

PHP on IBM i Workshop (part 2)

by *Enrico Zimuel*
Senior Software Engineer - Zend Technologies

Email: *enrico@zend.com*

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About me



- **Software Engineer since 1996**
 - C/C++, Java, Perl, PHP, Javascript, VBScript, etc.
- **Enjoying PHP since 1999**
- **PHP Engineer at Zend Technologies**
 - Senior Consultant (since 2008)
 - Zend Framework Core Team (from April 2011)
- **BSc honors in Computer Science and Economics**
- **PHP 5 Certified Engineer, ZF Certified Engineer**
- **More info about me: <http://www.zimuel.it>**

Agenda

- **Introduction to Zend Server for IBM i**
- **Zend Server in Action**
- **i5 Toolkit: integrate PHP with IBM I**
- **5250 Bridge**
- **Examples**

Intro to Zend Server for IBM i

Zend Server: how to run PHP on IBM i

- **Zend Server is the IBM certified PHP server**
- **Contains the PHP engine to run PHP applications on a IBM i machine**
- **Enterprise features:**
 - Monitoring system
 - Code Tracing
 - Performance improvement
 - Job Queue
 - Support



The PHP Company

Zend Server for IBM i editions

- **Zend Server Community Edition (free)**
 - PHP Engine 2
 - Zend Optimizer+ (PHP opcode accelerator)
 - Zend Data Cache
 - i5 Toolkit
 - Java Bridge
 - initial year of free support



Zend Server for IBM i editions (2)

- **Zend Server (in addition to CE features):**
 - Event Monitor
 - Code Tracing
 - 5250 Bridge
 - Page Caching
 - Job Queue
 - Support (24x7x365)



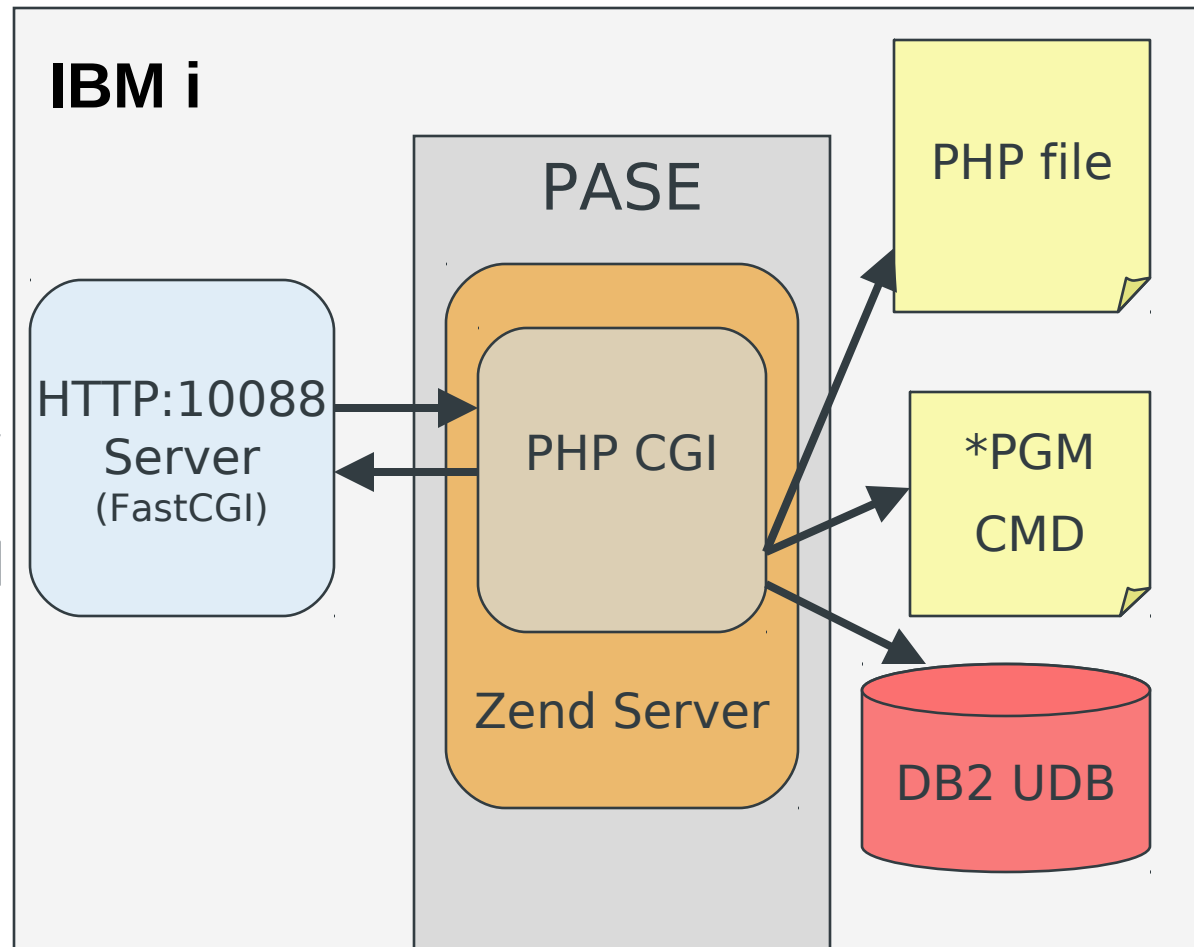
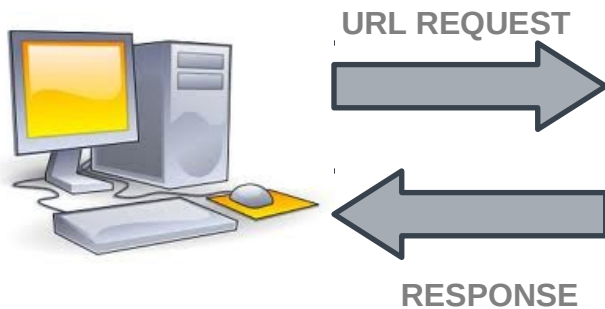
IBM i supported systems

