“From Zero to ZF” on IBM i

Your first Zend Framework project

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About Alan

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- Zend Framework contributor (DB2 for i enhancements)
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Strategic Business Systems, Inc.

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- **IBM Business Partner**
  - Power Systems hardware, software, development, consulting

Where to download these slides

From my site
http://alanseiden.com/presentations

On SlideShare
http://slideshare.net/aseiden

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Who 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 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 those dreaded "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

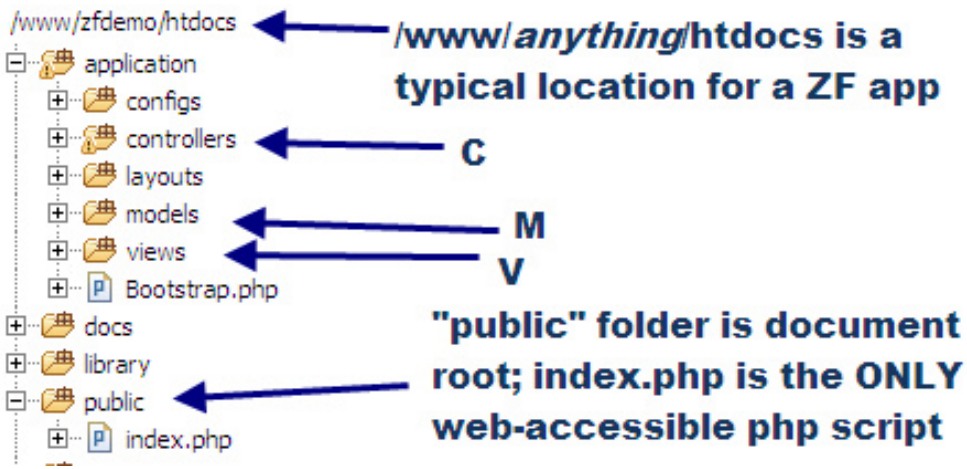
- PHP-based framework with best practices for PHP5, OO
- Free and open source
- Cross-platform
- Developed by the community and full-time, dedicated Zend employees, with help from other important technology companies
- Downloaded millions of times

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**
- **Next slide shows a typical directory structure**

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

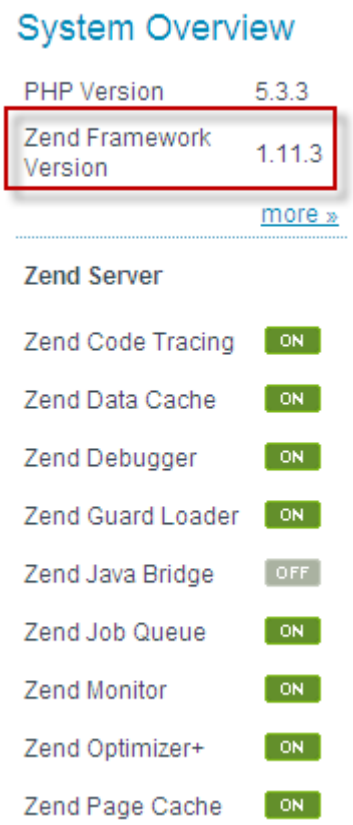
Resources for learning ZF

- **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

Installing ZF

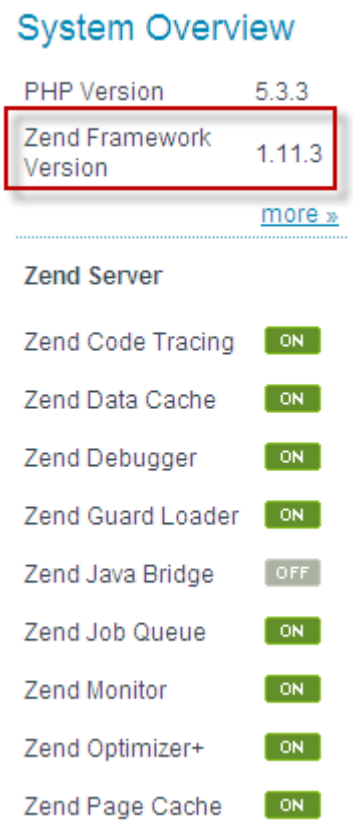
It’s already there. Or download a fresh copy

- **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**



Zend Server's default install is easy

- **This way is <u>fine</u> 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



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):

