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# **“From Zero to ZF” on IBM i**

## **Your first Zend Framework project**

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Alan Seiden Consulting  
[alanseiden.com](http://alanseiden.com)

## Advancing PHP on IBM i

- PHP project leader, Zend/IBM Toolkit
- Contributor, Zend Framework DB2/i enhancements
- Developer, Best Web Solution, IBM/Common
- Authority, subsecond web performance on IBM i/iSeries

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# Where to download these slides

From my site

**<http://alanseiden.com/presentations>**

On SlideShare

**<http://slideshare.net/aseiden>**

The latest version will be available on both sites

# Whom this talk is for

- **Experienced PHP developers...**
  - ...will see a step-by-step demonstration of how to create a Zend Framework project that runs on the first try
- **Zend Framework developers...**
  - ...will learn a streamlined, methodical approach that uses today's tools
- **Others...**
  - ...will maybe see something interesting. 😊  
To beginning PHP developers: Regular PHP is fine. You will know when the time is right to jump in with ZF.

# What we'll do today

- **Help you get a feeling of SUCCESS with Zend Framework (v1.x) on IBM i**
- **We'll get you past common sticking points:**
  - Installing ZF
  - Creating a remote project (IFS-based) in Zend Studio
  - Apache web server configuration, including “rewrite” rules
  - Adding to the default project
  - Getting library lists to work (and other db2 on i options, too)
- **I'll provide additional resources for study**
- **And answer your questions**

# ZF Basics

# What ZF is

- **PHP-based framework with best practices for PHP5, OO**
- **Free and open source**
- **Cross-platform**
- **Developed by the community and full-time, dedicated Zend employees, with help from other important technology companies**
- **Downloaded millions of times**





# A component library AND a full framework

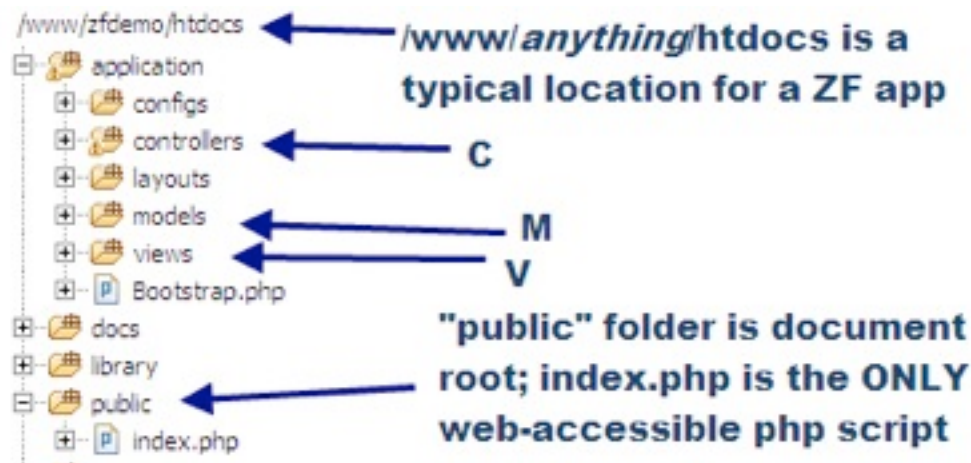
- **ZF includes popular individual components for mail, security, forms, PDF, web services, and much more.**
  - These components can be used from “regular” PHP
  - They are the “gateway drug” of ZF
- **As a full stack framework, ZF includes a Model-View-Controller (MVC) architecture that makes apps easy to maintain**

# Friendly URLs

- **ZF supports friendly URLs by default**
- **URLs route to PHP script and function/method**
  - Defined by ZF's router
  - URL split into script/method/variables according to naming convention (controller and action)
- **Example: `http://mysite.com/customer/list/division/2`**
- **In example above:**
  - Script: **CustomerController.php**
  - Method/function: **listAction()**
  - **division = 2**

# MVC directory structure: more than MVC

- **Model, View, Controller folders, of course**
- **“Public” folder, which is the only public folder**
  - Consistent with best security practices
  - Public script `index.php` initiates a “Front controller”
- **Other resources such as configuration files, layouts, code libraries and documentation**



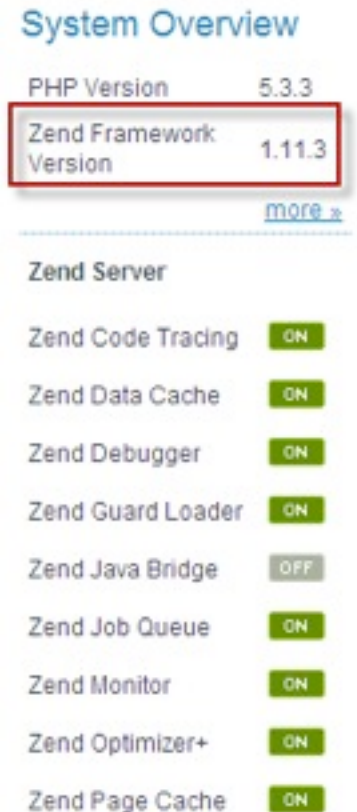
# How ZF fits with Zend's product line

- **Zend Server** <http://www.zend.com/en/products/server/>
  - A value-added PHP install for IBM i, Linux, Windows, Mac OS X
  - As “free” Community Edition (CE) and regular edition
  - Installs a copy of Zend Framework
- **Zend Studio** <http://www.zend.com/en/products/studio/>
  - Integrated Development Environment (IDE)
  - IBM i edition is “free” thanks to IBM/Zend relationship
  - Also installs its own copy of Zend Framework! (on your PC)
- **Zend Framework** <http://framework.zend.com>
  - Can work with any PHP 5.x install, anywhere, but of course it works very well with the above products