- **Zend Server runs on the following IBM i OS:**
 - V5R4
 - i6.1
 - i7.1
- **Zend Server CE** is preloaded with IBM i 5.4, 6.1 and 7.1 starting in April 2010. The first year of Silver support (Web-based) from Zend is provided for no additional charge. To receive support and product updates, customers must register on www.zend.com

Zend Server under the cover

ILE Apache:10088

- Default configuration FastCGI



Zend Server in Action

Zend Server in Action

i5 PHP Toolkit

i5 Toolkit APIs

- Are shipped with Zend products
 - § Zend Server for IBM i
 - § Documented in the Zend Server User Guide
- Geared for accessing DB2 data & IBM I resources from PHP
 - § Simplifies modern application integration with legacy data and applications

i5 Toolkit APIs

- Note: The I5_COMD job must be running in the ZENDSVR subsystem
 - § Use WRKACTJOB SBS(ZENDSVR) to see i5_COMD job
 - § Use the Zend menu to start the i5_COMMD job if not started:
 - § GO ZENDSVR/ZSMENU
 - § Option 5 (Service Management menu)
 - § Option 8 (Start I5_COMD service)

i5 Toolkit APIs

- **Connection management**

- §i5_connect
- §i5_close
- §i5_adopt_authority
- §i5_error
- §i5_errno
- §i5_errormsg

- **Command calls**

- §i5_command

- **Program calls**

- §i5_program_prepare
- §i5_program_prepare_PCML
- §i5_program_call
- §i5_program_close

- **Data retrieval**

- §i5_fetch_array
- §i5_fetch_assoc
- §i5_fetch_object
- §i5_fetch_row
- §i5_info
- §i5_field_len
- §i5_field_name
- §i5_field_scale
- §i5_field_type
- §i5_list_fields
- §i5_num_fields
- §i5_result

- **Native file access**

- §i5_open
- §i5_addnew
- §i5_edit
- §i5_delete
- §i5_cancel_edit
- §i5_setvalue
- §i5_update
- §i5_range_from
- §i5_range_to
- §i5_range_clear
- §i5_data_seek
- §i5_seek
- §i5_bookmark
- §i5_free_file
- §i5_new_record
- §i5_update_record

i5 Toolkit APIs

- **System values**

- §i5_get_system_value

- **Data areas**

- §i5_data_area_prepare

- §i5_data_area_receive

- §i5_data_area_send

- §i5_data_area_close

- **Job logs**

- §i5_jobLog_list

- §i5_jobLog_list_read

- §i5_jobLog_list_close

- **Active jobs**

- §i5_job_list

- §i5_job_list_read

- §i5_job_list_close

- **Objects list**

- §i5_object_list

- §i5_object_list_read

- §i5_object_list_close

- **User space**

- §i5_userspace_create

- §i5_userspace_prepare

- §i5_userspace_get

- §i5_userspace_put

- **Print/Get spooled file**

- §i5_spool_list

- §i5_spool_list_read

- §i5_spool_list_close

- §i5_spool_get_data

- §i5_spool_from_file

Connection

- Must connect to IBM i system to use any of the toolkit APIs
 - § Connecting (i5 for i5 functions, db2 for DB2 functions):
 - § **i5_connect**
 - Need system, user profile name, and password as parameters
 - Can set library list here
 - § **i5_close**
 - Always close a connection you've opened
 - § **i5_adopt_authority**
 - Can adopt other authorities while running
 - § Error handling
 - § **i5_error**
 - Get data about an error
 - § **i5_errno**
 - Error number
 - § **i5_errormsg**
 - Error message

The future of i5 Toolkit

- Today, we distribute the i5 PHP Toolkit v. 3.0 by Aura in **Zend Server**
- For the future, we will support an open source toolkit using an IBM technology
- The **XMLSERVICE** provided by IBM is a protocol that we can use from PHP to talk with IBM i environment (for instance, call RPG)
- **Zend** has just released the PHP Toolkit XML Service Functions a PHP class that uses XMLSERVICE
- The PHP Toolkit XML Service is still in beta:
 - http://files-source.zend.com/help/Zend-Server-IBMi/php_toolkit_xml_service_functions.htm

Examples

Two toolkit examples

- Data Area
- System Values
- Program call
- Spooled File Access

Data Area Contents

```
Display Data Area                                     System: CUPERP1
Data area . . . . . : COMPANY
Library . . . . .  : ZENDDATA
Type . . . . .     : *CHAR
Length . . . . .   : 50
Text . . . . .     : Company Name

Value
Offset *...+...1...+...2...+...3...+...4...+...5
  0     'Zend Technologies, Inc.'
```

Press Enter to continue.