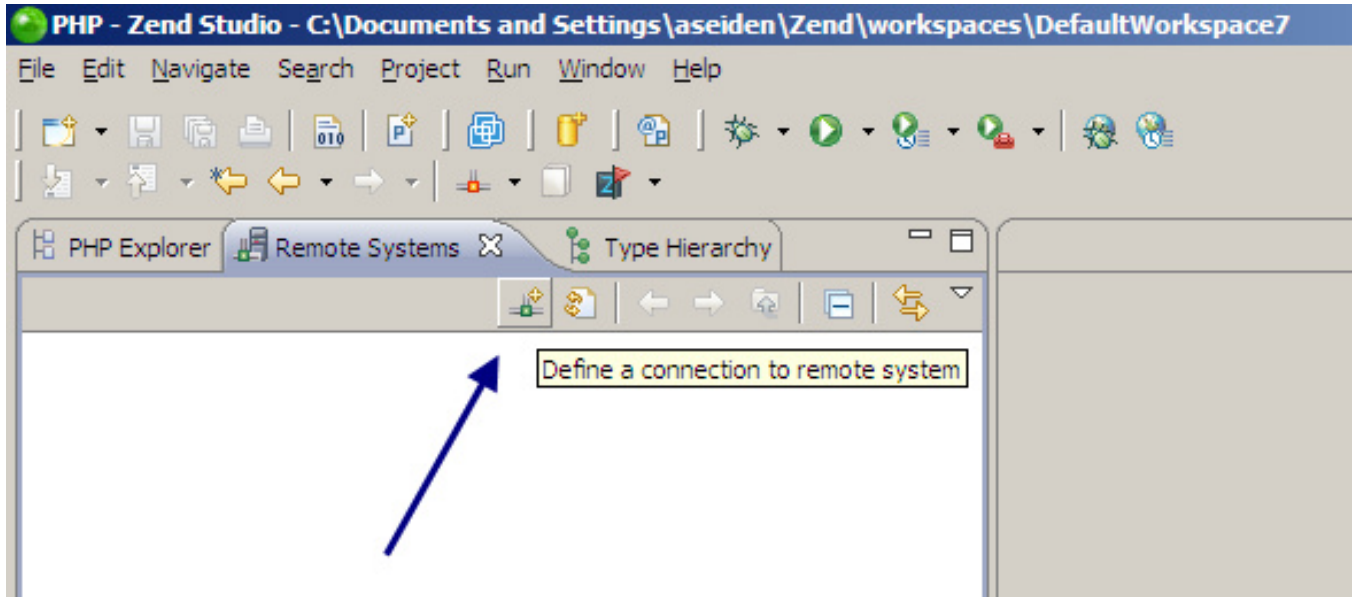
```
/usr/sbin/sshd &
```

For more information on sshd setup, see "Young i Professionals" SSH wiki article:

