patterns and practices
    • More on OO later

• **2007-2009: Fast progress**
  ▪ July 2007: GA version 1.0
  ▪ Feb. 2009: version 1.70 with db2/i5 support
  ▪ Oct. 2009: version 1.94; minor releases every couple of weeks

• **April 2009: ZF/i application won COMMON’s “best web solution”**
COMMON award for best web solution 2009

Allied Beverage Group’s “eBiz”

Wine catalog/ordering system on IBM i

Built in Zend Framework

Full-text catalog search in native db2
Why eBiz was successful

- For Allied, PHP brings people and resources together on the “i”
  - db2 database provides reliable, consistent product catalog and order data
  - No extra servers needed
  - Re-using RPG logic
  - Everyone on the same team
  - PHP is “superglue”: plans afoot to connect other systems, too

- In the wine distribution industry, a solid reputation is important
  - For their first high-profile project, asked Strategic (us) to develop the system

- Consistency, standards, security, reusability
  - Zend Framework

- Speed critical for sales reps in the field
  - (Being compared to green screen speed!)
  - Zend Platform
## Allied Beverage eBiz live demo (if time)

### Zend Server and Zend Framework on IBM i

- **Date:** 21-April-2010
- **Presenter:** Alan Seiden, Strategic Business Systems

---

### Search Results for CHARD NAPA 375ML

- **Product:**
  - **Acacia Chardonnay A By Acacia**
  - **Code:** 5637061
  - **Size:** 375 MI
  - **Pack:** 12
  - **Qty:** 3
  - **Price:**
    - **$ Case:**
    - **$ Bottle:**
  - **Inventory:**
    - **Case:** 26
    - **Bottle:** 5
  - **Vintage:** NV
  - **$ Best Buy:**

- **Cakebread Cellars Chardonnay Napa Valley 07**
  - **Code:** 7433065
  - **Size:** 375 MI
  - **Pack:** 12
  - **Qty:** 1
  - **Price:**
    - **$ Case:**
    - **$ Bottle:**
  - **Inventory:**
    - **Case:** 9
    - **Bottle:** 5
  - **Vintage:** 2007

- **Greiff Cellar Chardonnay**
  - **Code:** 5544265
  - **Size:** 375 MI
  - **Pack:** 12
  - **Qty:**
  - **Price:**
    - **$ Case:**
    - **$ Bottle:**
  - **Inventory:**
    - **Case:** 5
    - **Bottle:** 7
  - **Vintage:** 2006

- **Levendi Chardonnay Red Hen 05**
  - **Code:** 4591060
  - **Size:** 375 MI
  - **Pack:** 12
  - **Qty:**
  - **Price:**
    - **$ Case:**
    - **$ Bottle:**
  - **Inventory:**
    - **Case:** 13
    - **Bottle:** 2
  - **Vintage:** 2005

- **Merryvale Chardonnay Starmont 07**
  - **Code:** 4223069
  - **Size:** 375 MI
  - **Pack:** 12
  - **Qty:**
  - **Price:**
    - **$ Case:**
    - **$ Bottle:**
  - **Inventory:**
    - **Case:** 8
    - **Bottle:** 8
  - **Vintage:** 2007

- **Schramsberg Blanc de Blanc**
  - **Code:** 4056064
  - **Size:** 375 MI
  - **Pack:** 12
  - **Qty:**
  - **Price:**
    - **$ Case:**
    - **$ Bottle:**
  - **Inventory:**
    - **Case:** 17
    - **Bottle:** 9
  - **Vintage:** 2005

---

**Welcome to Allied Beverage eBiz!**

- **Pricing Month:** June 2009
- **Total List:** $184.56
- **Total Discount:** $122.54
- **Est Total Net:** $62.02
  - **Cases:** 1
  - **Bottles:** 0
Object Orientation
(Instant 2-slide intro)
Object Orientation (OO)