F3=Exit F12=Cancel

Disconnect

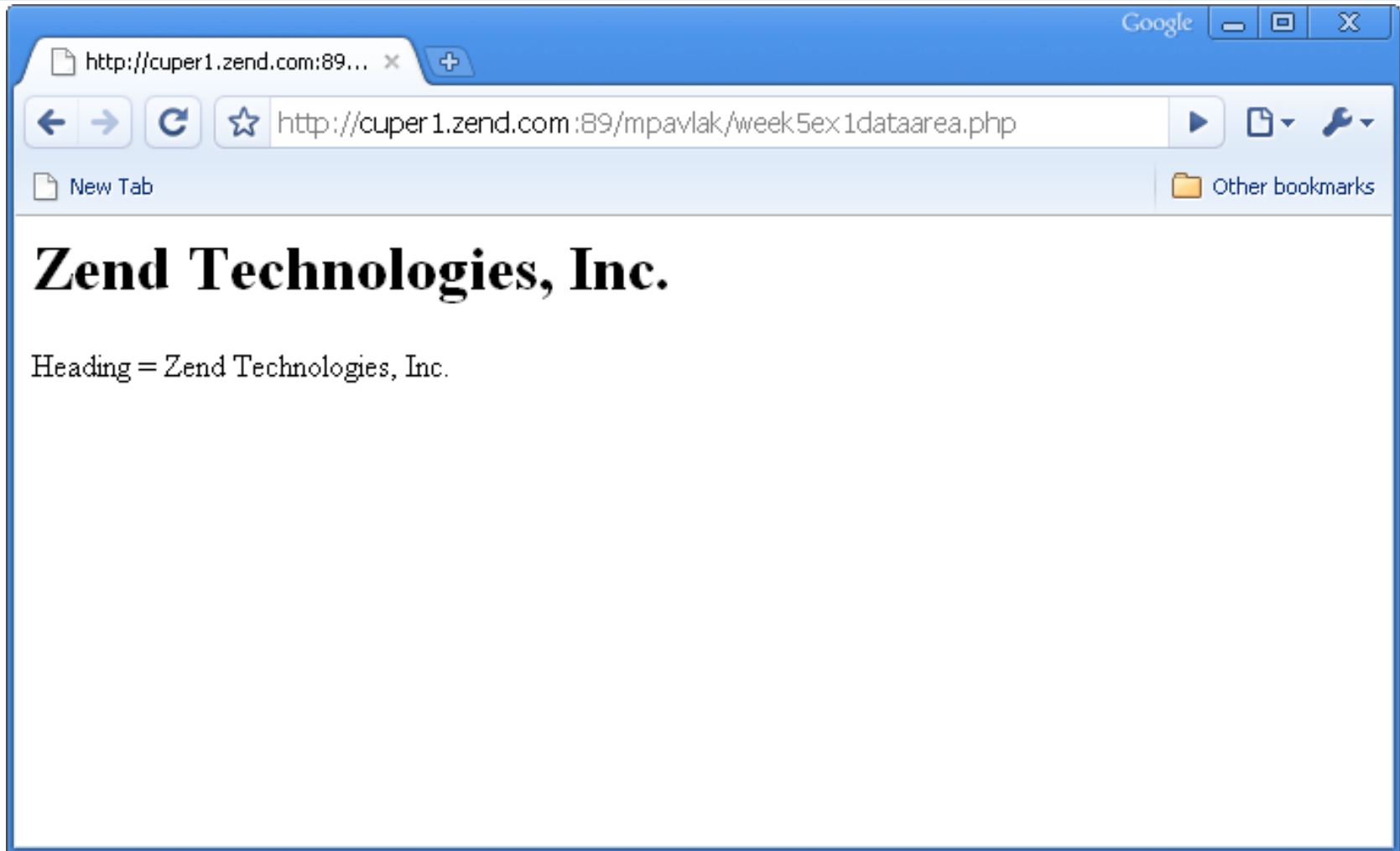
POWERED BY ZENO 5250 BRIDGE

Done

Data Area Code

```
1 <?php
2
3 include("i5db2connectonly.php");
4 $heading='test';
5
6 $heading = i5_data_area_read("ZENDDATA/COMPANY");
7 if (!$heading)
8 die("<br>data area read failed.");
9
10 echo "<h1>" . $heading . "</h1>";
11
12 echo "Heading = $heading";
13 i5_close($conn);
14
15 ?>
```