http://174.79.32.155/wiki/index.php/PASE/SSHSetup

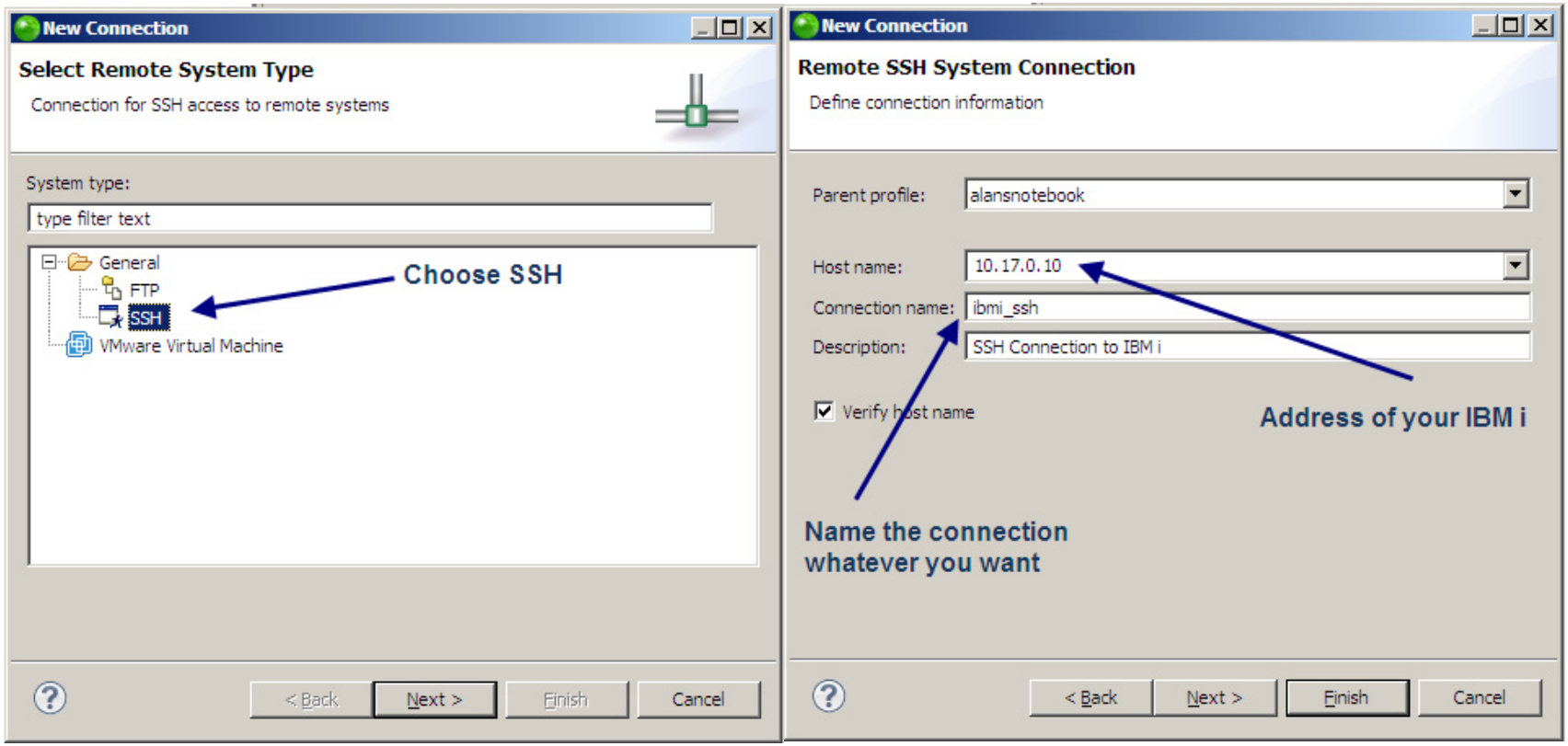
Zend Studio as an SSH client

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



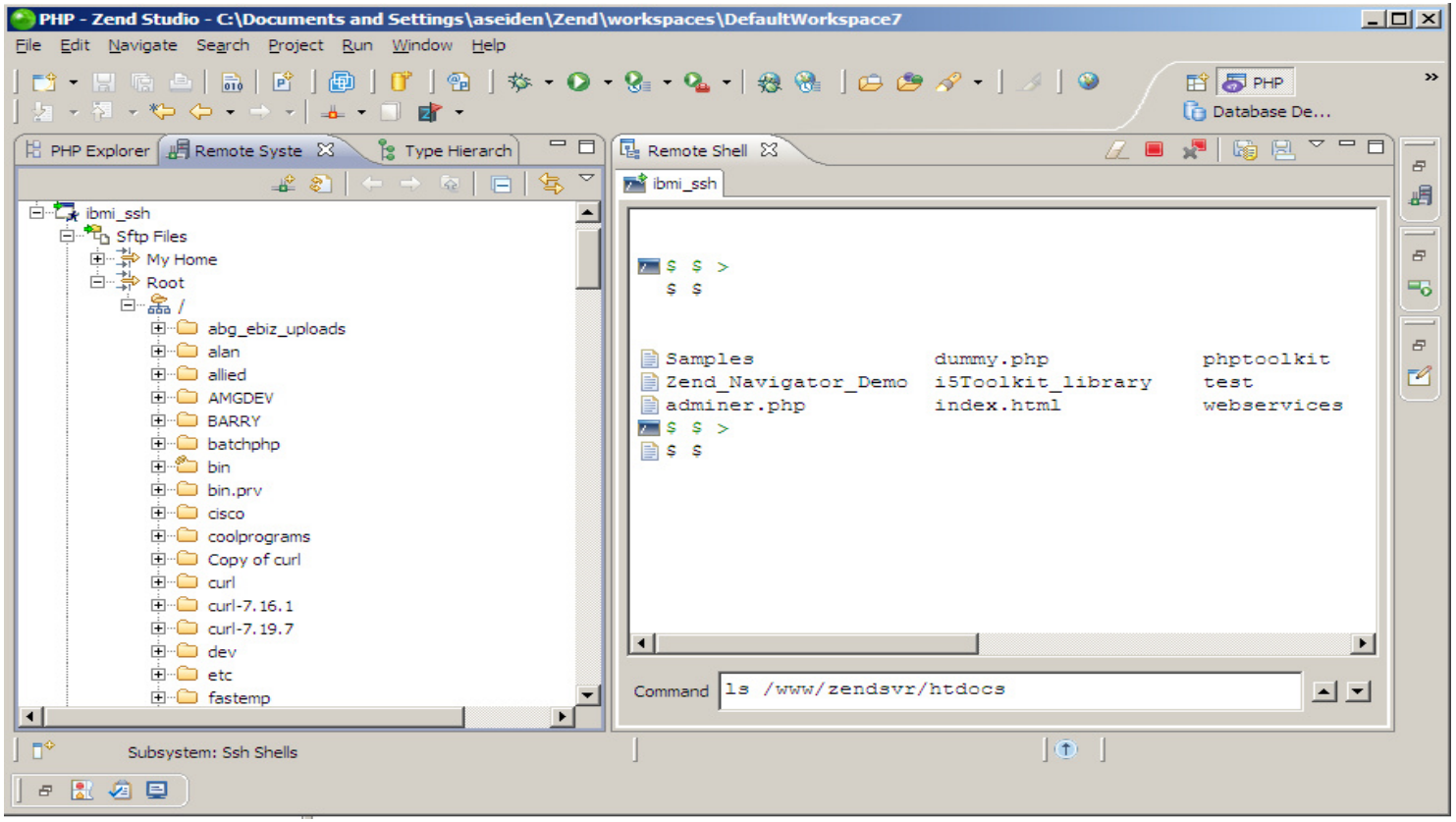
Define connection to IBM i

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 Remote Shell in Zend Studio**
  For example: "mkdir –p /www/zfdemo/htdocs"