Here is an incredibly quick summary of OO, which you’ll see used throughout ZF

<table>
<thead>
<tr>
<th>OO Concept</th>
<th>Analogy in i5</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property</td>
<td>a field in a data structure</td>
<td>$_orderNum</td>
</tr>
<tr>
<td>Method</td>
<td>function or subprocedure</td>
<td>isOrder()</td>
</tr>
<tr>
<td>Class</td>
<td>Imagine an intelligent data structure containing both data (properties) and programming logic (methods), which are both called “members” of the class</td>
<td>class Order {</td>
</tr>
<tr>
<td></td>
<td></td>
<td>protected $_orderNum;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>function isOrder() {</td>
</tr>
<tr>
<td></td>
<td></td>
<td>. . .</td>
</tr>
<tr>
<td></td>
<td></td>
<td>}</td>
</tr>
<tr>
<td></td>
<td></td>
<td>. . .</td>
</tr>
<tr>
<td></td>
<td></td>
<td>}</td>
</tr>
</tbody>
</table>
The arrow (->) lets you access the members (methods and properties) of an object instance

- $controller = $this->getRequest()->getControllerName();

Sometimes you’ll also see the double colon (::), which is similar, but is used when a member is “static” (one per class)

- echo Zend_Registry::get('user');

If you can read this notation, you can read ZF code. You will learn to appreciate its simplicity.
Model – View – Controller (MVC) design pattern

- You already know this pattern from RPG/DDS
- With green screens, IBM handles it under the covers, so you take it for granted
- On the web, you must define your application’s structure more explicitly
- Be patient…MVC seems strange at first, but you’ll soon realize that you’ve been here before…
MVC in detail

• **Model**
  - Reusable classes that access data and business rules
  - Keep SQL and application details in one place

• **View**
  - Templates containing HTML or other output, with small bits of PHP
  - Plunk your HTML into a “view” without worrying about overwriting your mainline PHP code—helps web designers work with business programmers

• **Controller (action controller)**
  - Application flow
  - Connects model and view
  - Don’t confuse with “front controller,” which just initializes the MVC

• **Next: MVC from an RPG perspective**
RPG Model View Controller (MVC)

RPG/Application (Subroutine)

Access/Business Logic

VIEW

5250 Screen (DDS)

RPG/Application flow (Mainline)
Confession

For my first attempt with ZF, I put all my SQL in the controller

It gave me a feeling of accomplishment

The MVC police did not appear

Later, I moved the SQL into a model class

- Simplified the controller, which was getting complex and hard to understand
- Made the SQL reusable
Front controller to action controller

Zend Framework - Extremely Simple

Frontend Generators
- ZTemplate
- ZForm
- ZAjax
- ZGetText
- ZPdf

Data
- ZDbTable
- ZActiveRecord
- ZSearch
- ZInputFilter
- ZXQuery
- ZDbSelect
- ZRequest
- ZXmlRepository

Web Services
- ZRest (Google, Yahoo!, eBay, Amazon)
- ZSoap, ZWsdl
- ZXmlRps
- ZFeed

User
- ZAuth
- ZAc1
- ZSession

Misc
- ZNavigation
- ZConfiguration
- ZMail
- ZLog
- ZUri
- ZComponent

Documentation
- phpDoc
- Manual (DocBook)
Front controller routes “friendly” URL

- **Default routing convention:**
  - `http://example.com/controller/action/param1/value1...`

- Controller maps to class name
- Action maps to method name
- Param/value pairs are passed to action

Diagram:
- Bootstrap: index.php
  - http request
  - Front Controller
  - Controller1 action1()
  - Controller1 action2()
All requests through index.php in doc root

Document root is the only public folder.

index.php:
- initializes application
- instantiates Front Controller

On i5, I prefer to edit the Apache .conf file directly rather than add .htaccess files.
Apache configuration

Most tutorials suggest .htaccess, but I prefer to use the main PASE Apache config file (without proxy): /usr/local/Zend/apache2/conf/httpd.conf

Listen 8000
RewriteEngine on

NameVirtualHost 10.11.12.13:8000
<VirtualHost 10.11.12.13:8000>
    DocumentRoot /www/ebiz/htdocs/html
</VirtualHost>

<Directory /www/ebiz/htdocs/html/>
    # disallow .htaccess, so webserver won’t search for them
    AllowOverride None

    # funnel all requests to index.php
    # except requests for static resources
    RewriteEngine On
    RewriteRule !\.(js|ico|gif|jpg|png|css|html)$ index.php
</Directory>
<?php
// minimum bootstrap file (can be many variations)
// use explicit, full paths to save the i5 time searching for files
$paths = array(
    realpath(dirname(__FILE__) . '/../library'),
    realpath(dirname(__FILE__) . '/../application'),
    realpath(dirname(__FILE__) . '/../application/models'),
    '.
);
set_include_path(implode(PATH_SEPARATOR, $paths));