# Installing ZF

# It's already there--or download fresh

- **Installed automatically with Zend Server**  
`/usr/local/zendsvr/share/ZendFramework/library/zend`
- **Updates available at <http://framework.zend.com/download/latest>**
  - Unzip into `/usr/local...` (see above) or your ZF library folder
- **PEAR channel on Google Code**
  - Instructions: <http://engineeredweb.com/blog/10/6/installing-and-using-zend-framework-pear>
- More ideas: <http://mikepavlak.blogspot.com/2010/09/updating-zend-framework-on-ibm-i.html>



**System Overview**

PHP Version	5.3.3
Zend Framework Version	1.11.3

[more →](#)

**Zend Server**

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

# Zend Server's easy default install

- This way is fine when you are starting out
- **Folder is** `/usr/local/zendsvr/share/ZendFramework/`
  - Contains `library/zend`
- **PHP.INI specifies** `"/usr/local/zendsvr/share/ZendFramework/"` in its **`include_path` variable**
  - All your PHP applications will be able to find the `library/zend` folder without any further work

## System Overview

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[more »](#)

## Zend Server

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# Step-by-step ZF project



# Step by step ZF configuration

- **Set up SSH**
  - (server) on IBM i
  - (client) in Zend Studio
- **Create project directory on remote server (IBM i)**
- **Use Zend\_Tool to generate skeleton project**
  - We'll use Zend Studio's Zend\_Tool integration rather than PASE's zf.sh script, though both work
- **Configure Apache webserver virtual host**
- **Test basic project. It should run at this point**
- **Configure DB2 adapter for IBM i and test db table**
- **Create additional controller/action**

# SSH setup

# SSH = Secure Shell protocol

- **Faster and more secure than FTP**
- **Zend Studio connects over SSH to the IBM i**
  - SSH server (daemon) is IBM i
  - SSH client is Zend Studio
- **Let's see how to set up the server and client**

# Starting SSH daemon (sshd) on IBM i

- **i6.1 or higher: one step creates keys and starts server**

```
STRTCPSVR *SSHD
```

- **V5R4: two steps**

First, create public/private key pairs:

```
CALL QP2TERM
```

```
ssh-keygen -t rsa1 -f /QOpenSys/QIBM/UserData/SC1/OpenSSH/  
openssh-3.5p1/etc/ssh_host_key -N ""
```

```
ssh-keygen -t dsa -f /QOpenSys/QIBM/UserData/SC1/OpenSSH/  
openssh-3.5p1/etc/ssh_host_dsa_key -N ""
```

```
ssh-keygen -t rsa -f /QOpenSys/QIBM/UserData/SC1/OpenSSH/  
openssh-3.5p1/etc/ssh_host_rsa_key -N "
```

Then start sshd (“&” means to run in background):

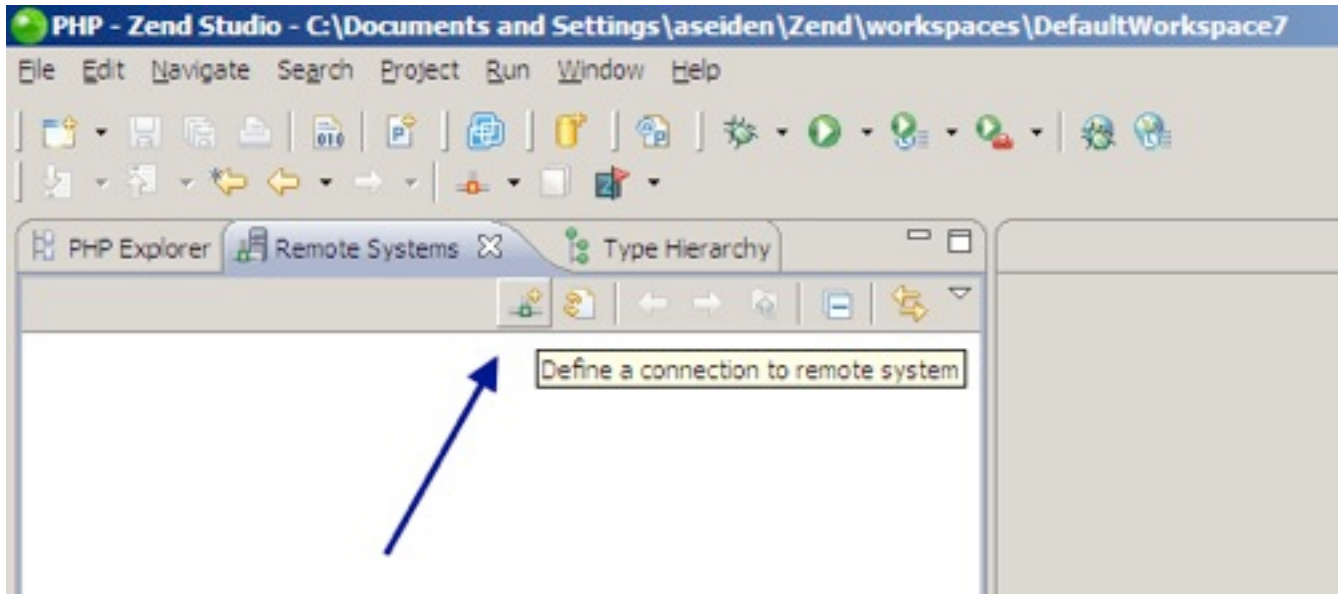
```
/usr/sbin/sshd &
```

For more on sshd setup, see  
“Young i Professionals” wiki:

[http://174.79.32.155/wiki/  
index.php/PASE/SSHSetup](http://174.79.32.155/wiki/index.php/PASE/SSHSetup)

