The PHP Company

PHP: Toolkit Examples

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Southeast Michigan iSeries User Group

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Audience

- New to PHP
- Looking to leverage IBM i resources in web applications
- Seeking business value of PHP

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Agenda

- Review Zend Server: Home of the Toolkit
- Overview of toolkit functions
  - Studio Integration
- Examples
  - Data Area
  - Data Queue
  - Program Call
- Explore 5250 bridge
  - Bridge functions
  - Updated emulator
- New open Source Toolkit Demo

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Questions?

- Let's keep it interactive!

- Follow us!

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  - http://twitter.com/zend

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Review Zend Server

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Review of Zend Server

- Variables & Data Types
- Functions
- Copybooks

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Zend Server 5.0 GA on 04/12/2010!

- The Linux and Windows distributions have been GA since Feb
- Code base consistency is making this gap smaller
- Training class available…see zend.com/store for more info

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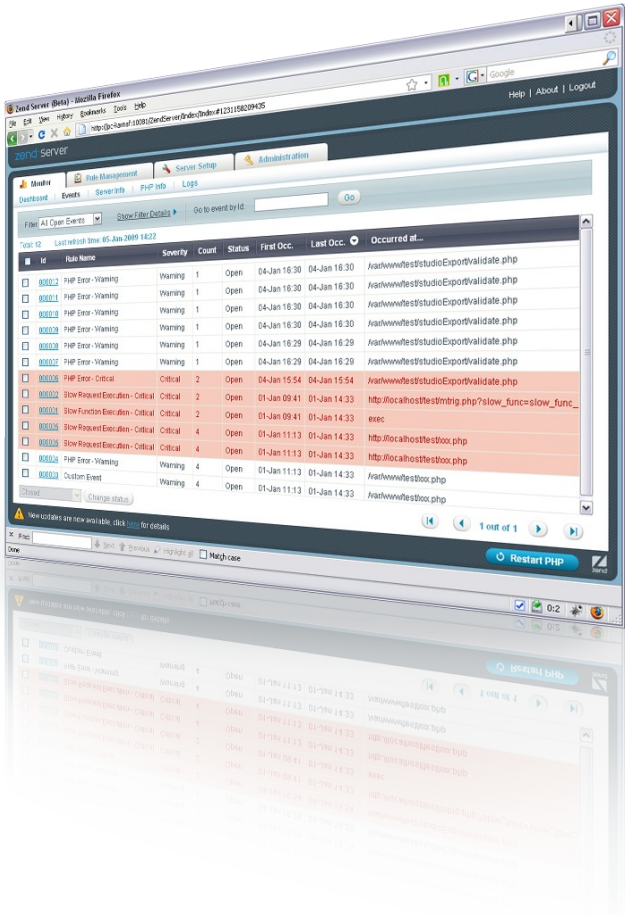
What Is Zend Server?

- Production quality PHP stack
  - PHP, ZF, DB connectivity, debugging extension, and more
- Two Editions - Free “Community Edition” provided by IBM & Full commercial edition
  - Both are production ready
- Application monitoring and diagnostics (integrated with Zend Studio)
- Multi-level performance enhancement capabilities
- Software updates and security hot fixes
- Easy and quick installation
- Zend Framework Integration



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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 products**
  - Zend Server for IBM i Community Edition
    - Available at no charge per IBM partnership
  - Zend Server for IBM i
    - Subscription available from Zend
    - High value extra features
    - Higher Support SLAs

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Why a new generation?

- **Based on feedback of key areas for Improvement**
- **Improved basic PHP Performance**
  - 30% to 600% depending on the application
- **New capabilities**
  - Code Tracing – Faster problem resolution
  - Job Queue – Performance and scalability
  - Page Caching – Performance and Scalability
  - Support for PHP 5.3
- **Easier installation, administration & maintenance**
  - Single apache server

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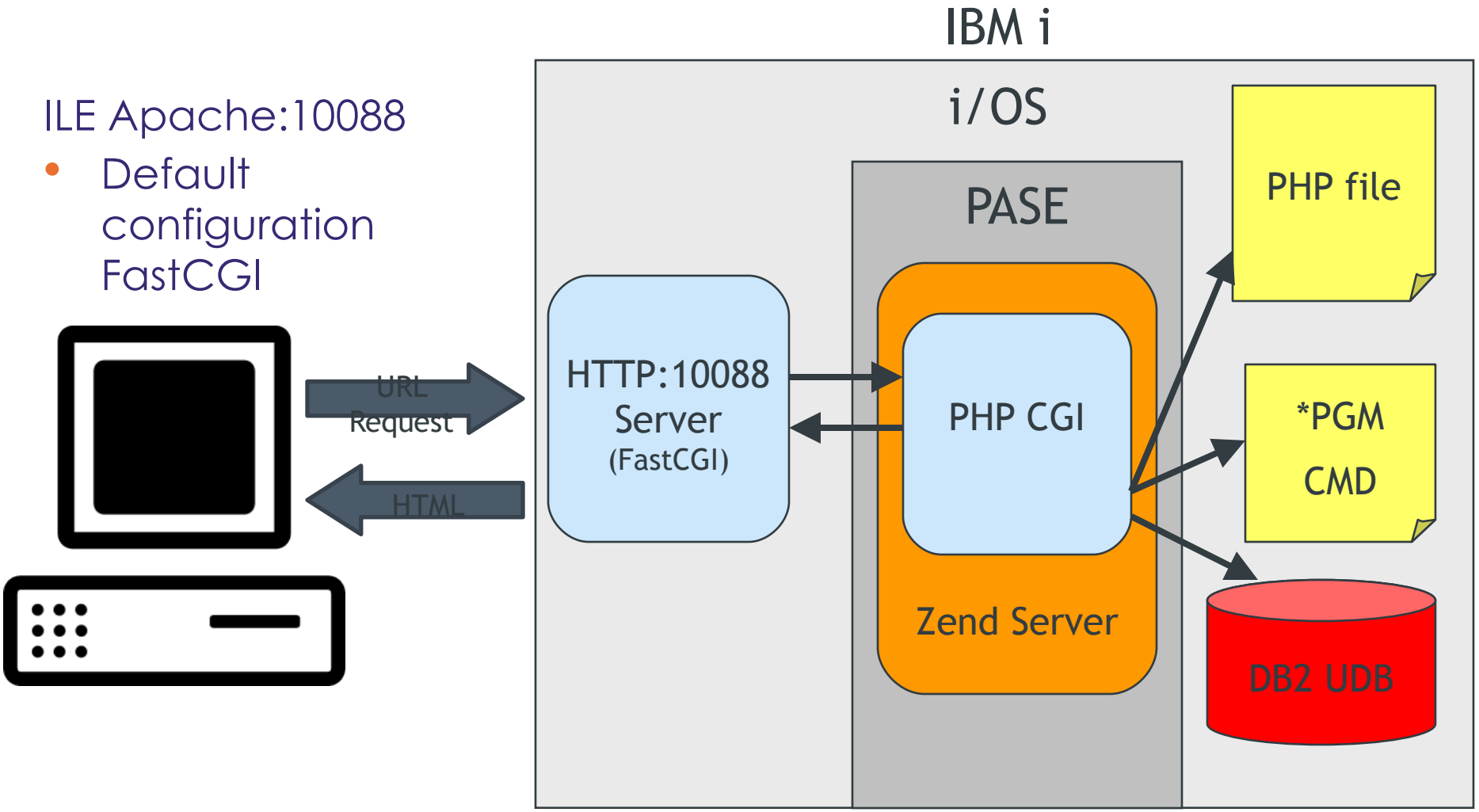
Zend Server Under the Covers

