

The Omni User



IBM System i™

IBM

PHP and MySQL in i5/OS – New Stacks and New Solutions

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System i Technology Center

Open Community Technologies

i want stress-free IT.

i want control.

*i want an **i**.*

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Agenda

- Introduction
- The iAMP Stack
- The iADP Stack

Web Development Stacks

L A M P
 i p y H
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W I M P
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Introduction

- The LAMP stack (Linux, Apache, MySQL, PHP) is being used by a growing number of developers to provide a low-cost, reliable platform for web-based applications.
- The iAMP stack (i5/OS, Apache, MySQL, PHP) is the i5/OS native variant of the LAMP stack – it allows for development of web-based applications integrated with the MySQL open source database.
 - iAMP is well suited for those customers/environments that wish to leverage existing open source applications based on PHP and MySQL.
- The iADP stack (i5/OS, Apache, DB/2, PHP) is another i5/OS native variant of the LAMP stack – it allows for development of web-based applications integrated with the DB/2 database and other native i5/OS resources
 - iADP is well suited for those customers/environments that wish to develop customized web applications that provide the ability to access and manipulate i5/OS resources

The LAMP Stack

- LAMP refers to a set of tools (Linux, Apache, MySQL, and PHP) that facilitates rapid development and deployment of software applications
- LAMP is often defined as the open source web platform.

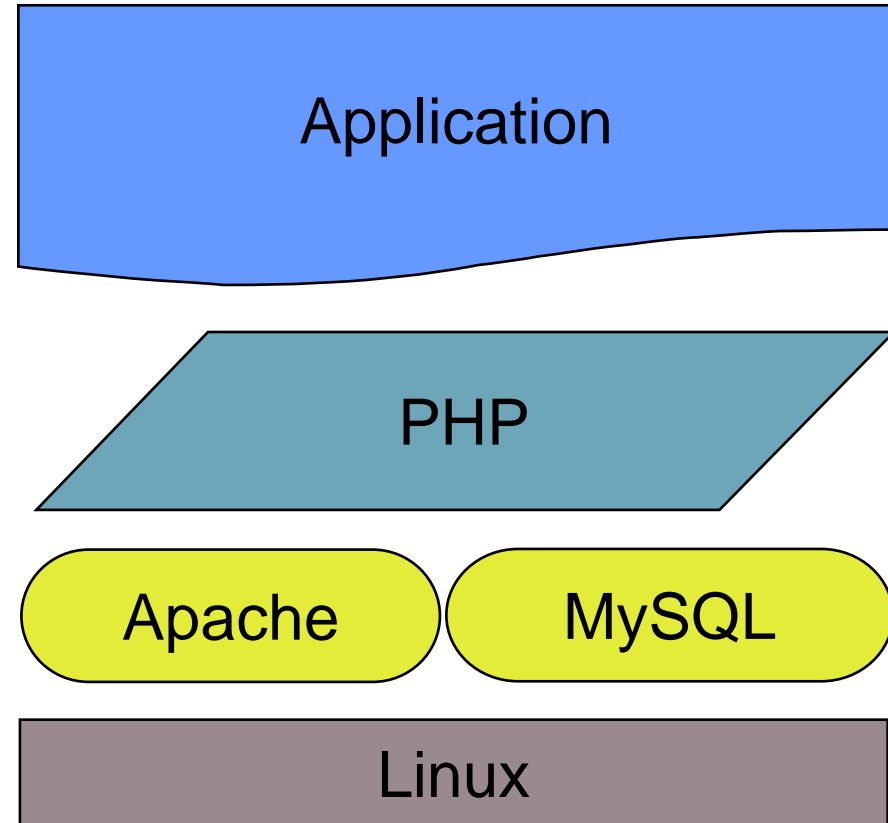
Evolution of web applications

- Every 7 seconds a new wiki or blog is created...
- Next wave of programmers: folks who create content are now empowered to create applications
- New platforms being established – providing simple, feature rich environments for editing and contributing content.
- Content is handled with a simple WYSIWYG editor that makes editing accessible to anyone
- Main content accompanied with discussion tabs, history tabs, version tabs, mailing list tabs