Data Area Output



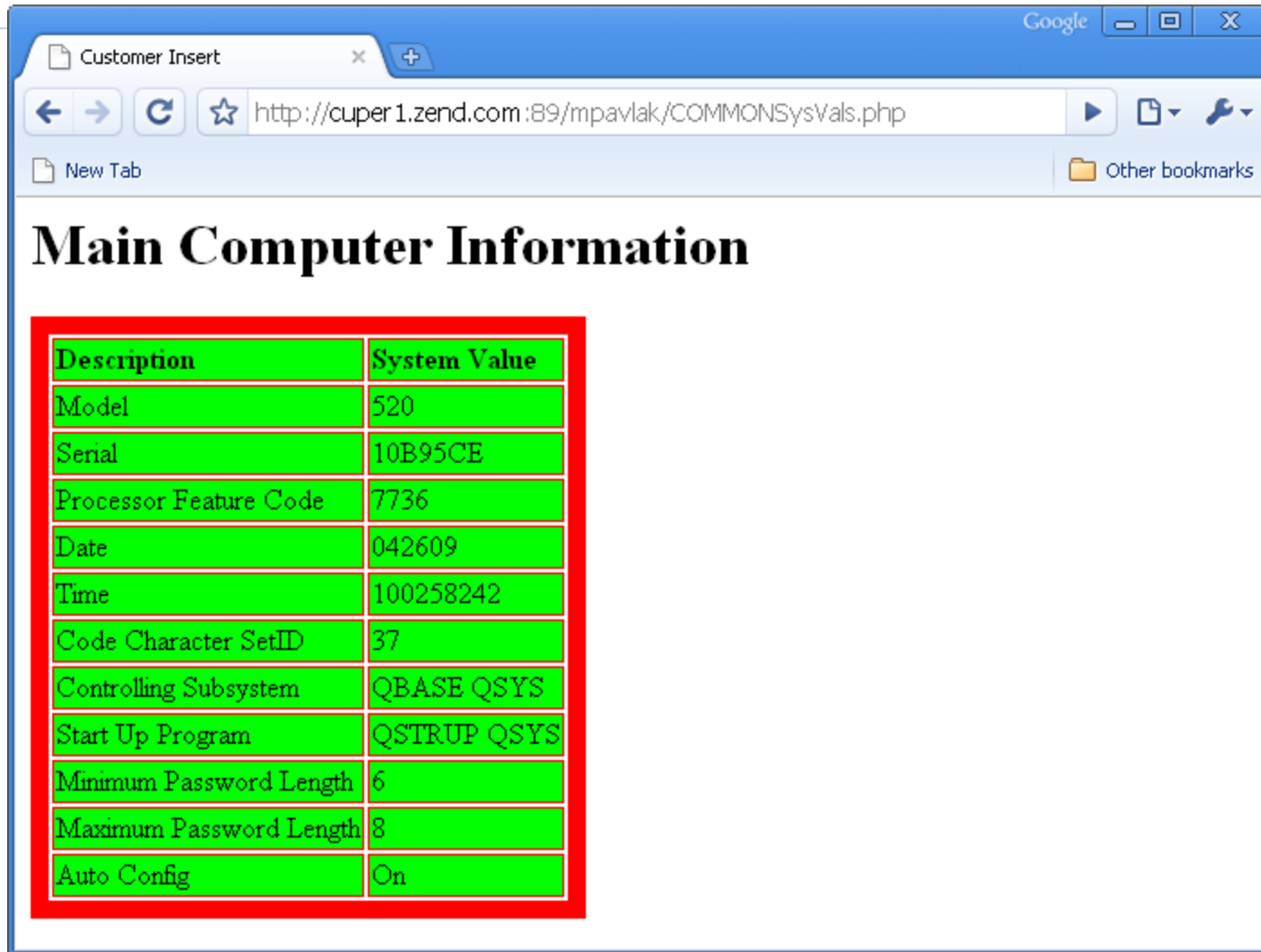
System Values Code Part 1

```
1 <html> <head><title>Customer Insert</title></head><body>
2
3 <h1>Main Computer Information</h1>
4
5 <?php
6
7 include("i5db2connectonly.php");
8
9 // $conn = i5_connect("localhost", "PHPDEV", "phpdev1");
10
11 //if (!$conn)
12 //die("<br>Connection failed. Error number = " . i5_errno() . " msg = " . i5_errormsg());
13
14 //Define table and start filling rows...
15 echo '<TABLE BORDER="10" BORDERCOLOR="red"><TBODY BGCOLOR="00FF00">';
16 echo '<TR><TD><B>Description</TD><TD><B>System Value</TD></TR>';
17
18 print "<TR><TD>Model</TD><TD>" . i5_get_system_value("QMODEL") . "</TD></TR>";
19
20 print "<TR><TD>Serial</TD><TD>" . i5_get_system_value("QSRLNBR") . "</TD></TR>";
```

System Value Code Part 2

```
34 print "<TR><TD>Minimum Password Length</TD><TD>" . i5_get_system_value("QPWDMINLEN") . "</TD></TR>";
35
36 print "<TR><TD>Maximum Password Length</TD><TD>" . i5_get_system_value("QPWDMAXLEN") . "</TD></TR>";
37
38 print "<TR><TD>Auto Config</TD><TD>";
39
40 if(i5_get_system_value("QAUTOCFG") == 1) {
41     echo "On";
42 }
43 else {
44     echo "Off";
45 }
46
47 print "</TD></TR>";
48
49
50 echo '</table>';
51 i5_close($conn);
52 ?>
```

System Values Output



The screenshot shows a web browser window with the title "Customer Insert" and the URL "http://cuper1.zend.com:89/mpavlak/COMMONSysVals.php". The page content is titled "Main Computer Information" and displays a table of system values. The table has two columns: "Description" and "System Value". The table is highlighted with a red border.

Description	System Value
Model	520
Serial	10B95CE
Processor Feature Code	7736
Date	042609
Time	100258242
Code Character SetID	37
Controlling Subsystem	QBASE QSYS
Start Up Program	QSTRUP QSYS
Minimum Password Length	6
Maximum Password Length	8
Auto Config	On

Program Call...