ILE Apache:10088

- Default configuration FastCGI



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Overview of Toolkit Functions

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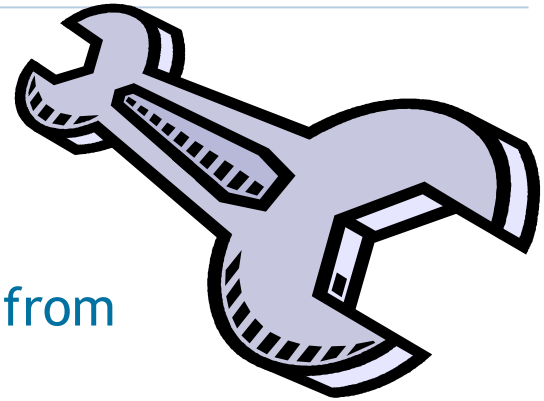
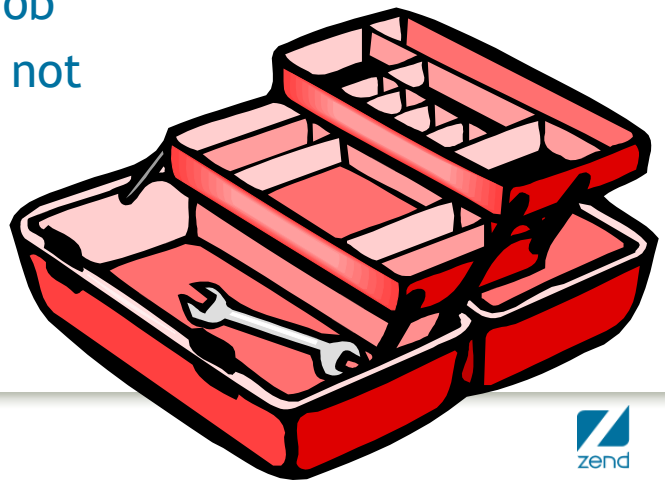
i5 Toolkit APIs



- 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
- 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)



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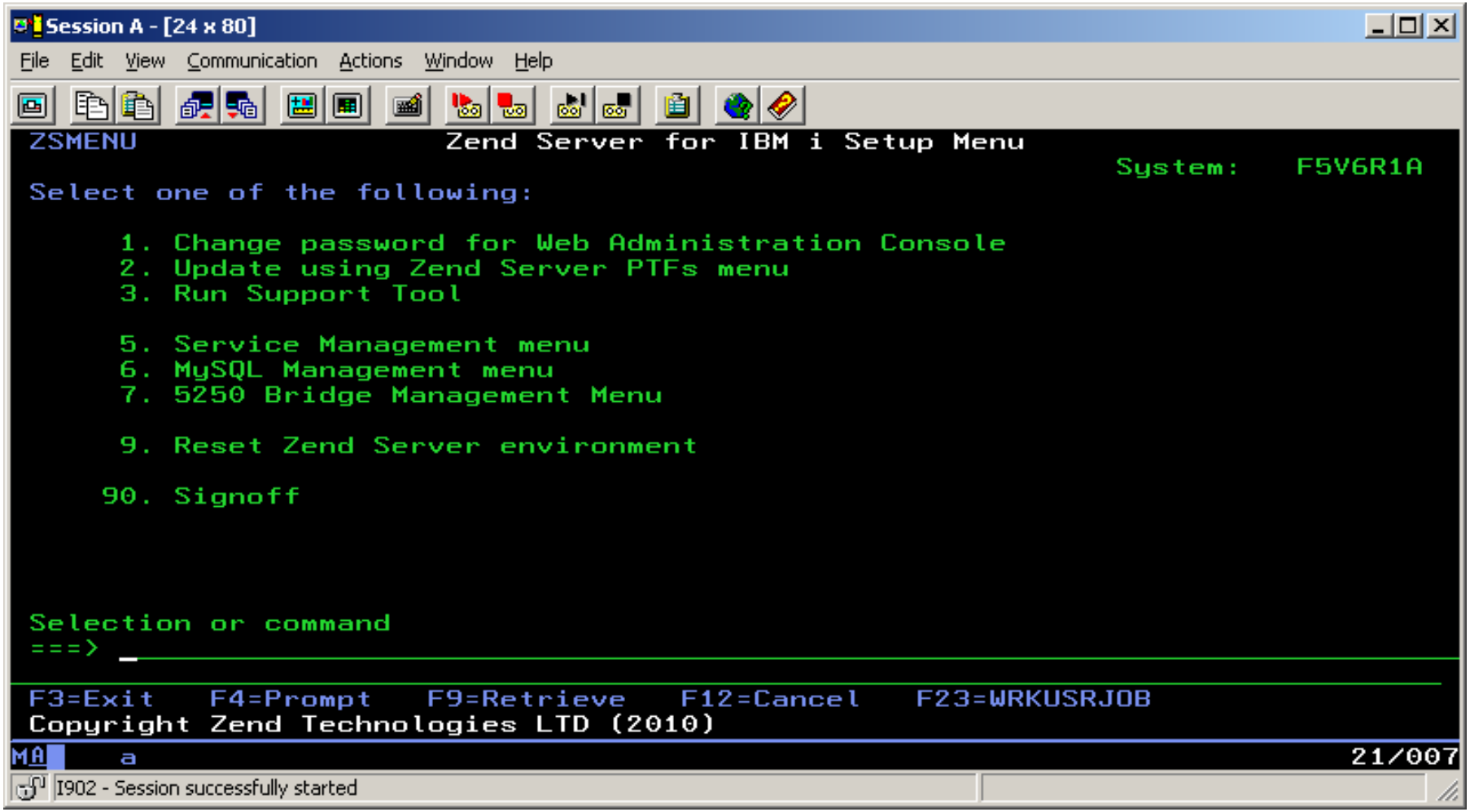
Zend Server Menu