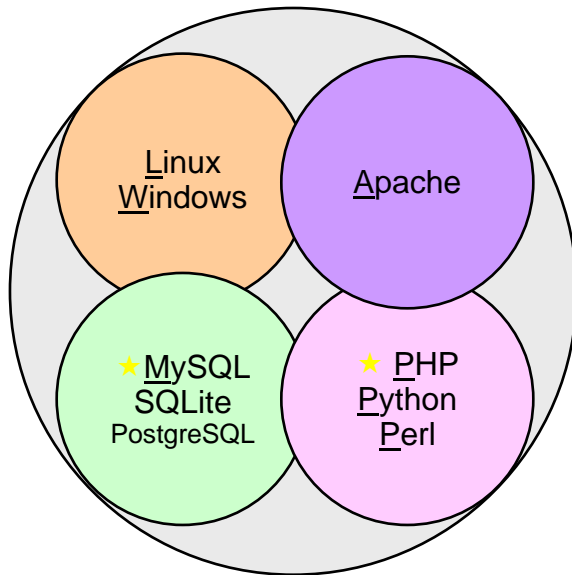


The LAMP Stack

- Open Source Software Components – used as a "toolkit" by web developers for deploying robust web-content complete with data access and manipulation
- Has become a major development platform for the enterprise
 - Used by such enterprises as Amazon, Friendster, Google, and Yahoo



What is LAMP?



- L = Linux
- A = Apache web server
- M = MySQL
- P = PHP | Perl | Python

- Open-source software stack with a strong focus on:
 - Affordability – Perceived zero to low cost
 - Ease of development, ease-of-use
 - Community
 - Building solutions. Large body of single-click install & auto-configure solutions and libraries (<http://www.hotscripts.com/>)
 - The functionality in LAMP is probably the same function that about 80% of J2EE/WebSphere applications use

The LAMP components

Linux

- Free UNIX-type operating system
- Has become firmly established as an enterprise-class alternative to proprietary UNIX and Microsoft products
- Commercial entities, such as IBM, have extended the free Linux kernel and created the support and services infrastructure essential to enterprise customers

Apache

- Traces its roots to the public domain HTTP daemon developed at the National Center for Supercomputing Applications
- Apache has been the most popular web server every year since 1996

MySQL

- World's most popular open source database
- Many large corporations – including Sabre Holdings, Cox Communications, The Associate Press, and NASA are using MySQL to power web-sites, business-critical enterprise applications and packaged software

PHP

- Widely used general-purpose scripting language
- Especially suited for web development
- Can be embedded in HTML
- It has become one of the most popular languages on the web

What's driving LAMP (and open-source related development stacks)