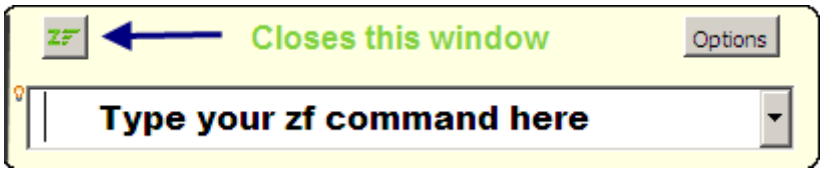
```
Command  mkdir -p /www/zfdemo/htdocs
```

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

Create project with Zend_Tool

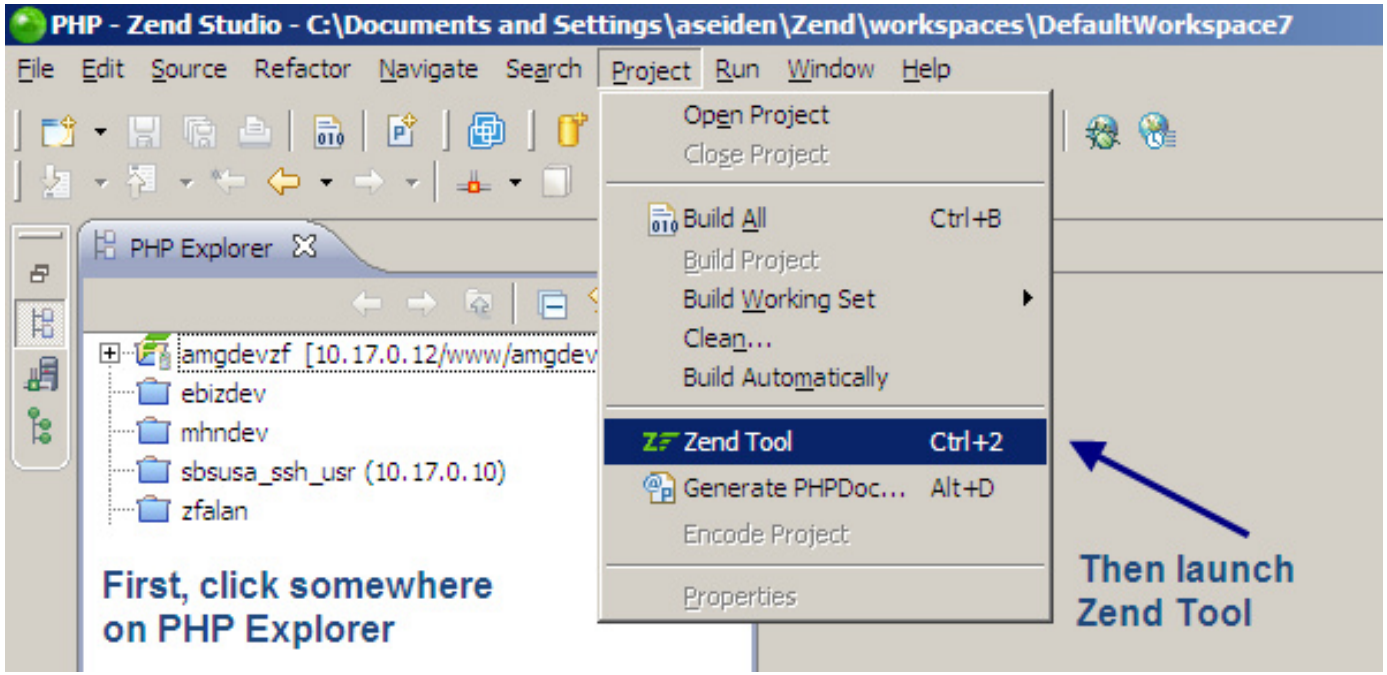
Zend_Tool creates ZF files/folders for us