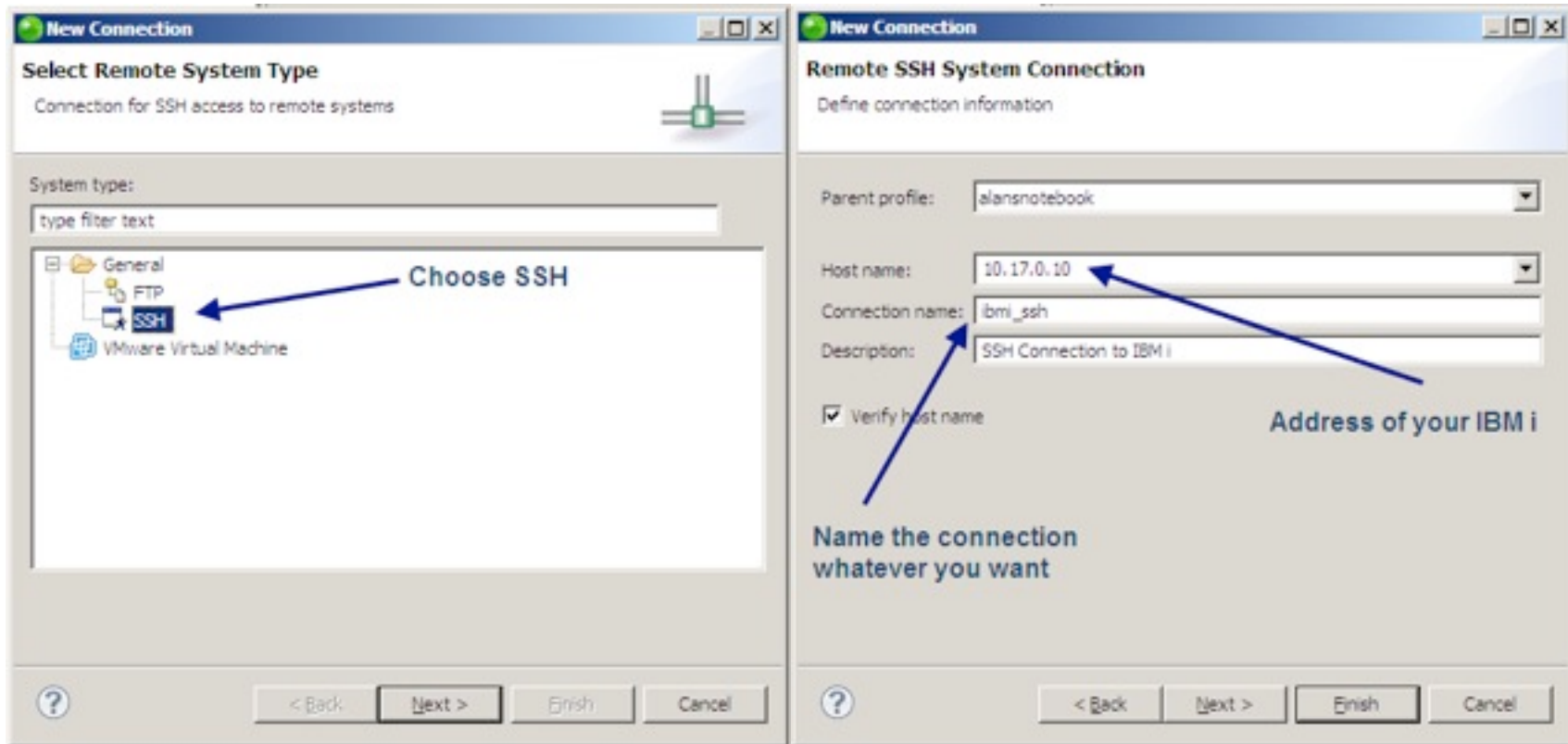
# Zend Studio as an SSH client

- **Open the Remote Systems perspective**
  - (Window / Perspective / Remote Systems)
- **Click the “Define a connection...” button**