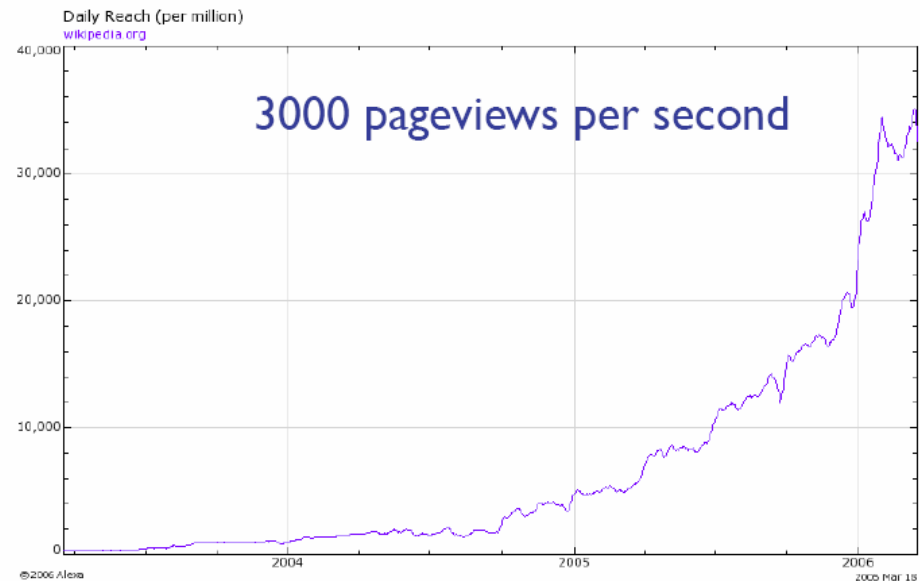
- Constant pressure on developers to do more, faster, and with less as firms strive to reduce costs, improve returns on IT investments, and accelerate time-to-value
- Growing adoption of SOA environments for enterprise integration
 - Allows wider choice of application development & implementation technologies by allowing heterogeneous systems to interact freely at the service level
- Faster pace of open source software improvement relative to proprietary products
 - Facilitated by active participation of global user communities
- Availability of polished developer tools for the LAMP environment
 - Example: Zend's integrated development and production environments for PHP applications

Speed and Simplicity

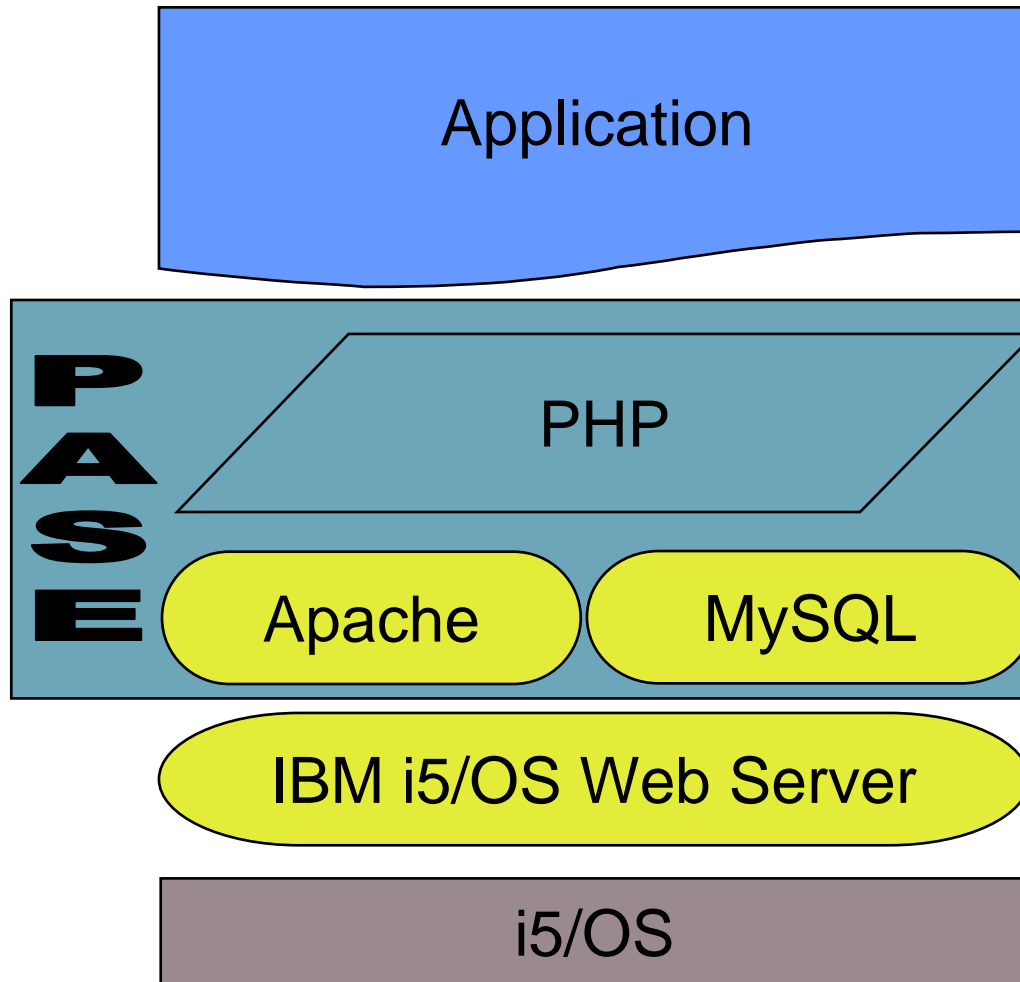
- The language component (PHP) of the LAMP stack (as well as iADP and iAMP) has been created specifically to simplify, streamline, and accelerate programming tasks typical of Web development.
- PHP is particularly well suited for text handling as well as database access for dynamic content generation.
- PHP features a simple, clear syntax that makes it easy to learn.