- **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:**



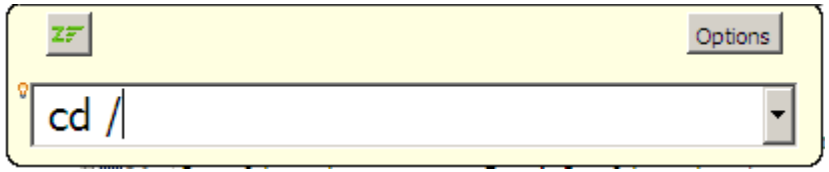
Launch Zend Tool command entry

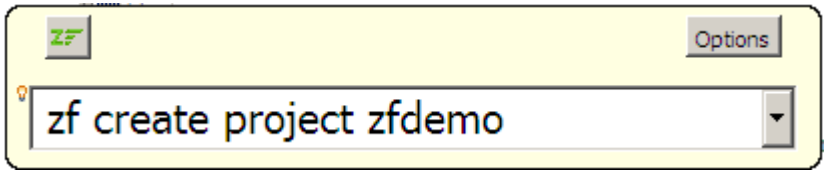
- **Click on the PHP Explorer pane**
- **Click Project, then Zend Tool**
  - Shortcut: CTRL+2



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"

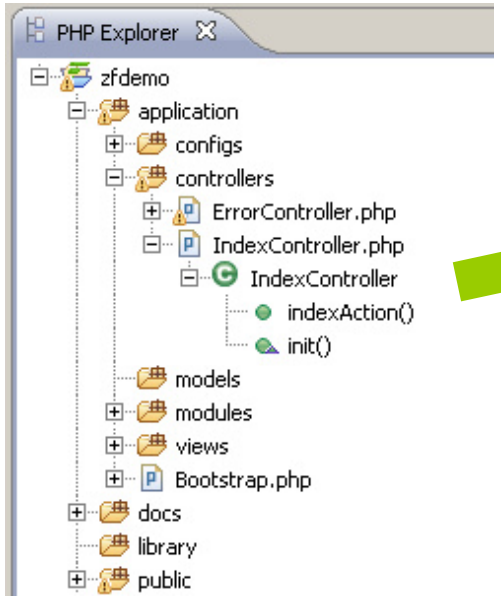




- **Press F5 or File/Refresh to refresh view of files**

Our project is there

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



IndexController: default controller
indexAction: default action within a controller