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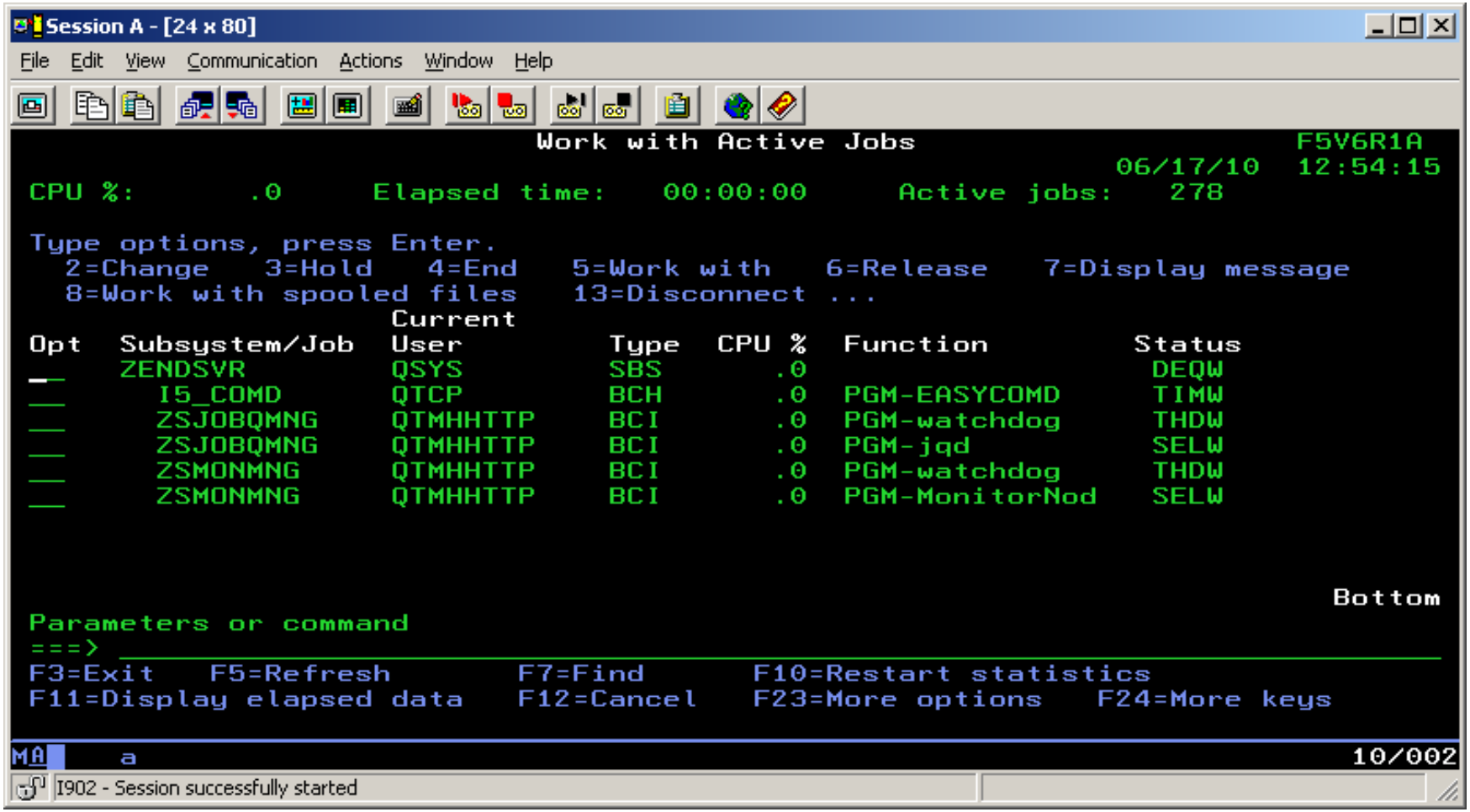
Zend Server Subsystem



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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

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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
- Print/Get spooled file
  - i5_spool_list
  - i5_spool_list_read
  - i5_spool_list_close
  - i5_spool_get_data
  - i5_spool_from_file
- 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_crearte
  - i5_userspace_prepare
  - i5_userspace_get
  - i5_userspace_put

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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