- Most popular use of the API Toolkit
 - Can call ANY IBM i program
 - Our example will show CL
 - Three parameters
 - Concatenate a string
 - Six steps:
 1. Parameter setup
 2. Prepare the program
 3. Load the i/o array of parameters
 4. Call the program
 5. Retrieve values

Program Call, script...Parameters

```
<h1>Village Water Billing System</h1>
```

```
<h2>Program Call</h2>
```

```
<?php
```

```
include("i5db2connectlib.php");
```

```
// Setup parameters in associative array...
```

```
$desc = array (
```

```
array ("name"=>"string1", "io"=>I5_INOUT, "type" => I5_TYPE_CHAR,  
"length"=> "10"),
```

```
array ("name"=>"string2", "io"=>I5_INOUT, "type" => I5_TYPE_CHAR,  
"length"=> "10"),
```

```
array ("name"=>"string3", "io"=>I5_INOUT, "type" => I5_TYPE_CHAR,  
"length"=> "20"),
```

```
);
```

Program Call, script...Prepare

```
// Prepare the program, similar to prototype in ILE...
$prog = i5_program_prepare("clp1", $desc);
if ($prog === FALSE)
{
    $errorTab = i5_error();
    echo "Program prepare failed <br>";
    var_dump($errorTab);
    die();
}
```

Program Call, script...Load parms

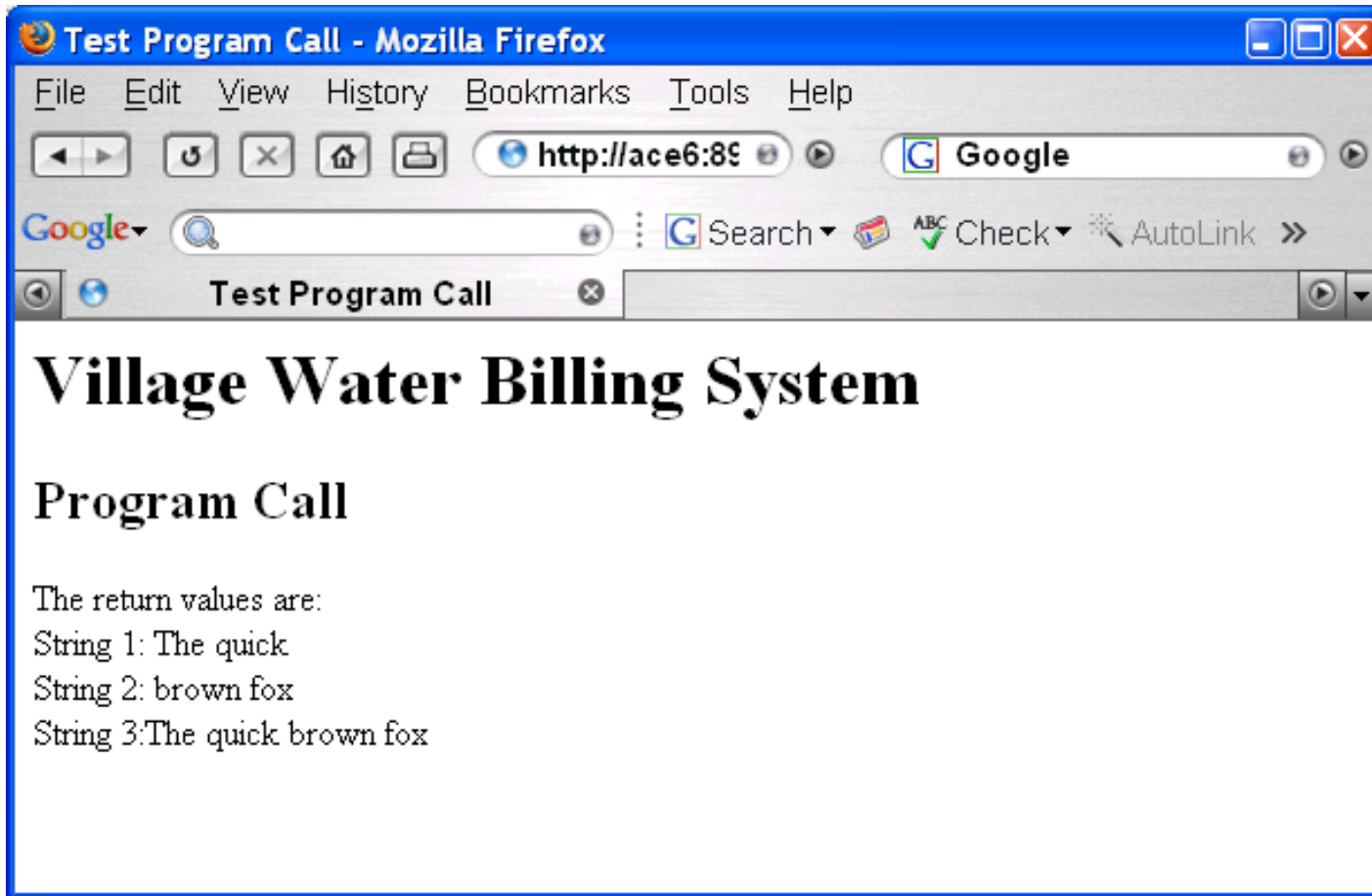
```
// Load parameters...
$params = array ("string1"=>"The quick ", "string2"=>"brown fox
", "string3"=>" ");

// Map parameters to variables...
$retvals =
array("string1"=>"string1", "string2"=>"string2", "string3"=>"string3");
```

Program Call, script...Execute!

```
$ret = i5_program_call($prog, $params, $retvals);
if ($ret === FALSE)
{
    $errorTab = i5_error();
    echo "FAIL : i5_program_call failure code <br>";
    var_dump($errorTab);
    die();
}
```

Program Call, example...