What can be done with LAMP – an Example

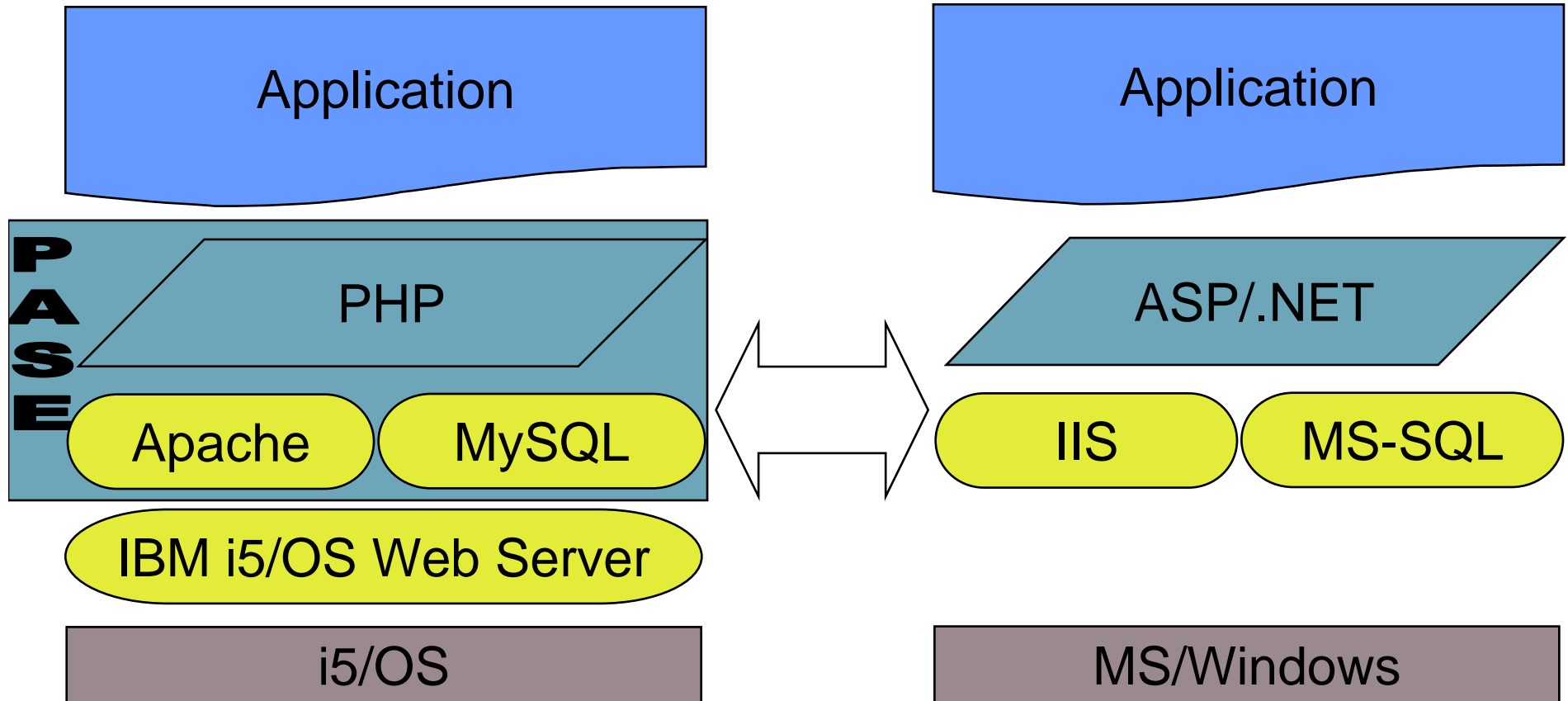
- Wikipedia:
 - >8,000 HTTP requests per second
 - >25,000 SQL requests per second
 - 12 database servers
 - 15 application servers in 'external storage' role
 - 20 application servers in 'object cache' role