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Examples

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Two toolkit examples

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

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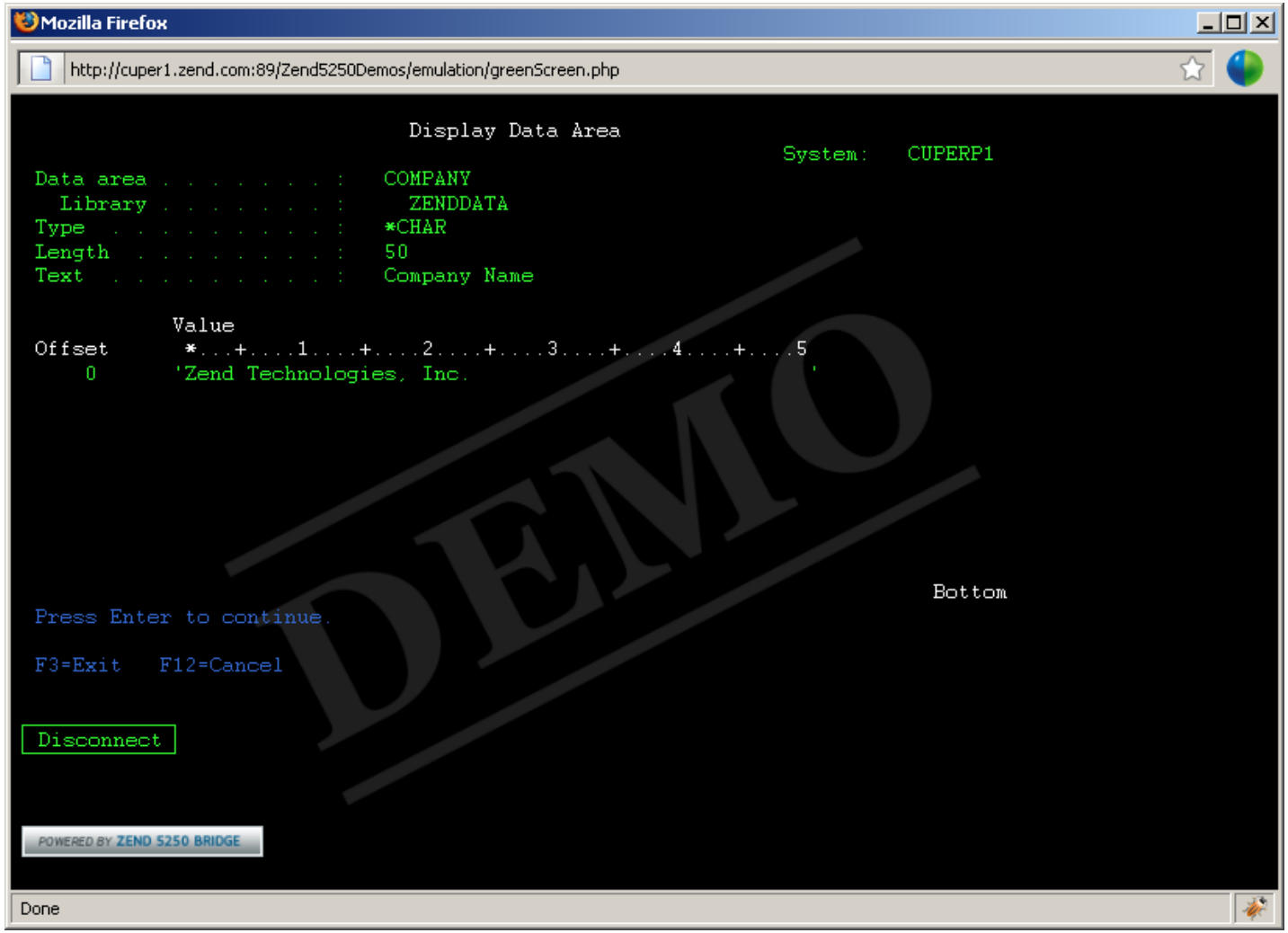
Data Area Contents



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Data Area Code

```php
<?php

include("i5db2connectonly.php");
$heading='test';

$heading = i5_data_area_read("ZENDDATA/COMPANY");
if (!$heading)
die("<br>data area read failed.");

echo "<h1>" . $heading . "</h1>";

echo "Heading = $heading";
i5_close($conn);

?>
```

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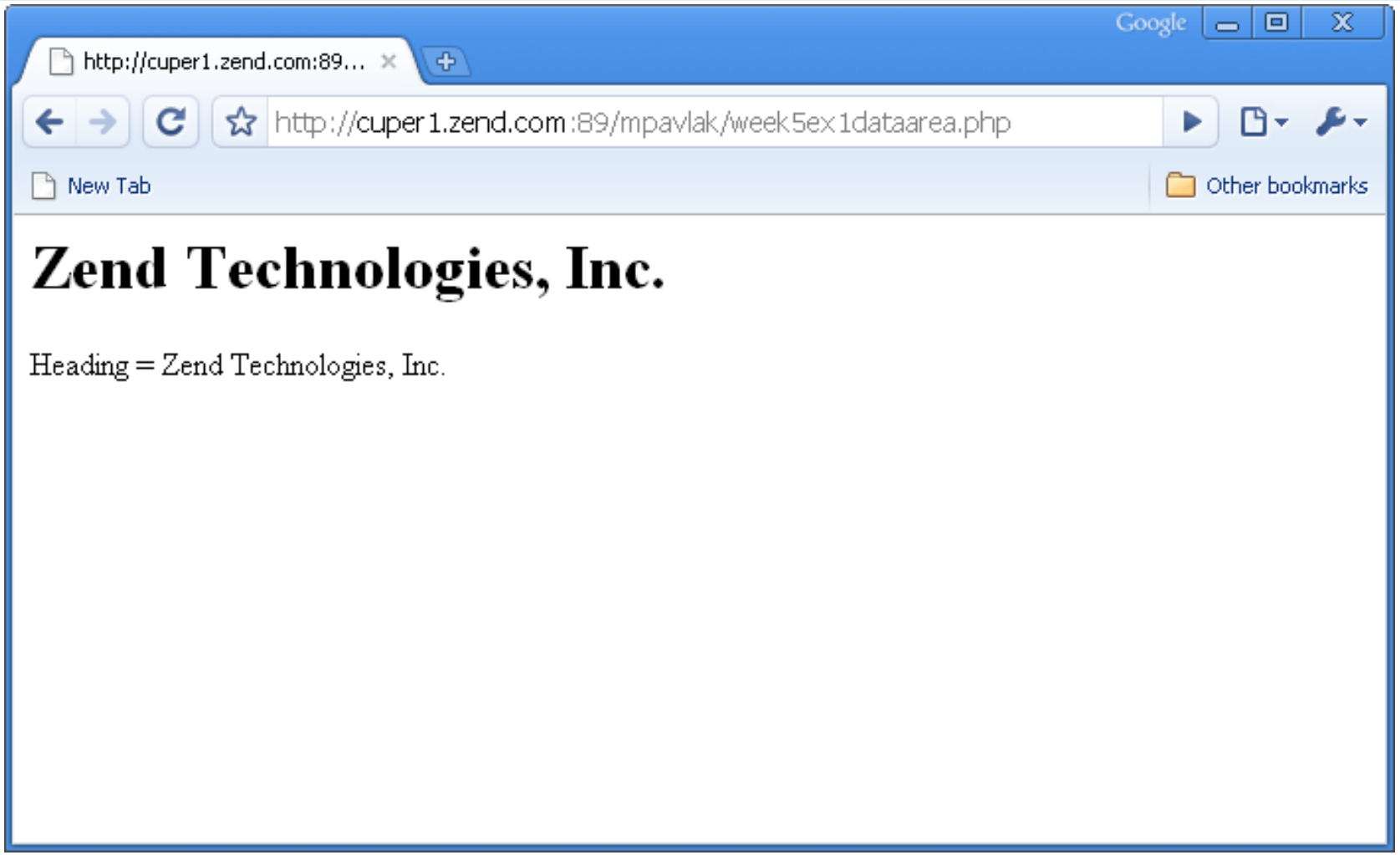
Data Area Output