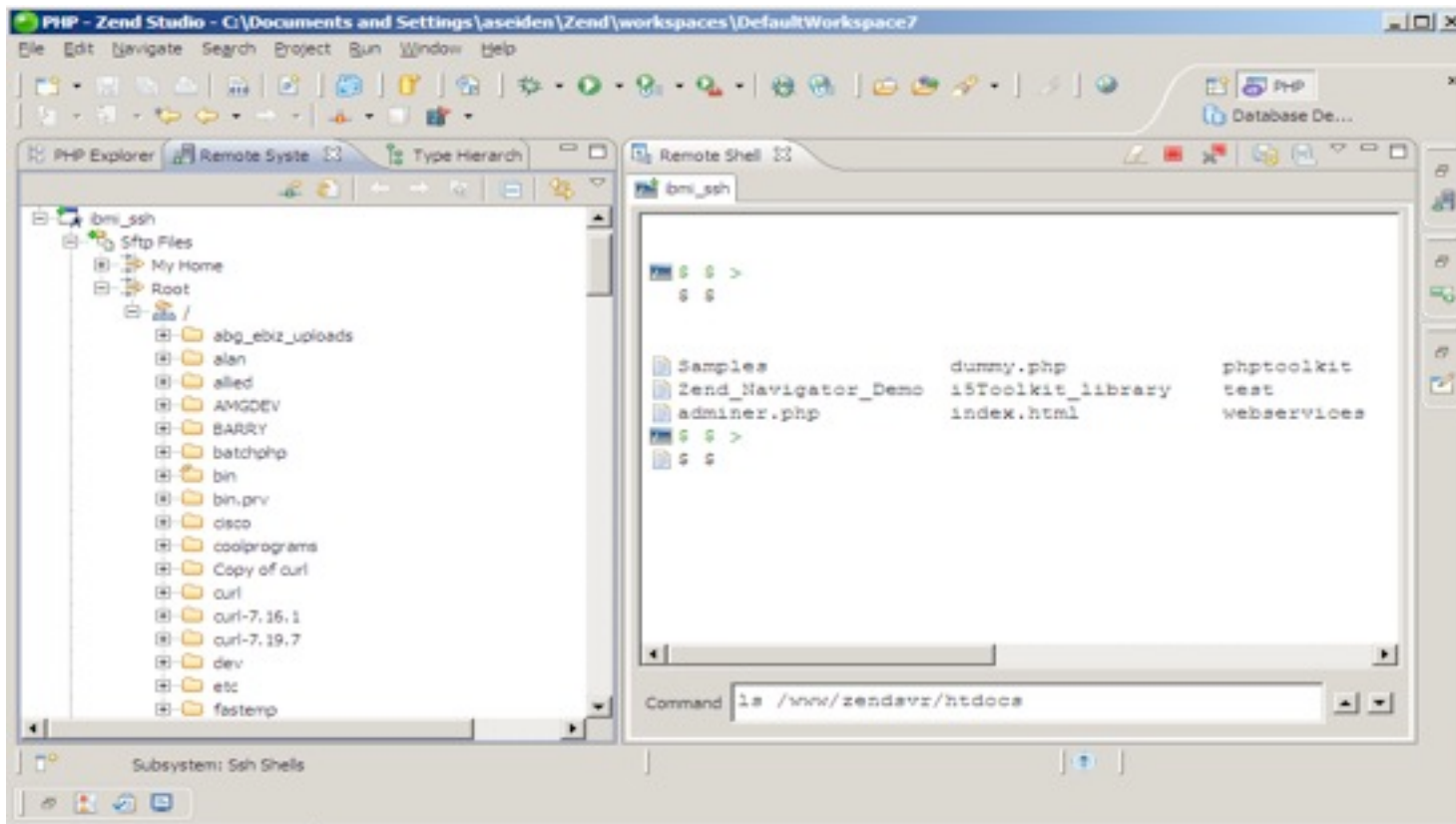
# Define connection to IBM i

1. Choose SSH as connection type. Click “Next.”
2. Provide host name (IP or domain name) of your “i”. Click “Finish.”



# Done! We're connected to IBM i

1. On left: Remote System Explorer, an IFS file list
2. On right: Remote Shell, handy for entering shell commands  
(List of shell commands: <http://ss64.com/bash>)



**Create project  
directory**



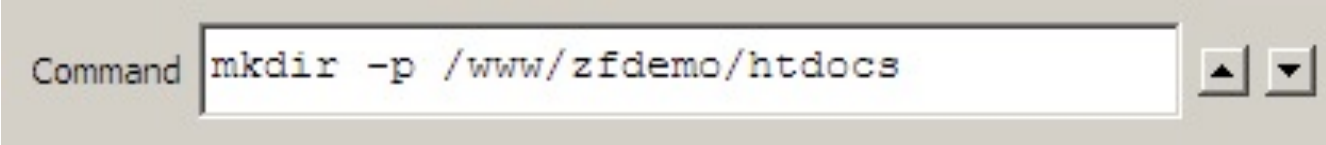
# Create IFS directory for project

- Typical directory pattern: `/www/anything/htdocs`
  - Example: `/www/zfdemo/htdocs`
- From 5250 screen, use “md” command for each dir level

```
Selection or command  
==> md '/www/zfdemo'
```

```
Selection or command  
==> md '/www/zfdemo/htdocs'
```

- Or, better, use “mkdir” from PASE or Remote Shell in Zend Studio  
For example: “mkdir -p /www/zfdemo/htdocs”



```
Command mkdir -p /www/zfdemo/htdocs
```

- “-p” means “create parent folders if necessary”
- Verify it was created: WRKLNK or “ls /www/zfdemo/htdocs”

**Create project with  
Zend\_Tool**

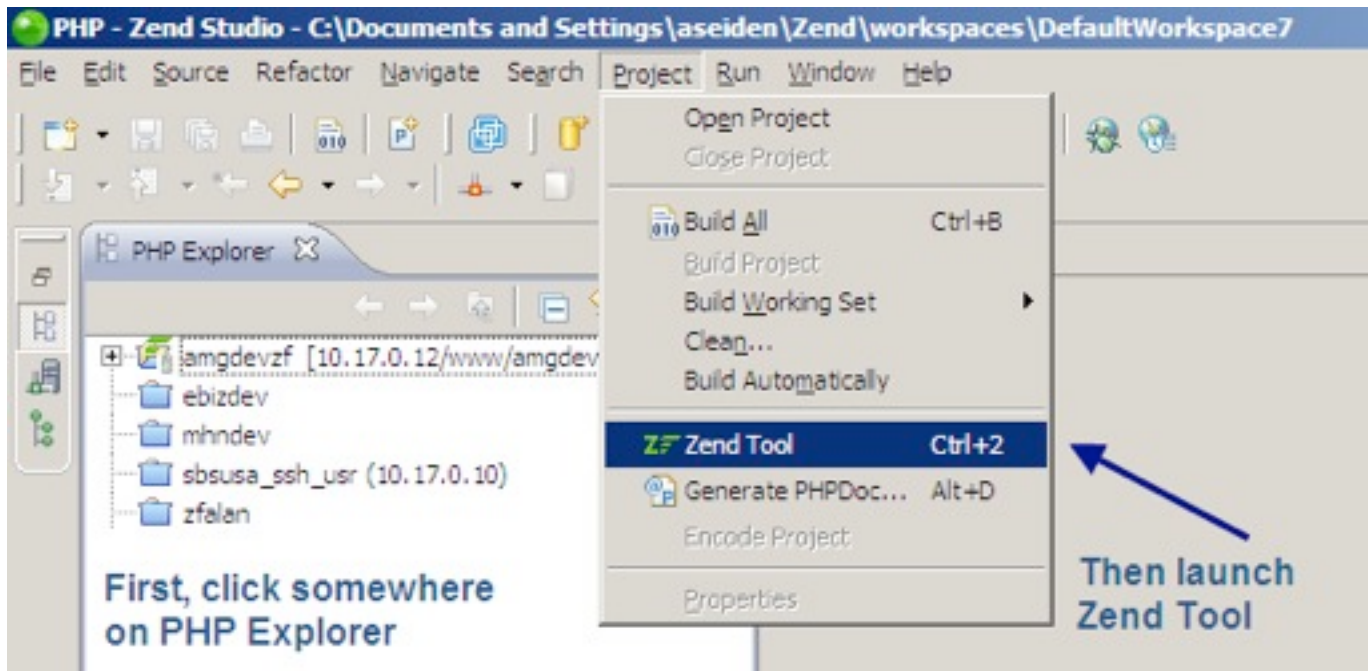
# Zend\_Tool creates ZF files/folders for us