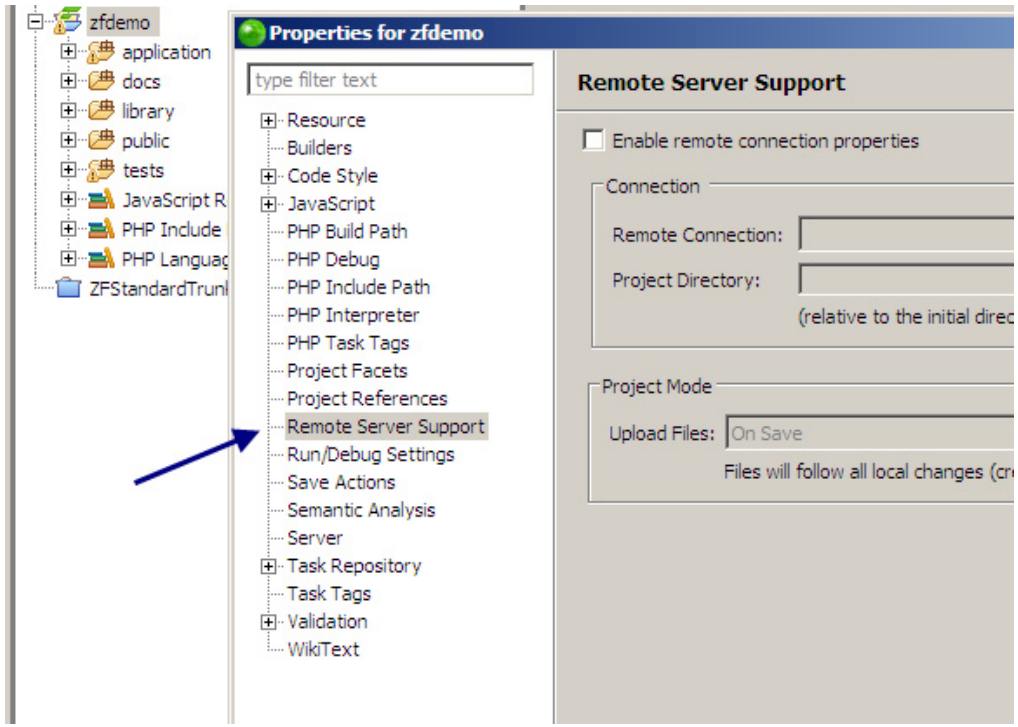
"index" is a default name

(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**

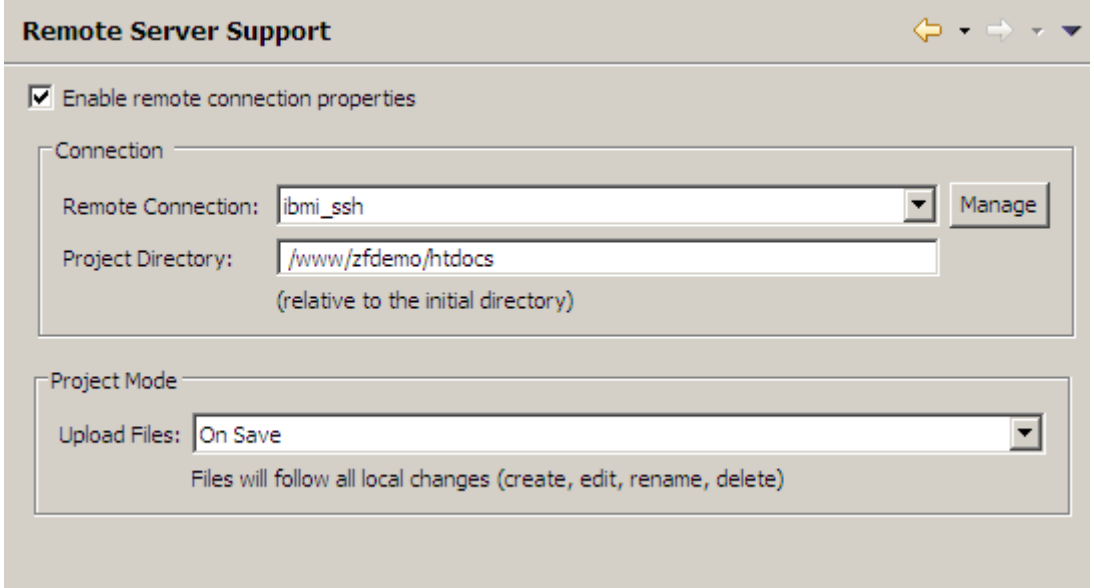
Enable remote synch of project with IFS

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



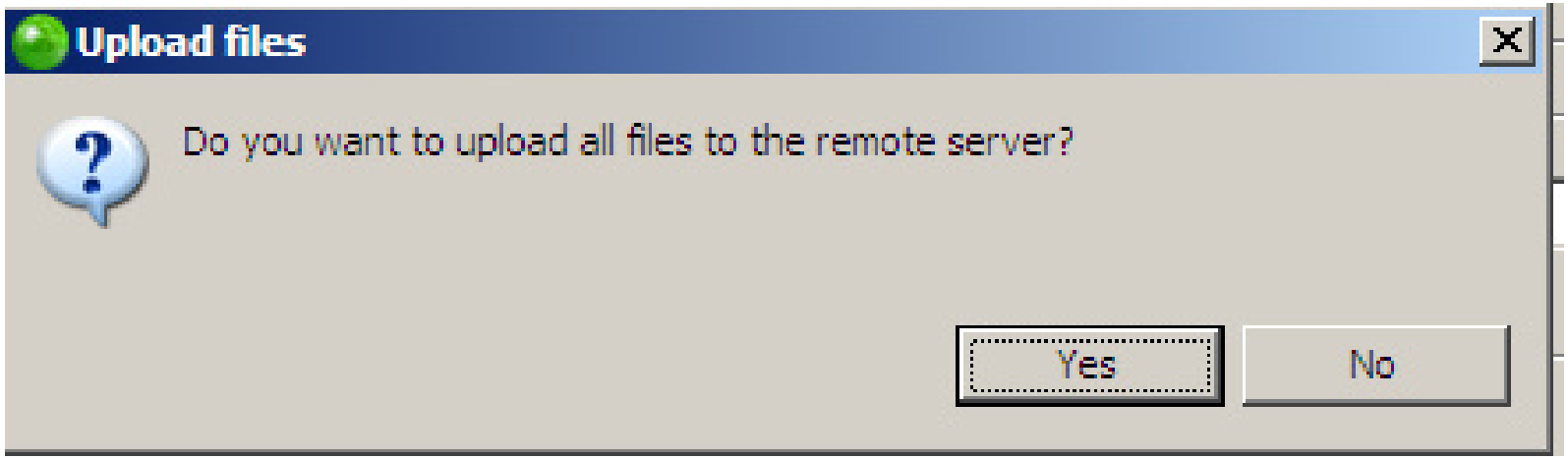
Set up the Remote Support settings

- **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**



Upload the project to IFS

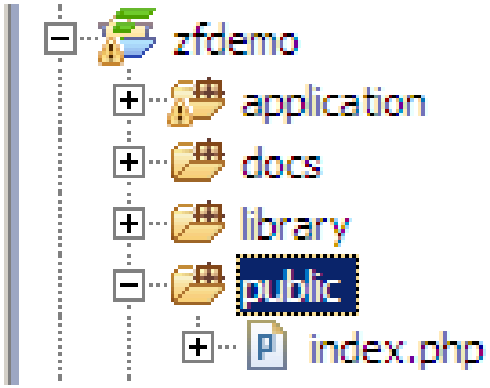
- **You'll be asked: "Do you want to upload all files to the remote server?"**
  - Click "Yes"
- **Then click "Finish"**