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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>";
```

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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 ?>
```

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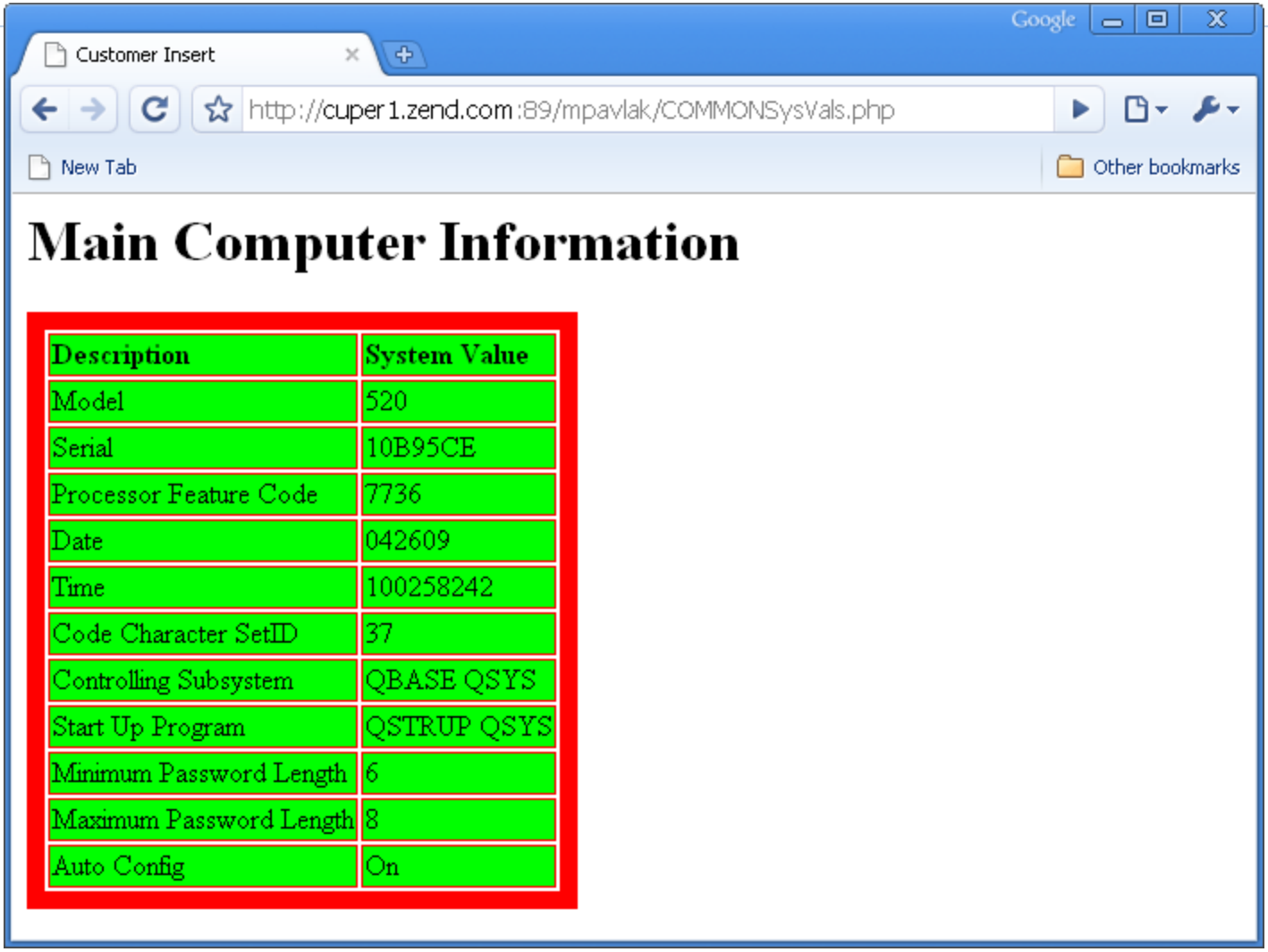
System Values Output



Main Computer Information

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

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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:
  - Parameter setup
  - Prepare the program
  - Load the i/o array of parameters
  - Call the program
  - Retrieve values

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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"),
);
```

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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();
}
```

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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");
```

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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();
}
```