- **It's a component that sets up our project correctly and quickly**
- **Command-line interface: “zf” (lower case)**
  - UNIX or PASE: a shell script called zf.sh
  - Zend Studio: use the “Zend Tool” menu option from the Project menu
    - Keyboard shortcut: CTRL+2
- **Another Studio interface to Zend\_Tool is the “New...” wizard from the File menu**
  - Underneath, it calls the “zf” commands, so you might want to try it to learn the “zf” commands better
- **Here we will use the “Zend Tool” option from Project menu**
  - **Make sure you clicked on the “PHP Explorer” pane first**
  - **zf command line looks like:**



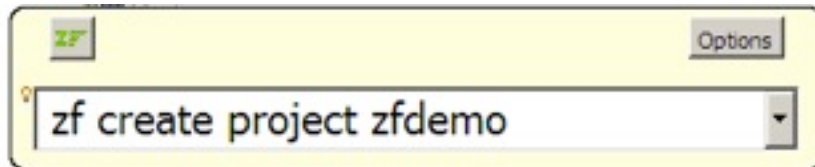
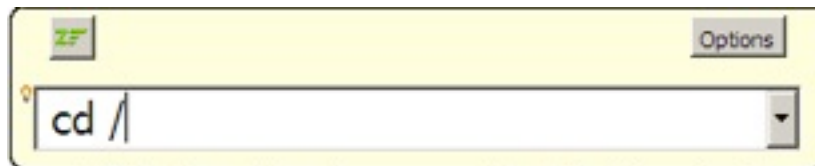
# Launch Zend Tool command entry

- Click on the PHP Explorer pane
- Click Project, then Zend Tool
  - Shortcut: CTRL+2



# Create the project

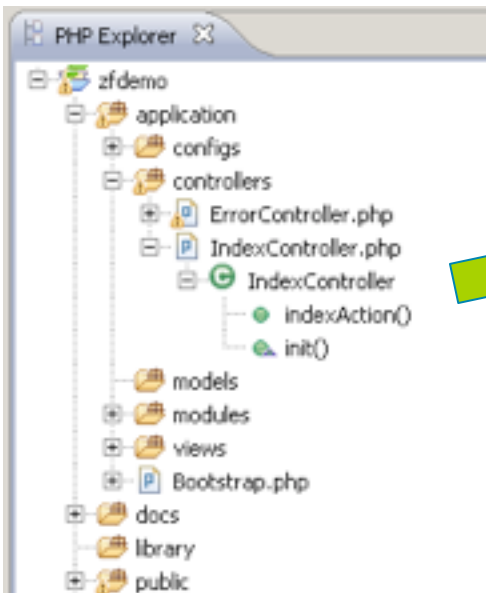
- **Let's name the project “zfdemo”**
  - Will fit nicely with the folder we created, /www/zfdemo/htdocs
- **Type these commands into Zend Tool window:**
  - Go to Studio's workspace root: “cd /”
  - Create the project: “zf create project zfdemo”



- **Press F5 or File/Refresh to refresh view of files**

# Our project is there

- You should see a complete project structure called **zfdemo**



**IndexController:** default controller  
**indexAction:** default action within a controller

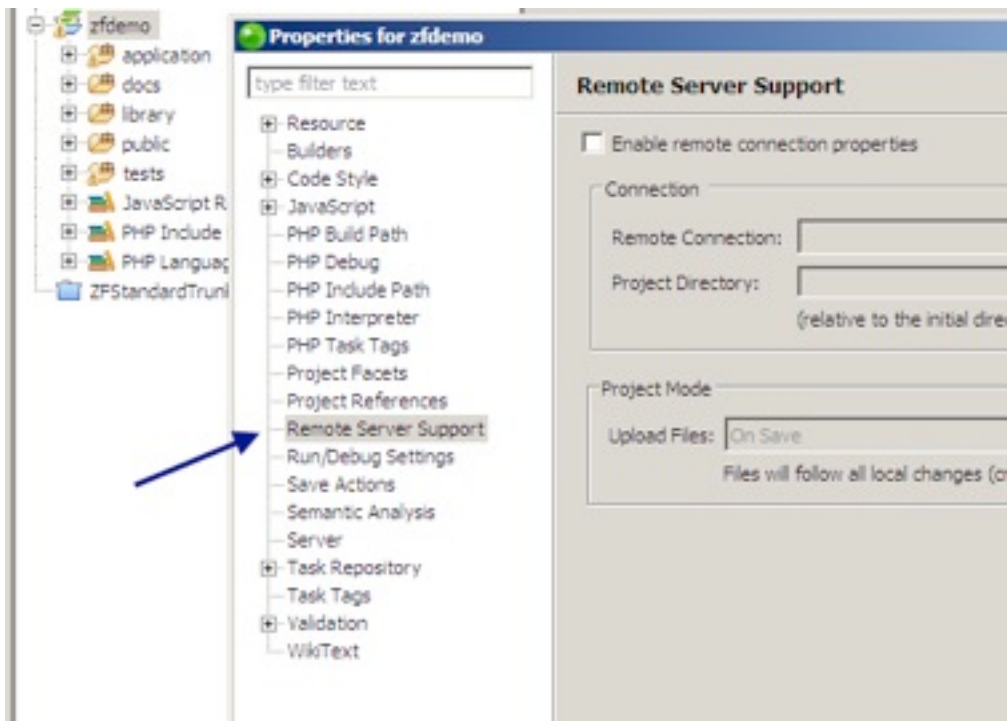
“index” is a default name

(Compare index.html as the usual homepage of a website)

- The project exists in Studio's workspace
- Now we should link it to IFS for automatic synchronization

# Enable remote synch of project with IFS

- **Right-click the project**
- **Choose “properties,”** then **“Remote Server Support”**



# Set up the Remote Support settings

- **Click “Enable remote connection properties”**
- **Choose the remote connection you created earlier**
- **Type the Project Directory you created earlier**
  - Example: /www/zfdemo/htdocs
- **Leave “On Save” as upload method; click OK**