// Prepare the front controller
$frontController = Zend_Controller_Front::getInstance();
// Dispatch the request using the front controller
$frontController->dispatch();
Model-View-Controller
(Good structure for your application)
**Action Controller**

- **Controller classes handle groups of request URLs**
  
  http://example.com/controller/action

  Default: IndexController

  - Organizes and groups functionality
  - One class (extending Zend_Controller_Action) for each controller

- **Action methods in each controller class handle requests**
  
  http://example.com/controller/action

  Default: indexAction()

  - Named like `actionAction()`
  - Example: If `action` is “edit” then method is `editAction()`
Controller example

```php
<?php

require_once 'Zend/Controller/Action.php';

class IndexController extends Zend_Controller_Action
{
    /**
     * The default action - show the home page
     */
    public function indexAction()
    {
        // Use default value of 1 if id is not set
        $id = $this->_getParam('id', 1);

        // assign id to view
        $this->view->id = $id;
    }
}
```
Zend View
View

Scripts (templates)
- PHP-based script templates to present data
- Should contain only display logic, not business logic
- Default naming: “myaction.phtml”

Helpers
- Classes and methods that provide reusable view functionality
  - Examples of built-in view helpers: escape(), formText(), partial(), partialLoop(), headTitle()
  - Write your own, too

Layout
What View means to you

You can plunk HTML right into the view script and replace literals with PHP echo statements:

- `<?php echo $this->productNum ?>`

ZF provides smart defaults

- The `$this->escape()` view helper uses PHP’s `htmlentities()` function, recommended by most security experts.
class Zend_View_Helper_Title_Case {

    public $view;

    public function titleCase($string = '') {
        return ucwords(strtolower(trim($string)));
    }

    public function setView(Zend_View_Interface $view) {
        $this->view = $view;
    }

} //public function titleCase()

Usage:
echo $this->titleCase('mozilla 
firefox');
// Mozilla Firefox
Controller (again)…leads to view

```php
<?php

require_once 'Zend/Controller/Action.php';

class IndexController extends Zend_Controller_Action
{
    /**
     * The default action - show the home page
     */
    public function indexAction()
    {
        // Use default value of 1 if id is not set
        $id = $this->_getParam('id', 1);

        // assign id to view
        $this->view->id = $id;
    }
}
```
Welcome
Welcome the home page's simple view script.
Your id is 1.

Welcome
Welcome to the home page's simple view script.
Your id is 39.
Zend_Layout

Gives your site a consistent look while retaining flexibility

Two-step view pattern
  - Uses Zend_View for rendering

Placeholders useful for setting javascript, titles, other variable data
```php
1<?php
2
3echo '<?xml version="1.0" encoding="UTF-8" ?>';
4echo $this->doctype();
5?>
6
7<html>
8
9   <head>
10      <meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
11<?php
12echo $this->headTitle();
13echo $this->headScript();
14echo $this->headStyle();
15?>
16
17</head>
18
19<body>
20   <h1><?php echo $this->placeholder('title') ?></h1>
21<?php echo $this->layout()->content ?>
22
23   <br/>
24   <br/>
25
26</body>
27</html>
```
Model
Model

Model classes are abstract representations of data

- Can be extended from:
  - Zend_Db_Table – For database abstraction
  - Or any other class that fits your needs
  - Or build your own abstract representations of your data

Model classes can contain business logic to prepare complex data for presentation

I stuff any “weird” code in models so that controllers/views are clean
Model example: “system busy” flag

// model: Busyflag.php

class Busyflag
{
    protected $name = 'SYSFLAGS'; // old-fashioned “System 36”
table

    // isSiteUp: return true if up, false if down
    public function isSiteUp() {
        $sql = "select BZYFLG from \$this->name where RECID ='B'";
        $row = SBSDbhelp::getOneRow($sql);

        // true if Y, false otherwise.
        return $row['BZYFLG'] == 'Y';
    }
} // (public function isSiteUp())
} // (class Busyflag)