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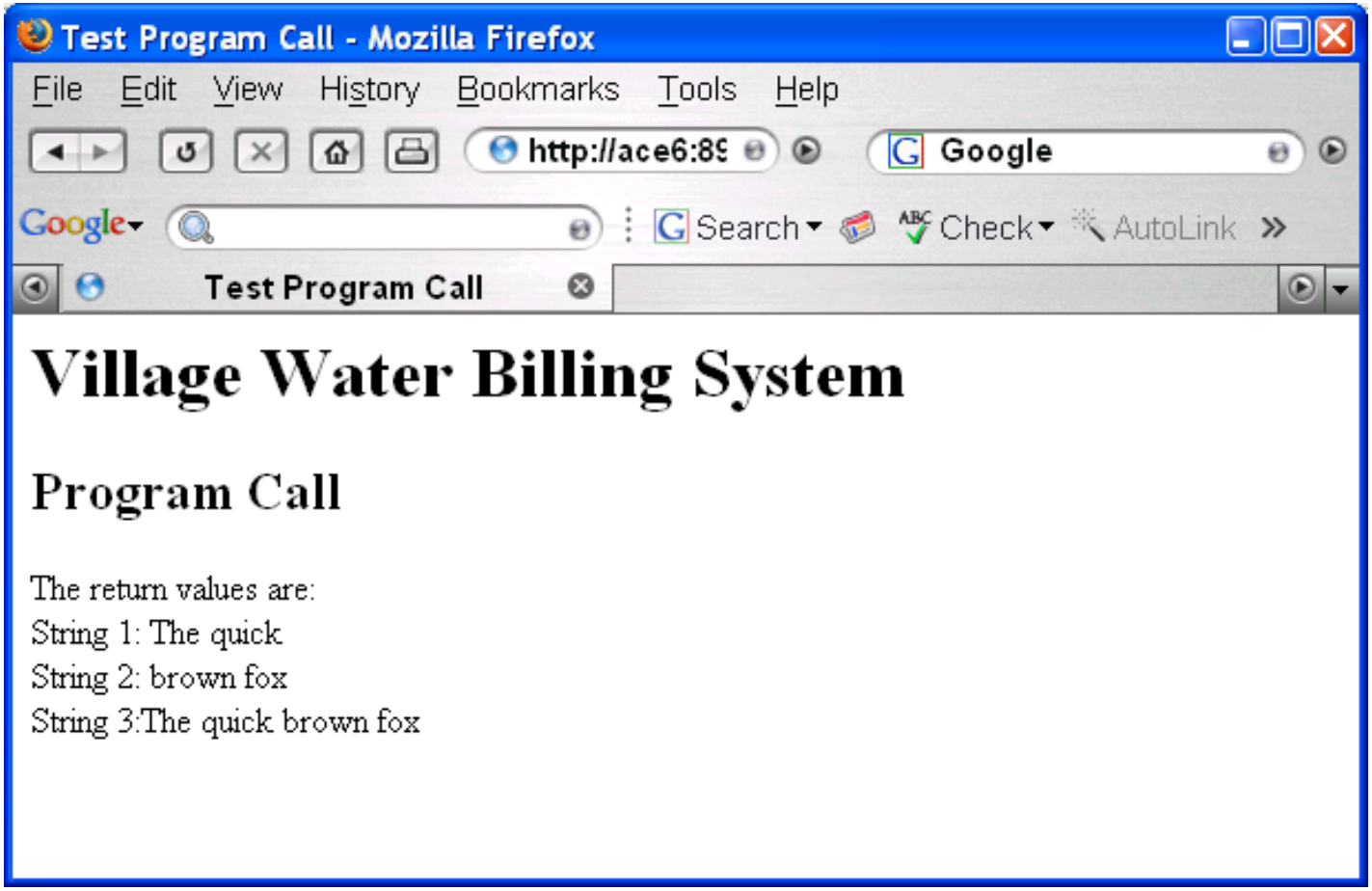
Program Call, example...



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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

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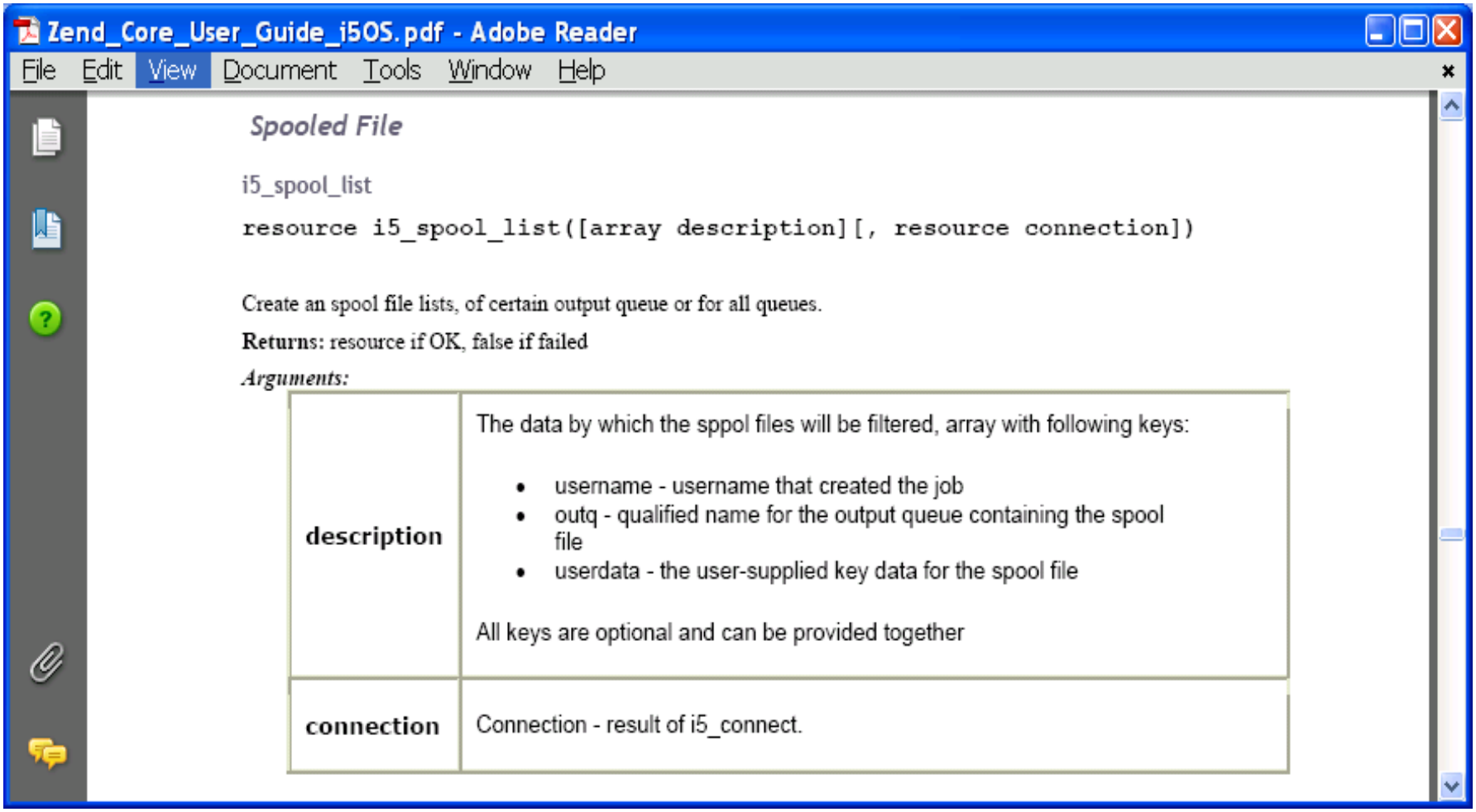
Spooled file listing...