**Remote Server Support**

Enable remote connection properties

Connection

Remote Connection:  Manage

Project Directory:   
(relative to the initial directory)

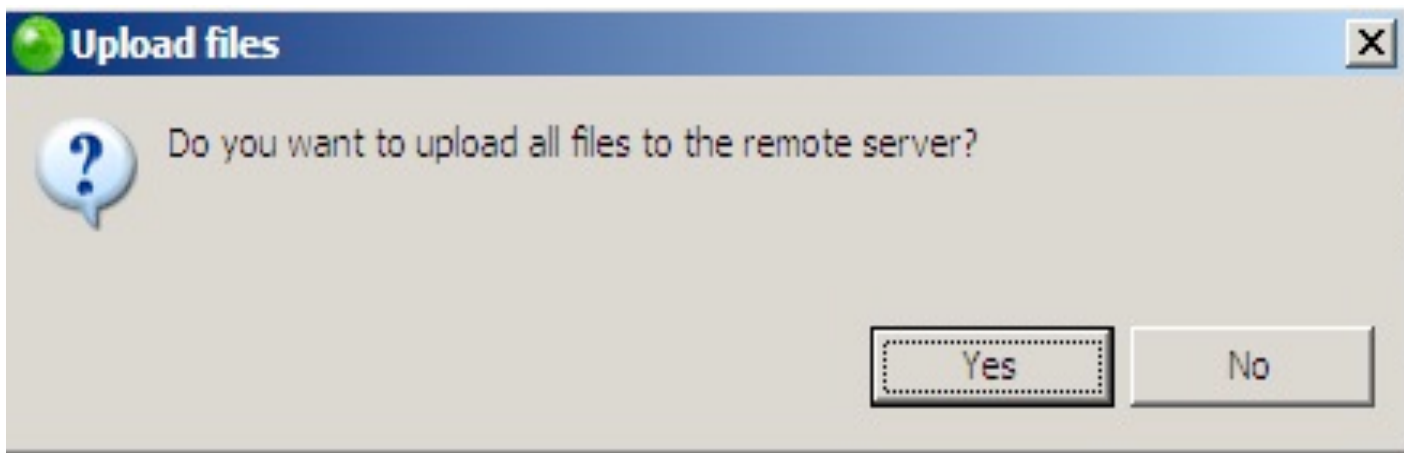
Project Mode

Upload Files:   
Files will follow all local changes (create, edit, rename, delete)



# Upload the project to IFS

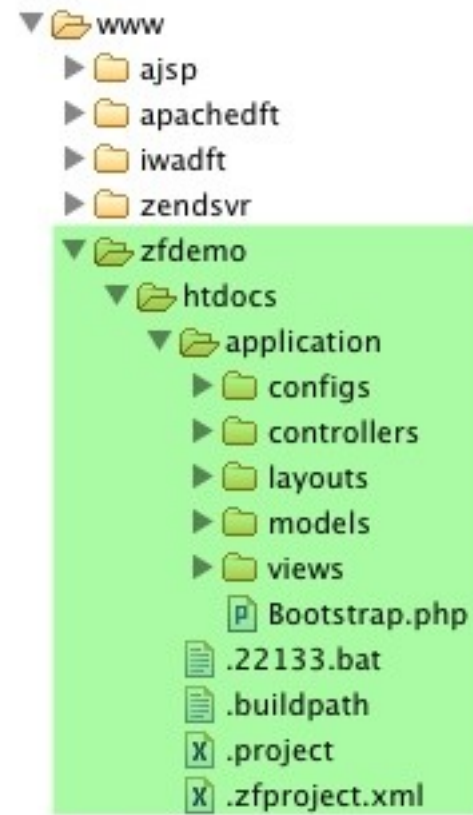
- You'll be asked: "Do you want to upload all files to the remote server?"
  - Click "Yes" then "Finish"



- Project is now on IFS

# Project files are now on IFS

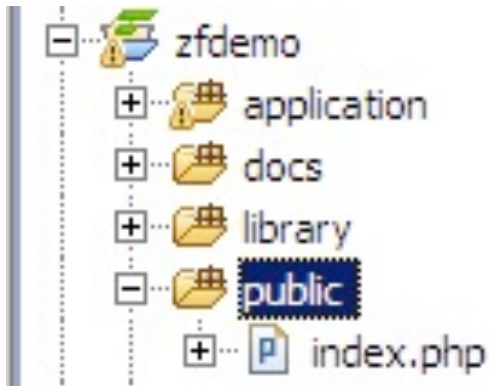
- **Verify with Remote Systems Explorer (use F5)**
- **or WRKLNK ‘/www/zfdemo’**



# Configure Apache

# Control access/routing to our project

- The folder called “public” is Document Root, containing index.php



- Use Apache “rewrite rules” to route all ZF requests to index.php
- ZF’s router will examine the original REQUEST\_URI to route request to correct controller and action

# More about Apache config

- **For performance and security, do not use .htaccess files in production systems**
- **Put configurations in main httpd.conf instead**
- **See example of correct virtual host config on next slide...**

# Section from /www/zendsvr/conf/httpd.conf

```
# use your choice of IP and port, if they are not already in use elsewhere
# Use 80 for a public site and 443 for SSL-encrypted
Listen *:12345
# NameVirtualHost allows us to share an IP address/port among multiple sites
NameVirtualHost *:12345
<VirtualHost *:12345>
    DocumentRoot "/www/zfdemo/htdocs/public"

    # specify ServerName if using NameVirtualHost (must match URL typed in browser)
    ServerName 1.2.3.4:12345

    # This should be omitted in the production environment
    SetEnv APPLICATION_ENV development

    #Detailed documentation: http://framework.zend.com/manual/en/project-structure.rewrite.html
    RewriteEngine off
    <Location />
        RewriteEngine On
        RewriteCond %{REQUEST_FILENAME} -s [OR]
        RewriteCond %{REQUEST_FILENAME} -l [OR]
        RewriteCond %{REQUEST_FILENAME} -d
        RewriteRule ^.*$ - [NC,L]
        RewriteRule ^.*$ /index.php [NC,L]
    </Location>
    <Directory "/www/zfdemo/htdocs/public">
        Options Indexes MultiViews FollowSymLinks
        AllowOverride None
        Order allow,deny
        Allow from all
    </Directory>
</VirtualHost>
```