// usage (from a preDispatch front controller plugin)
$busyFlag = new Busyflag();
if (!$busyFlag->isSiteUp()) {
    // Take user to "site down" page.
} // (if (!$busyFlag->isSiteUp()))
Components included
Library of Zend components

Reminder:
Zend/Db.php = Zend_Db
Zend/Db/Table.php = Zend_Db_Table
Zend_Form component
Zend_Form

• Creates the HTML for your data entry forms
  ▪ $form = new Zend_Form();
  ▪ $form->addElement('text', 'ordernum');
  ▪ $form->addElement('text', 'date');

• Several ways to output form elements
  ▪ echo $form; // (all elements) or
  ▪ echo $form->ordernum; // (just ordernum) or
  ▪ echo $form->getElement('ordernum');

• The HTML generated by that last echo
  ▪ <input type="text" name="ordernum" id="ordernum">
// in a model:
class My_Form extends Zend_Form
{
    /* Create a text box that checks for non-letter characters 
     ** and converts text to lower case on submission */
    $form->addElement('text', 'username', array(
        'validators' => array(
            'alnum',
            array('regex', false, '/^[a-z]/i')
        ),
        'required' => true,
        'filters' => array('StringToLower'),
    ));
}

// in a controller:
$form = new My_Form();
$this->view = $form

// in a view:
echo $this->form;
Real life example of Zend_Form
### Search Results

**Search Results (14 products found)**

**Advanced Search**

- Search for item: 
- with bottle price ($) 

Results for **Varietal: CHARDONNAY BLEND**

<table>
<thead>
<tr>
<th>Product</th>
<th>Code</th>
<th>Size</th>
<th>Pack</th>
<th>Price</th>
<th>Inventory</th>
<th>Vintage</th>
<th>Info</th>
<th>$ Best Buy</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Antinori Cervaro</em> <em>Della Sala</em> <em>Chardonnay</em></td>
<td>6600543</td>
<td>750 Mi</td>
<td>6</td>
<td></td>
<td></td>
<td>2006</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Bodegas Julian</em> <em>Chivite Navarra Reserva Coleccion 125</em></td>
<td>6784340</td>
<td>750 Mi</td>
<td>6</td>
<td></td>
<td></td>
<td>IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ca Montini Luna Di Luna Chardonnay/Pinot Grigio Gift Pack</em></td>
<td>4502448</td>
<td>750 Mi</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*This product may be substituted with 8600544.*
// AdvancedSearchForm class is a model:
class AdvancedSearchForm extends Zend_Form {

    $prodId = new Zend_Form_Element_Text("prodid",
            array('size' => 7, 'maxlength' => 7, 'class' => 'width5'));
    $prodId->setRequired(false)
            ->addFilters(array("StripTags", "StringTrim"))
            ->addValidator(new Zend_Validate_Digits())
            ->setDescription("Partial product ID")
            ->setLabel("Code");

    $this->addElements(array($prodId));

} //(AdvancedSearchForm)
Zend_Db

database access
Database access with Zend_Db

**Zend_Db can create SQL for you**
- Fewer long, error-prone SQL strings

**Zend_Db offers a lot beyond creating SQL**
- consistent quoting
- escaping
- prepared statements (substitutions for “?”)
- profiler
Database access

Several classes give you a good start

- **Zend_Db_Adapter_Abstract**: uniform API for many RDBMS’s
  - Zend_Db_Adapter_Db2
  - Zend_Db_Adapter_Pdo_Mysql

- **Zend_Db_Table**: Gateway class for doing queries on a given table

- **Zend_Db_Statement**: Specify SQL for “prepared” statement (secure--with ? marks)

- …and more
Zend_Db_Table gives you record-level access similar to what you may be used to.