The iAMP Stack



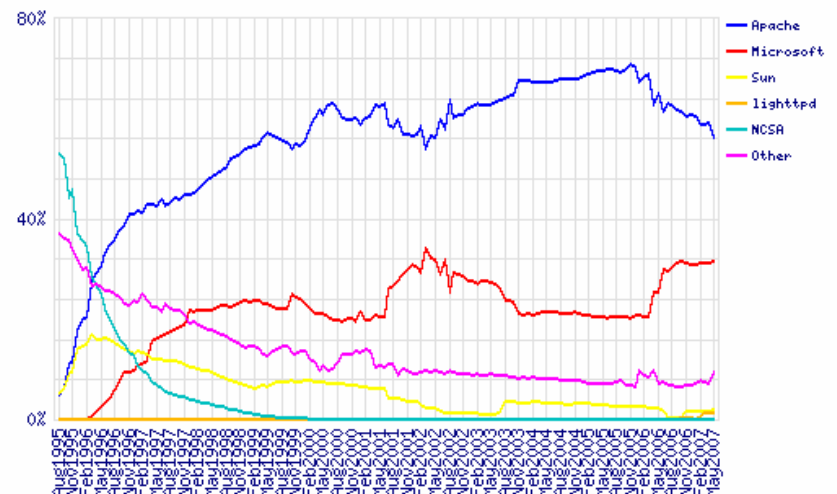
Comparing iAMP



Apache

- Flexible, Easy to configure
- Serves over 50% of all websites
- Secure, efficient, extensible server
- Many extensions available

Market Share for Top Servers Across All Domains August 1995 - May 2007





MySQL



- Very easy to setup and use
- Most popular open source database
- Has gained popularity in the web application world and is used in most of the leading PHP applications.
- Open Source, but also commercially backed
- Used in more the 11 million installations
- Cross-platform (over 20 including i5/OS, Windows, Linux, OS/X, HP-UX, AIX, Netware)

MySQL – Dual License

- MySQL has both a free and non-free license
- When using the free licensed MySQL – the GNU public license comes into play:
 - Any application that you develop (and plan on selling) that uses MySQL would require you to make the source code of your application freely available.
 - If you use the free-version of MySQL, that software that depends on it must also be free (as in speech).
- When using the non-free licensed MySQL you are not bound by the GNU public license:
 - Now the source-code for any application that you develop that uses MySQL can remain proprietary
 - If you plan to profit from using MySQL in your application then you will want to pay for a licensed version.
- In the MySQL world, this dual-license approach is often referred to as "What goes around comes around"