# Update Apache conf and then restart

- Update `/www/zendsvr/conf/httpd.conf` with a config for your ZF project
  - Previous slide contains a solid template for you
- Restart Apache  
`STRTCPSVR SERVER(*HTTP) RESTART(*HTTP) HTTPSVR(ZENDSVR)`
- The sample project should run!
  - `http://yourserver:port`



**Create more  
controllers/actions**



# Zend\_Tool continues to help

- **Let's create a Customer controller**
- **And then an action to show a list of customers**
  - Call it "list"
- **Once again, launch Studio's Zend\_Tool window**
- **Create the Customer controller:**

```
cd /zfdemo
```

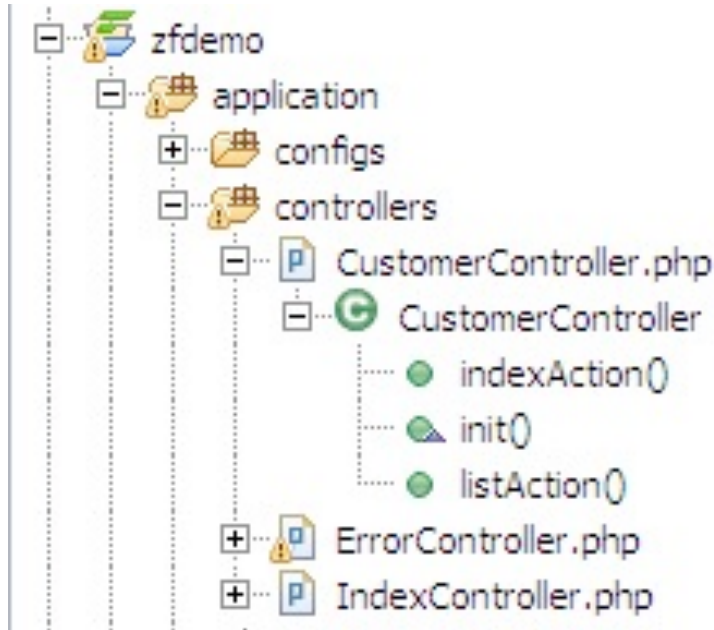
```
zf create controller Customer
```

- **Press F5 to refresh, then create the 'list' action:**

```
zf create action list Customer
```

- **Refresh again (F5)**

# Our new controller and action are there



If you open the CustomerController.php file you will find:

**public function** listAction()

```
{  
  
}
```

**Configure DB2**

# Configure Zend\_Db adapter for Db2

## At a minimum, create these settings:

- adapter type (Db2)
- username (may be blank)
- password (may be blank)
- dbname (may be blank or an entry from WRKRDBDIRE)

**Run:** `zf configure db-adapter`

```
"adapter=Db2&username=alan&password=secretpw&dbname=*LOCAL"
```

**The above zf command creates four keys in application.ini:**

```
resources.db.adapter = Db2
```

```
resources.db.params.username = "alan"
```

```
resources.db.params.password = "secretpw"
```

```
resources.db.params.dbname = "*LOCAL"
```

# Other useful keys for application.ini

`; os="i5" ensures adapter will know we're an IBM i(i5)`

**`resources.db.params.os = "i5"`**

`; persistent=true speeds performance`

**`resources.db.params.persistent = true`**

`; autocommit=DB2_AUTOCOMMIT_ON for insert/update/delete`

**`resources.db.params.driver_options.autocommit = DB2_AUTOCOMMIT_ON`**

`; i5_naming=DB2_I5_NAMING_ON means '/', not '.', is library sep.`

`; and allows library lists`

**`resources.db.params.driver_options.i5_naming = DB2_I5_NAMING_ON`**

`; i5_lib1= easy way to specify a library list (see i5_naming above)`

**`resources.db.params.driver_options.i5_lib1 = "LIB1 LIB2"`**

# Still more optional keys for application.ini

```
; isDefaultTableAdapter means to use this adapter for tables  
resources.db.isDefaultTableAdapter = true
```

```
; profiler is optional. lets you measure query performance.  
resources.db.params.profiler.class = "Zend_Db_Profiler_Firebug"  
resources.db.params.profiler.enabled = true
```


**Are we done? No... see the next slide for one more critical step**

# Install IBM i-optimized DB2 adapter

- **As of ZF 1.x, the Db2.php adapter doesn't work quite right for all IBM i's use cases, such as:**
  - **DB2\_I5\_NAMING = On**
    - Because library/schema separator is hardcoded as '.'
  - **Zend\_Db\_Table performance (metadata retrieval is slow)**
  - **Ability to utilize certain .INI settings**
- **I have a temporary fix for you. For ZF 2.x I'll be working with the ZF team on an official fix.**
- **See next slide for instructions**

# Installing my DB2 adapter fix

- Download corrected adapter from <http://www.alanseiden.com/code/ibm-i-db2-zf-adapter.zip>
- Extract **instructions.txt** and **Db2.php**
- Place Db2.php in the folder “**library/Strategic/Db/Adapter/**”
- Note: the “Adapter namespace” (first part of class name) is “Strategic” instead of “Zend.” This can be any name you choose.



```
58
59 /**
60  * @package      Zend_Db
61  * @copyright    Copyright (c) 2005-2010 Zend Technologies USA Inc. (http://www
62  * @license      http://framework.zend.com/license/new-bsd      New BSD License
63  */
64
65 class Strategic_Db_Adapter_Db2 extends Zend_Db_Adapter_Abstract
66 {
67     /**
68      * User-provided configuration.
69      *
70      * Basic keys are:
71      *
72      * username => (string) Connect to the database as this username.
73      * password => (string) Password associated with the username.
74      * host      => (string) What host to connect to (default 127.0.0.1)
```