Test Program Call - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://ace6:89 Google

Google Search ABC Check AutoLink

Test Program Call

Village Water Billing System

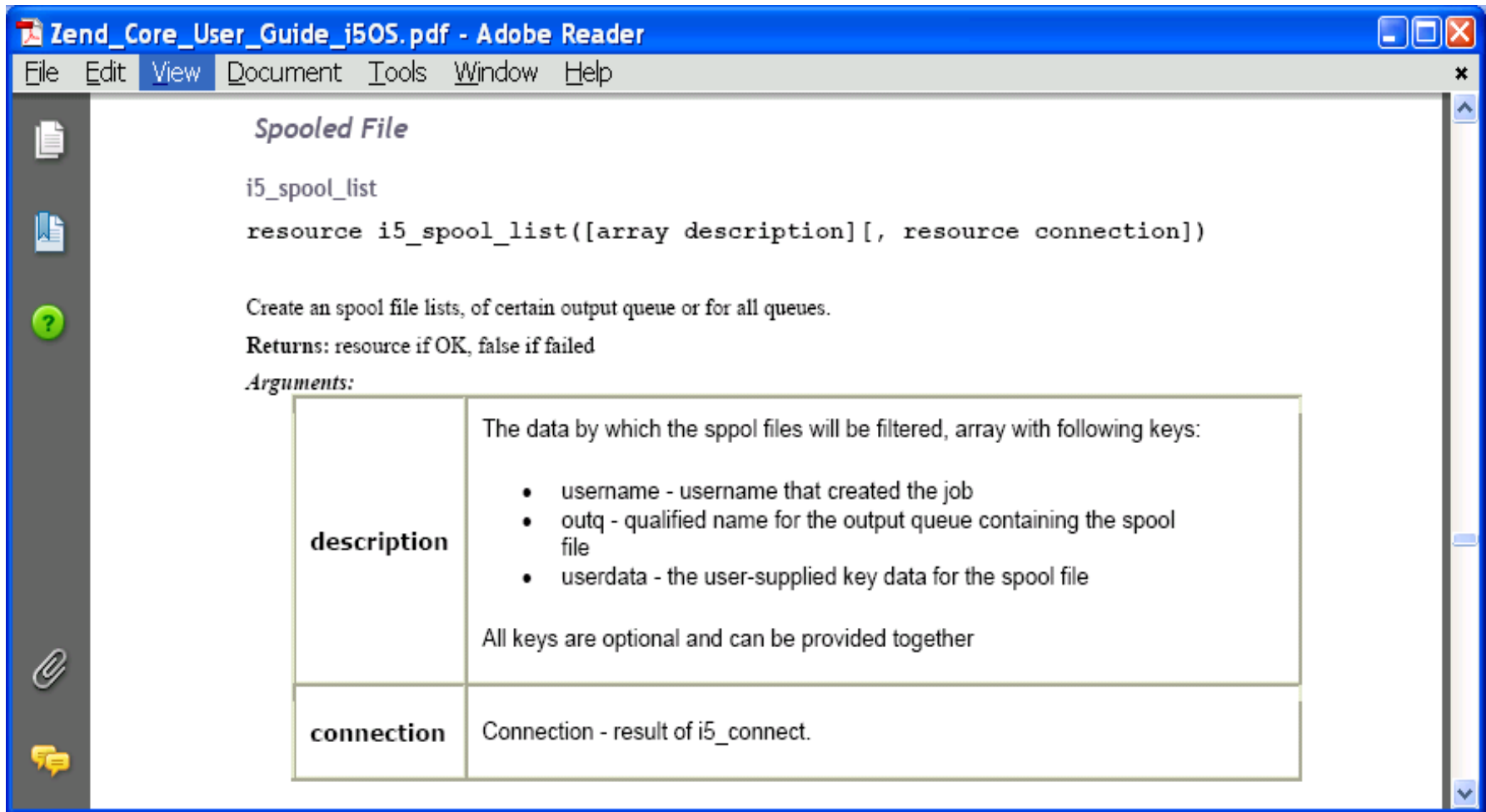
Program Call

The return values are:
String 1: The quick
String 2: brown fox
String 3: The quick brown fox

Spooled file listing...

- Everybody has them
- Used to print miles of standard reports
- Many utilities to make them “pretty”
- List them
- Maybe do something more

Spooled file listing...



Zend_Core_User_Guide_i5OS.pdf - Adobe Reader

File Edit View Document Tools Window Help

Spooled File

i5_spool_list

```
resource i5_spool_list([array description][, resource connection])
```

Create an spool file lists, of certain output queue or for all queues.

Returns: resource if OK, false if failed

Arguments:

description	<p>The data by which the spool files will be filtered, array with following keys:</p> <ul style="list-style-type: none">• username - username that created the job• outq - qualified name for the output queue containing the spool file• userdata - the user-supplied key data for the spool file <p>All keys are optional and can be provided together</p>
connection	<p>Connection - result of i5_connect.</p>

Spooled file listing...