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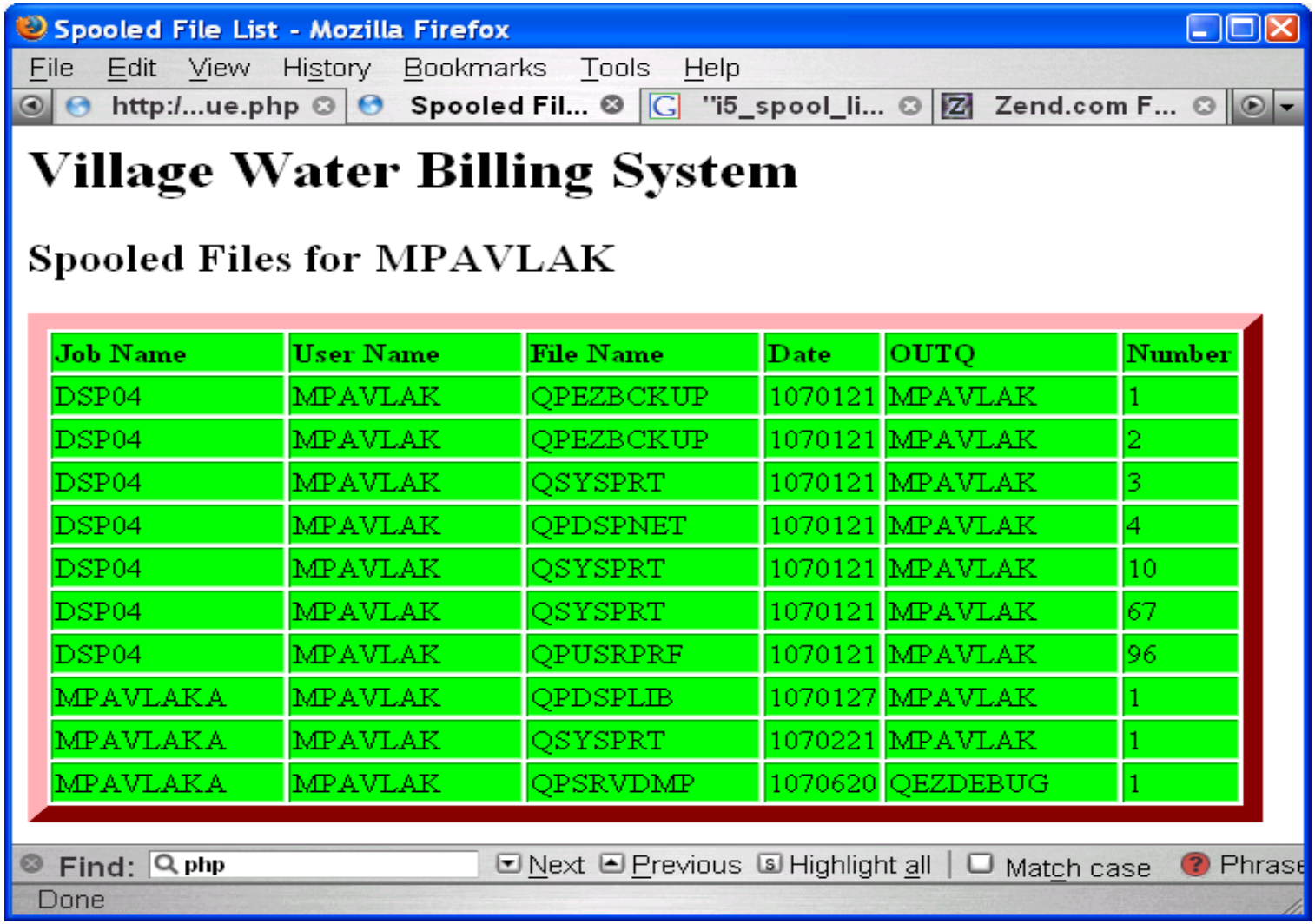
Spooled file listing...



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Spooled file listing...

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

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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>';
```

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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
}
```

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5250 Bridge & Emulator

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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
    - During the session these are the ones we will be focusing on
- **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 Platform App Server**

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Product Definition

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

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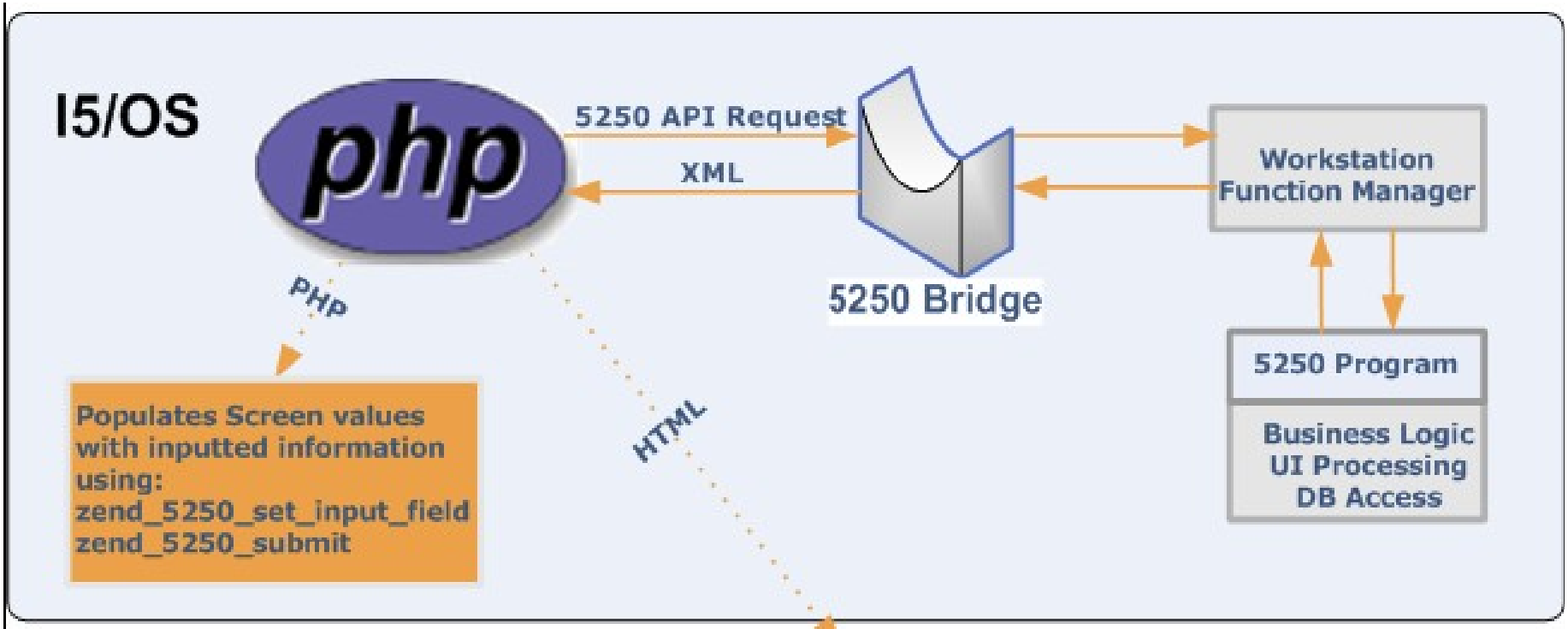
5250 Bridge Diagram