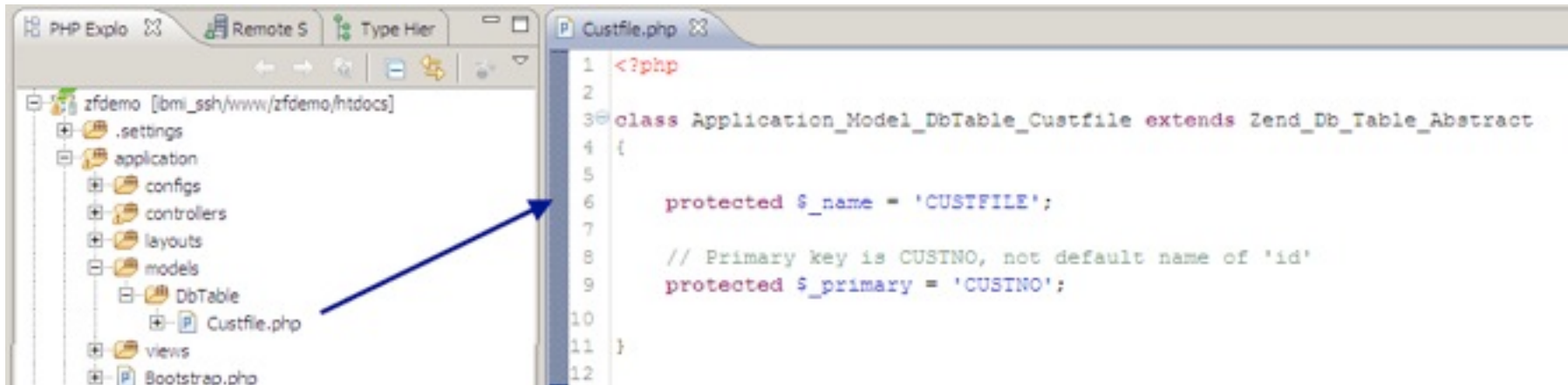
# Update application.ini with adapter name

- In application.ini, add this setting:  
`resources.db.params.adapterNamespace = Strategic_Db_Adapter`
- Now you are good to go
  - **In particular, library lists will work**

**Access a  
DB2 table**

# Zend\_Db\_Table is one way to access data

- **Table classes created for us by Zend\_Tool**
- **You provide 2 names: 1) class to create 2) table name**
  - Example: I have a table called CUSTFILE
  - Type “zf create dbtable **Custfile CUSTFILE**” (if uppercase table)
  - See resulting class file in screen shot below
- **Then edit the class, esp. when primary key is not ‘id’**



```
1 <?php
2
3 class Application_Model_DbTable_Custfile extends Zend_Db_Table_Abstract
4 {
5
6     protected $_name = 'CUSTFILE';
7
8     // Primary key is CUSTINO, not default name of 'id'
9     protected $_primary = 'CUSTINO';
10
11 }
12
```

# Read records using table class

In controllers/Customer\_Controller.php:

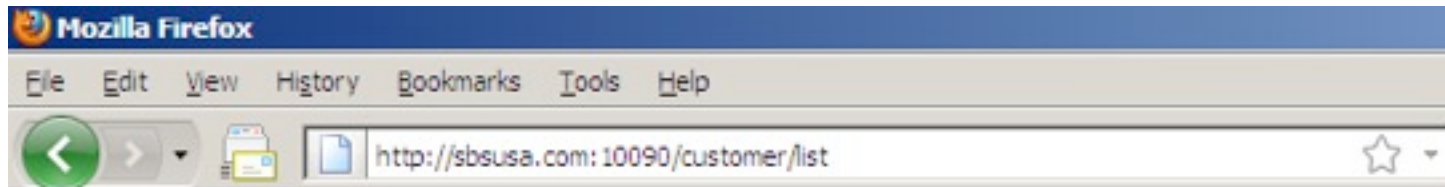
```
public function listAction()
{
    $custfile = new Application_Model_DbTable_Custfile();
    $custs = $custfile->fetchAll();
    $this->view->customers = $custs;
}
```

In views/scripts/customer/list.phtml (omitting the class and style tags):

```
<H1>Customer list from CUSTFILE table</H1>
<table class="list">
<tr style="font-weight: bold; text-align: left;"><th>Number</th><th>Name</
  th><th>Status</th></tr>
<?php
$customers = $this->customers;
foreach ($customers as $customer) {
echo "<tr><td>{$customer->CUSTNO}</td>
  <td>{$customer->LNAME}</td>
  <td>{$customer->STATUS}</td></tr>";
}
?>
```

# Display results

- **URL: /customer/list**



## Customer list from CUSTFILE table

Number	Name	Status
1	PAVLAK	A
2	JONES	A
3	O'SHEA	I

# We did it!

- **Now you know how to create a Zend Framework project on IBM i that will work on the first try, DB2 and all**
  - ZF version 1.x. For 2.x, see my webcast on Dec. 11, 2012
- **These slides are online where you can refer to them**
- **Send me feedback so I can continue to improve the process**

# Resources for learning ZF

- **Tutorials**

- Official ZF quickstart: <http://framework.zend.com/manual/en/learning.quickstart.html>
- Rob Allen's (author of *Zend Framework in Action*): <http://akrabat.com/zend-framework-tutorial/>

- **Online training**

- (Zend) <http://shop.zend.com/en/php-training/zend-framework-fundamentals.html>

- **Forums**

- <http://forums.zend.com>

- **User groups (Bring your laptop and ask a question!)**

- <http://framework.zend.com/community/groups>

# Questions



# Alan's upcoming appearances

<http://alanseiden.com/presentations/upcoming>

Oct. 17	Webcast	iPro Developer Online Conference
Oct. 22-25	ZendCon	Santa Clara, Calif.
Dec. 11	Webcast	Zend Framework 2 and IBM i

# Contact | Get tips

## Alan Seiden

Alan Seiden Consulting

Ho-Ho-Kus, NJ

[alanseiden.com](http://alanseiden.com)



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