- **Insert**
  
  ```php
  \$products->insert(array(
      'prodid' => '1234567',
      'prodname' => 'sparkling water',
  ));
  ```

- **Update**

- **Find (like chaining with a key)**
  
  ```php
  \$results = $products->find('1234567');
  ```

- **Delete**
Zend_Db techniques for IBM i

```php
$driverOptions = array('i5_lib' => 'MYLIBRARY');
// Use 'driver_options' => array('i5_naming' => DB2_I5_NAMING_ON)) for liblists

$config = array(
    'host' => 'localhost',
    'username' => 'ALAN',
    'password' => 'secret',
    'dbname' => 'SBSDB',
    'driver_options' => $driverOptions);

$db = Zend_Db::factory('DB2', $config);

// Using "select" method to select and display records
$rows = $db->select()->from('CUSTOMERS')
    ->where('CUSTNO >= 0');
// or write your own SQL with parameters
$sql = 'SELECT * FROM CUSTOMERS WHERE CUSTNO > ? and CUSTNO < ?';
$rows = $db->fetchAll($sql, array(100, 2000));

// either way, output results
foreach ($rows as $row) {
    echo $row['CUSTNO'] . ' ' . $row['CUSTNAME'];
}
```
<?php
// combine three TIFF images into a multi-page PDF
$images = array('/images/page1.tif', '/images/page2.tif', '/images/page3.tif');

$newFileName = '/pdf/full_document.pdf';

$pdf = new Zend_Pdf();

foreach ($images as $image) {
    // Create new page
    $pdfPage = $pdf->newPage(Zend_Pdf_Page::SIZE_A4);
    $image = Zend_Pdf_Image::imageWithPath($image);
    $pdfPage->drawImage($image, 10, 10, 400, 500);
    // add page to pdf
    $pdf->pages[] = $pdfPage;
}

// Save document as a new file
$pdf->save($newFileName);
Client classes for web services

- Akismet
- Amazon
- Audioscrobbler
- Delicious
- Flickr
- Google Data
- Nirvanix
- ReCaptcha
- Simpy
- SlideShare
- Strikelron
- Technorati
- Twitter
- Yahoo
Search the web with Yahoo

- Get your application ID from http://developer.yahoo.com/wsregapp/
- Class uses Zend_Rest_Client under the covers
- Returns Zend_Service_Yahoo_WebResultSet containing instances of Zend_Service_Yahoo_WebResult

```php
$yahoo = new Zend_Service_Yahoo("YAHOO_APPLICATION_ID");
$results = $yahoo->webSearch('IBM PHP',
                           array('results' => '10',
                                 'start'    =>   1));

foreach ($results as $result) {
    echo '<b>' . $result->Title . '</b> ' . $result->Url . '<br />';
}
```
Results from $yahoo->webSearch

Informed Networker - Social News for IT Professionals. - IBM, Zend ... http://www.informednetworker.com/other/ibplatform/
:: News: PHP: Zend Core for IBM on Linux http://madpenguin.org/cms/?m=show&id=4775
Digg - IBM: PHP development within Eclipse http://digg.com/programming/IBM_PHP_development_within_Eclipse
Digg - Will IBM Buy Zend / PHP ? http://digg.com/linux_unix/Will_IBM_Buy_Zend_PHP
php, simplexml | Diigo http://www.diigo.com/tag/php+simplexml
ibm, rest | Diigo http://www.diigo.com/tag/ibm,rest
IBM poop heads say LAMP users need to "grow up" http://naeblis.cx/rtomayko/2005/05/28/ibm-poop-heads
Hypergene MediaBlog " IBM, blogging and the rise of the world's biggest ... http://www.hypergene.net/blog/print.ph
Start the right way with Zend Studio for Eclipse

- Creates a complete “hello world” application for you
  - Leverage the ZF development team’s best practices
Official information:
- framework.zend.com/docs/quickstart
- zend.com/resources/webinars

Community tutorials and answers:
- zfforums.com
- devzone.zend.com
Path to ZF

• Jump in
  ▪ Have a pilot project in mind
  ▪ Take a ZF training class
  ▪ Get mentoring from someone savvy in both ZF and “i”

• Stay connected
  ▪ Join a ZF community, either online or a Meetup in person
  ▪ Subscribe to Zend’s ZF support if it’s a mission-critical app
Now it’s your turn
Share what you’ve been working on

- Or what you’d LIKE to be working on

- I’ll answer any questions about PHP or web
  - How to get started
  - Comparisons of technologies
  - Specific PHP issues
  - How to do a particular task
Thanks! See you at next talk tonight

Alan Seiden (blog and articles: alanseiden.com)
aseiden@sbsusa.com or 201-327-9400

To receive free PHP/i tips by email, write to aseiden@sbsusa.com with subject: “PHP tips.”
Or write “PHP tips” on a business card tonight