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:**

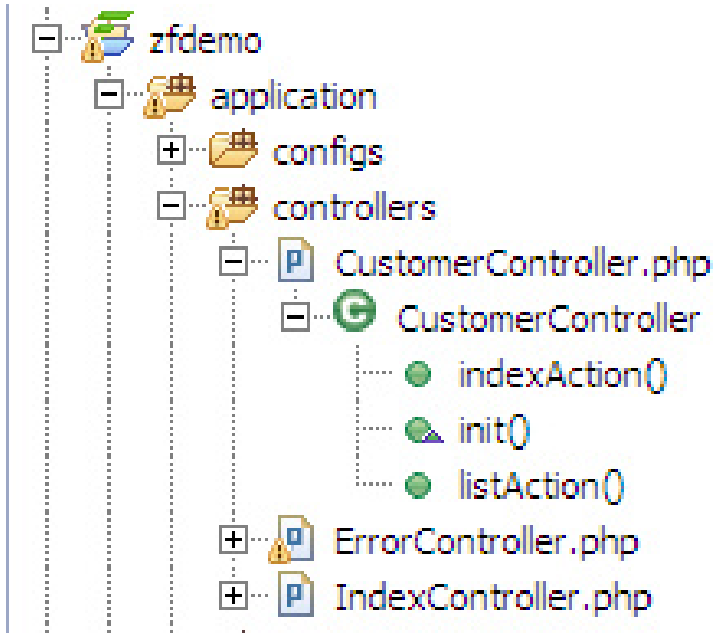
```
cd /zfdemo
zf create controller Customer
```