Village Water Billing System

Spooled Files for MPAVLAK

Job Name	User Name	File Name	Date	OUTQ	Number
DSP04	MPAVLAK	QPEZBCKUP	1070121	MPAVLAK	1
DSP04	MPAVLAK	QPEZBCKUP	1070121	MPAVLAK	2
DSP04	MPAVLAK	QSYSVRT	1070121	MPAVLAK	3
DSP04	MPAVLAK	QPDSNET	1070121	MPAVLAK	4
DSP04	MPAVLAK	QSYSVRT	1070121	MPAVLAK	10
DSP04	MPAVLAK	QSYSVRT	1070121	MPAVLAK	67
DSP04	MPAVLAK	QPUSRPRF	1070121	MPAVLAK	96
MPAVLAKA	MPAVLAK	QPDSPLIB	1070127	MPAVLAK	1
MPAVLAKA	MPAVLAK	QSYSVRT	1070221	MPAVLAK	1
MPAVLAKA	MPAVLAK	QPSRVDMP	1070620	QEZDEBUG	1

Find: Next Previous Highlight all Match case Phrase

Done

Spooled file listing...

- Need some particulars
 - User
 - Output Queue
 - User data
- Break code and conquer!
 - Create the handle
 - Read through the table

Spooled file listing...

```
<html> <head><title>Spooled File List</title></head><body>
<h1>Village Water Billing System</h1>
<?php
$userName="MPAVLAK";

echo "<h2>Spooled Files for " . $userName . " </h2>";
include("i5db2connectonly.php");

$HdlSpl = i5_spool_list(array(I5_USERNAME=>$userName));
if (!$HdlSpl){
    $ret = i5_errno();
    print_r($ret);
}
echo '<TABLE BORDER="10" BORDERCOLOR="red"><TBODY
BGCOLOR="00FF00">';
echo '<TR><TD><B>Job Name</TD><TD><B>User Name</TD><TD><B>File
Name</TD><TD><B>Date</TD><TD><B>OUTQ</TD><TD><B>Number</TD></
TR>';
```

Spooled file listing...

```
$continue=true;
while ($continue){
    $ret = i5_spool_list_read($HdlSpl);
    if (!$ret){
        $erreur = i5_error();
        if ($erreur["num"] != 14){
            // error code here...
        }
        $continue = false;
        break;
    }
}
?>
<tr><td width="20%"><?php echo $ret["JOBNAME"]; ?> </td>
    <td width="20%"><?php echo $ret["USERNAME"]; ?> </td>
    <td width="20%"><?php echo $ret["SPLFNAME"]; ?> </td>
    <td width="10%"><?php echo $ret["DATEOPEN"]; ?> </td>
    <td width="20%"><?php echo $ret["OUTQNAME"]; ?> </td>
    <td width="20%"><?php echo $ret["SPLFNBR"]; ?> </td></tr>
<?php
}
```

Spooled file listing...

```
$continue=true;
while ($continue){
    $ret = i5_spool_list_read($HdlSpl);
    if (!$ret){
        $erreur = i5_error();
        if ($erreur["num"] != 14){
            // error code here...
        }
        $continue = false;
        break;
    }
}
?>
<tr><td width="20%"><?php echo $ret["JOBNAME"]; ?> </td>
    <td width="20%"><?php echo $ret["USERNAME"]; ?> </td>
    <td width="20%"><?php echo $ret["SPLFNAME"]; ?> </td>
    <td width="10%"><?php echo $ret["DATEOPEN"]; ?> </td>
    <td width="20%"><?php echo $ret["OUTQNAME"]; ?> </td>
    <td width="20%"><?php echo $ret["SPLFNBR"]; ?> </td></tr>
<?php
} ?>
```

5250 Bridge

What is the "Bridge"

Three sets of APIs that allow a PHP script to drive a 5250 session

Green Screen Simulator

Object Oriented APIs / Procedural APIs

Multiple 5250 sessions can be connected to a single script

So you could combine the data from several green screen applications in a single browser window!

Bridge is available as part of Zend Server

Product Definition

The 5250 Bridge is a PHP based solution for running interactive applications in the i5/OS environment

```
Date: 12/17/07      User: Maintenance      Zend Technologies
Time: 08:59:48      5250 Bridge Version 1.0

      Position to. . . . . |_____

Type options, press Enter.
5-Display

  Opt  User ID      Serial      Application  Status
  ---  ---
  ---  BENJAMIN     1848142    BRIDGE      1 ACTIVE
  ---  BEVERLY       6532972    MEDICAL     1 ACTIVE
  ---  DIANA         6532972    MEDICAL     1 ACTIVE
  ---  JAMES        1848142    BRIDGE      1 ACTIVE
  ---  JEAN         2114748    STAFF       1 ACTIVE
  ---  KATE         1848142    BRIDGE      1 ACTIVE
  ---  MICHAEL      2114748    STAFF       1 ACTIVE
  ---  WILLIAM      7845152    LOGICAL     1 ACTIVE

                                          Button

F1-Exit
Response      © Copyright Zend Technologies 2008.
```



PHP Application for i5/OS 29 Jan 2008, Tuesday 08:27AM Disconnected

User Maintenance - demo program ZEND5250/ZMI001R

User ID	Serial no.	Details
BENJAMIN	1848142	Details
BEVERLY	6532972	Details
DIANA	6532972	Details
JAMES	1848142	Details
JEAN	2114748	Details
KATE	1848142	Details
REGINA	2114748	Details
WILLIAM	7845152	Details