1. PHP sends a 'start session' request to the 5250 Program using the 5250 Bridge.
2. The 5250 Bridge returns a confirmation to PHP that the session has started.
3. The 5250 Bridge sends current screen information in XML format to PHP (e.g. format name, input and output fields and current cursor position).
4. The input values can be automatically entered into the program or sent on in an html format for user input.

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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" }

13. [3]= array(8) { ["id"]= int(3) ["row"]= int(9)
14. ["column"]= int(53) ["length"]= int(10) ["value"]=
15. string(10) " " ["type"]= string(11) "Alpha shift" ["font"]=
16. string(11) "Not defined" ["format"]= string(11) "Not Defined" }

17. [4]= array(8) { ["id"]= int(4) ["row"]= int(10)
18. ["column"]= int(53) ["length"]= int(10) ["value"]= string(10) " " ["type"]= string(11) "Alpha shift"
    ["font"]=
19. string(11) "Not defined" ["format"]= string(11) "Not Defined" } }
```

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New Open Source Toolkit

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Open Source Toolkit

- Collaboration with IBM and Zend
- Built on ILE RPG, Stored Procedures & pure PHP
- Up to 10 times faster
- Object Oriented, but not too much!

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Example: Usage of all toolkit functions – Part 1

```
ToolkitObj = new  ToolkitService();
ToolkitObj->setToolkitServiceParams(array('ControlKey'=>'*here',  'Internal
key'=>'/tmp/QAUser') );

ToolkitObj->CLCommand("addlible test", 'b');
 /* Call a program without parameters */
ToolkitObj->PgmCall('TESTPGM', 'TESTLIB', array(0), NULL, NULL);

/* Call service program function "sum" which has 3 parms: 2 int input parms and 1 output parm */
$params[] = array('type'=>'10i0', 'io'=>'in', 'parm_name'=>'first',  100); /*first input parameter
*/
$params[] = AddParameterInt ('in', 10, 'second", 200); /*second input parameter */
$params[] = AddParameterInt ('out', 10, 'third',  0); /*third output parameter*/

$Result = ToolkitObj->PgmCall('TESTSRVPGM', NULL, $Params, NULL, array('func', 'sum'));

Var_dump($result );//$result[0]

/*execute function again with a new data */
 ToolkitObj->SetParamValue($Params, 'first', 20); /* reset value of first parameter*/

ToolkitObj->SetParamValue($Params, 'second', 30); /* reset value of second parameter*/

ToolkitObj->PgmCall('TESTSRVPGM', NULL, $Params, NULL, array('func', 'sum'));

ToolkitObj->disconnect();
```

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Open Source Toolkit

- Demo…

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Wrap up

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Resources

- **Recorded Webinars**
  - http://www.zend.com/en/resources/webinars/i5-os
- **Zend Server for IBM i main page, link to downloads**
  - http://www.zend.com/en/products/server/zend-server-ibm-i
- **Zend Server manual:**
  - PDF: http://www.zend.com/topics/Zend-Server-5-for-IBMi-Reference-Manual.pdf
  - Online: http://files.zend.com/help/Zend-Server-5/zend-server.htm#installation_guide.htm

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New book, new printing, same great stuff!

Kevin Schroeder from Zend's Global Services Group

with

Jeff Olen, co-author of…

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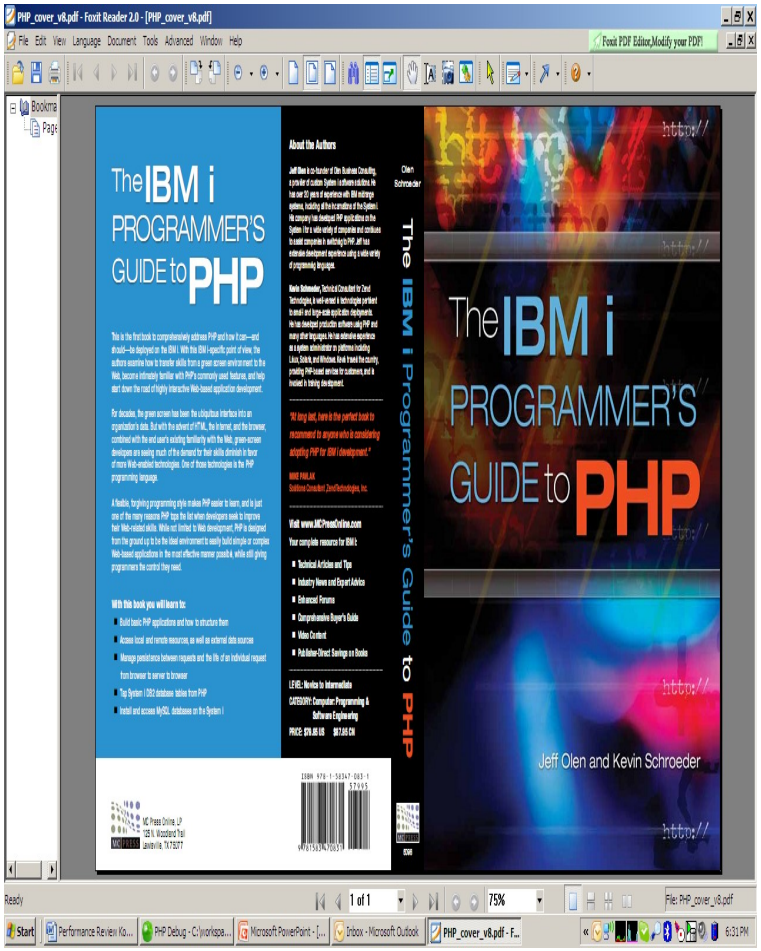

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Q&A

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