- **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_libl= easy way to specify a library list (see i5_naming above)
resources.db.params.driver_options.i5_libl = "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
```

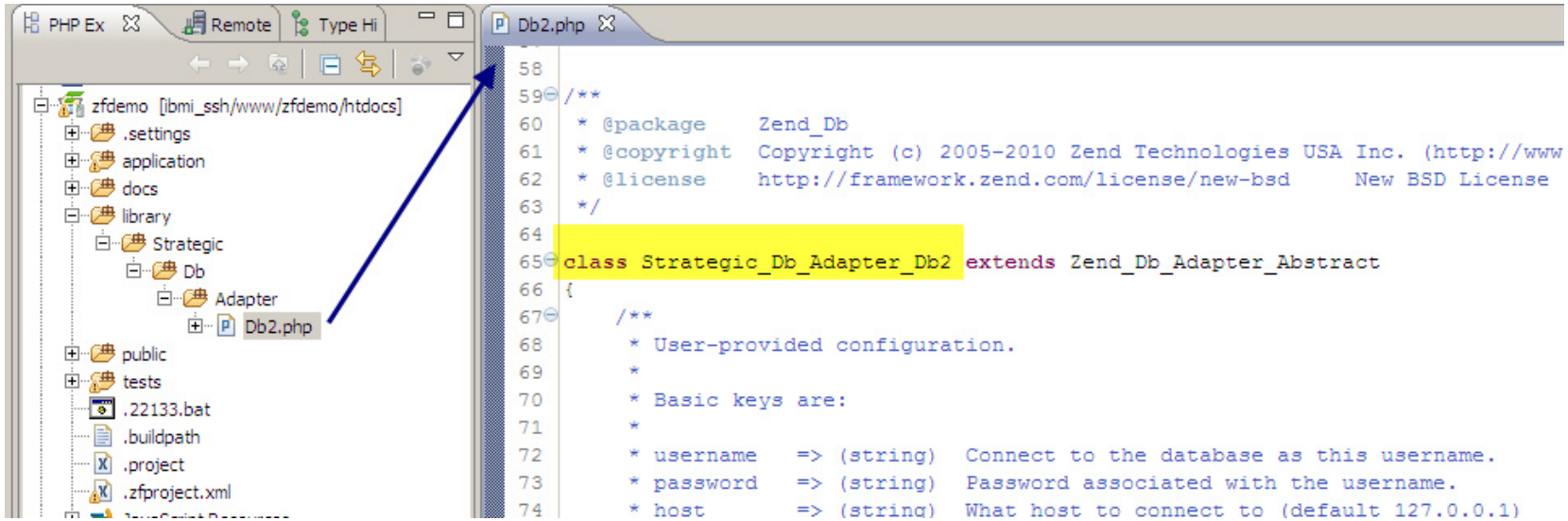
Are we done? No… see the next slide for one more critical step

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.**
  - This ZF 1.x fix was tested informally. "Use at your own risk."
- **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.



Update application.ini with adapter name

- In application.ini, add this setting:
  `resources.db.params.adapterNamespace = Strategic_Db_Adapter`

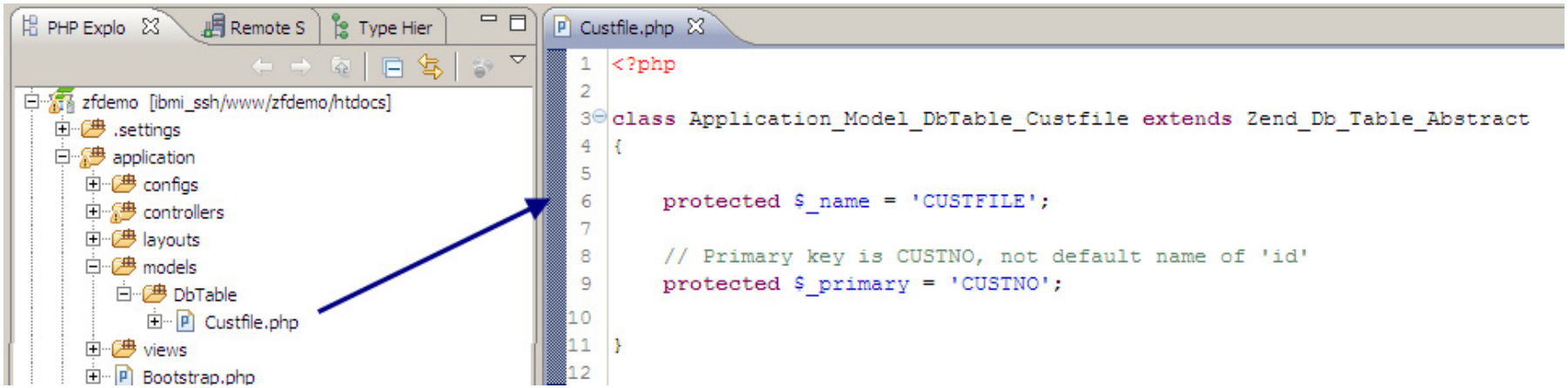
- Now you are good to go
  - **In particular, library lists will work**

- When the ZF team completes its official fix, you can comment out the “adapterNamespace” setting above.

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’**



Read records using table class

In controllers/Customer_Controller.php:

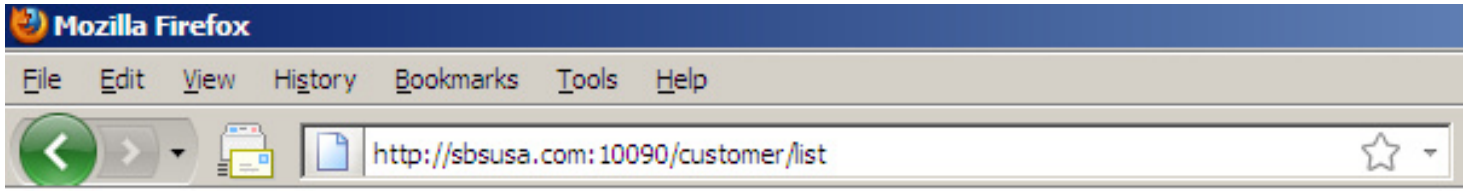
```
public function listAction()
{
        $custfile = new Application_Model_DbTable_Custfile();
        $custs = $custfile->fetchAll();
        $this->view->customers = $custs;
}
```

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>";
}
?>
</table>
```

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**
- **These slides are online where you can refer to them**
- **Send me feedback so I can continue to improve the process**

Questions

Alan’s upcoming appearances

MITEC, OCEAN....

Complete list here:

http://alanseiden.com/presentations/upcoming

In New York City? I host the NYC Zend Framework Meetup
http://www.meetup.com/ZendFramework-NYCmetro/

Contact | Get tips

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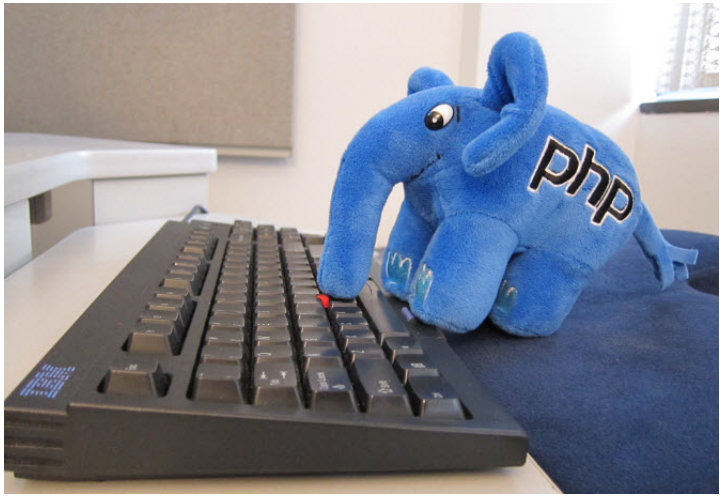
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