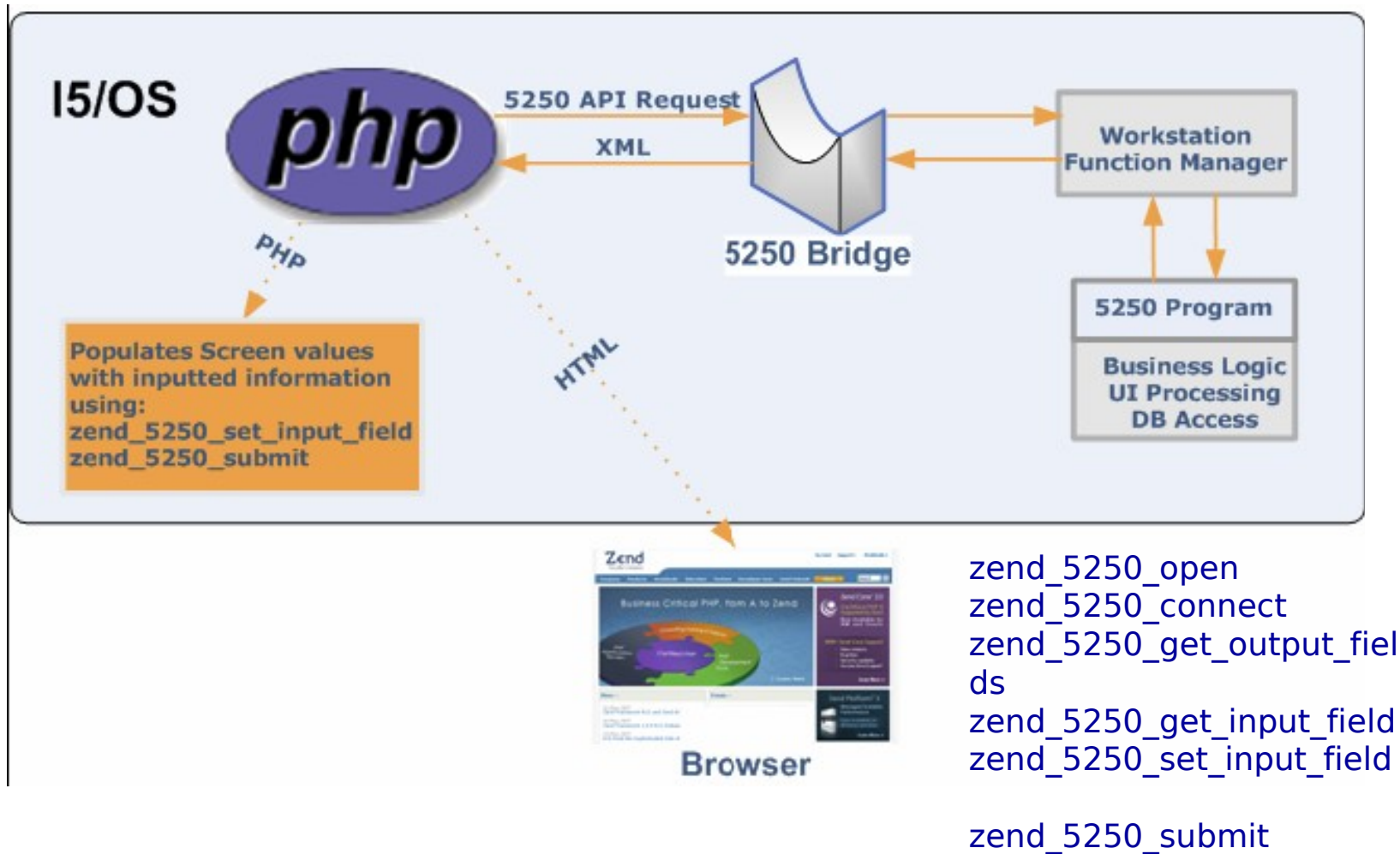


BENJAMIN 

Serial: #1848142
Application: BRIDGE
Status: Active
Number of Sign On: 3

© 2008 Zend Technologies
POWERED BY ZEND 5250 BRIDGE

5250 Bridge Diagram



ARRAY DUMP OF RETURN SET

```
1. array(5)
2. { [0]= array(8) { ["id"]= int(0) ["row"]= int(6)
3. ["column"]= int(53) ["length"]= int(10) ["value"]=
4. string(10) " " ["type"]= string(11) "Alpha shift" ["font"]=
5. string(11) "Not defined" ["format"]= string(11) "Not Defined" }

6. [1]= array(8){ ["id"]= int(1) ["row"]= int(7)
7. ["column"]= int(53) ["length"]= int(10) ["value"]=
8. string(10) " " ["type"]= string(11) "Alpha shift" ["font"]=
9. string(11) "Not defined" ["format"]= string(11) "Not Defined" }

10. [2]= array(8) { ["id"]= int(2) ["row"]= int(8)
11. ["column"]= int(53) ["length"]= int(10) ["value"]= string(10) " "
    ["type"]= string(11) "Alpha shift" ["font"]=
12. string(11) "Not defined" ["format"]= string(11) "Not Defined" }
```

Resources

- **PHP and IBM i:**
 - **Zend Server for IBM i**
 - **Zend and IBM i**
 - **PHP Toolkit for i5/OS**
 - **Developing PHP Applications for IBM Data Servers**
 - **Recommended PHP reading list**
 - **Modernize your IBM i applications**
 - **What's New with PHP on IBM i?**
 - **Mike Pavlak's Blog**
 - **Alan Seiden's Information Technology Blog**

Questions?



Thank you!

More info:

<http://www.zend.com>



The PHP Company