IBM and MySQL Announce Plans for i5/OS and DB2

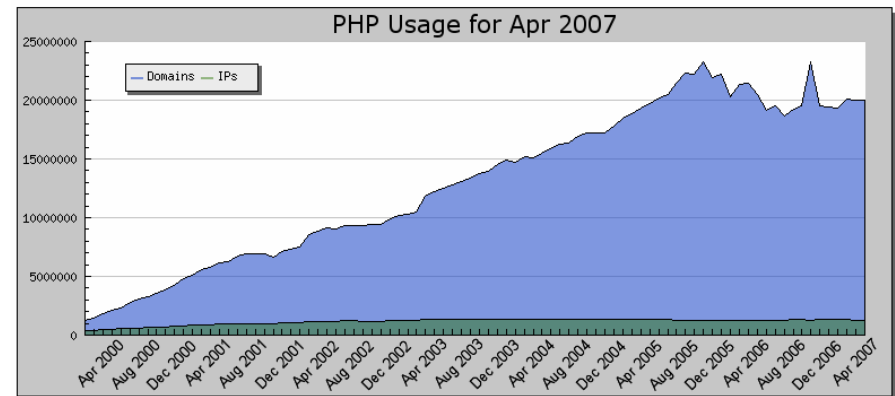
- MySQL is the leading open source database with over 11 million installations
- MySQL is the most popular database to use with PHP applications
- **Step 1: MySQL database to be supported on i5/OS**
 - *Enables customers to deploy MySQL-based applications on i5/OS*
- **Step 2: Plan to integrate MySQL with DB2 on i5/OS**
 - *Enables MySQL-based applications to store data in DB2 on i5/OS*



System i customers get the benefit of being able to use thousands of new open source applications while continuing to have one easy to use data store with DB2.

PHP

- Web Scripting language by design
- Easy to learn
- Flexible and powerful
- Cross-platform
- Easily extended



Zend Products for i5/OS – July 11, 2006 Announcement

- Customers can order Zend Core for i5/OS and Zend Studio Professional for i5/OS from IBM
 - Orders will be passed to Zend for fulfillment with a GA of July 28th

No Charge

- Zend Core for i5/OS



- PHP runtime environment in i5/OS providing connections to DB2 UDB for i5/OS and RPG and COBOL applications
 - With 3 years Standard support
- Gold and Platinum support levels available for a fee



- Zend Studio Professional for i5/OS

No Charge

- Integrated Development Environment on Windows or Linux
 - With 3 years Standard support
- Gold and Platinum support levels available for a fee

* Zend retail price for Core and Studio Professional on Intel for 5 developers with 3 years standard support – zend/com 7-6-06

= \$5000 Value*

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Support for Zend Products



- Zend provides support for i5/OS based products through the Zend Network
- Zend Core for i5/OS and Zend Studio Professional for i5/OS are provided with 3 years of Standard Support
 - Product downloads including current and previous versions
 - Software updates and information
 - Knowledge Base access
 - Web-based support including unlimited support tickets
- Gold and Platinum Support options are available
 - **Gold:** phone support, Monday through Friday, eight hours a day
 - **Platinum:** phone support, seven days a week, twenty-four hours a day
- <http://www.zend.com/core/network/>

Zend Support Offerings for i5/OS

	Standard	Gold	Platinum
Zend Support Subscription Period	3 years	1 year	1 year
Zend Network	✓	✓	✓
Web-based Support	✓	✓	✓
Web Response Time/SLA	3 days	1 business day	1 business day
North American Phone Support M-F 6am-6pm PST	✗	✓	✓
Global Phone Support M-F 6am-6pm GMT	✗	✓	✓
Phone Response Time/SLA (English)	✗	4 business hours	4 business hours
7x24 P1 Issues Phone Support (English)	✗	✗	✓
7x24 P1 Issues Response Time/SLA	✗	✗	2 hours
Price	No Charge	\$	\$

What are System i Customer's Doing with iAMP?

- Leveraging PHP portfolio: Run commercial or opensource PHP applications on i5/OS

System i Requirements for Zend Core for i5/OS

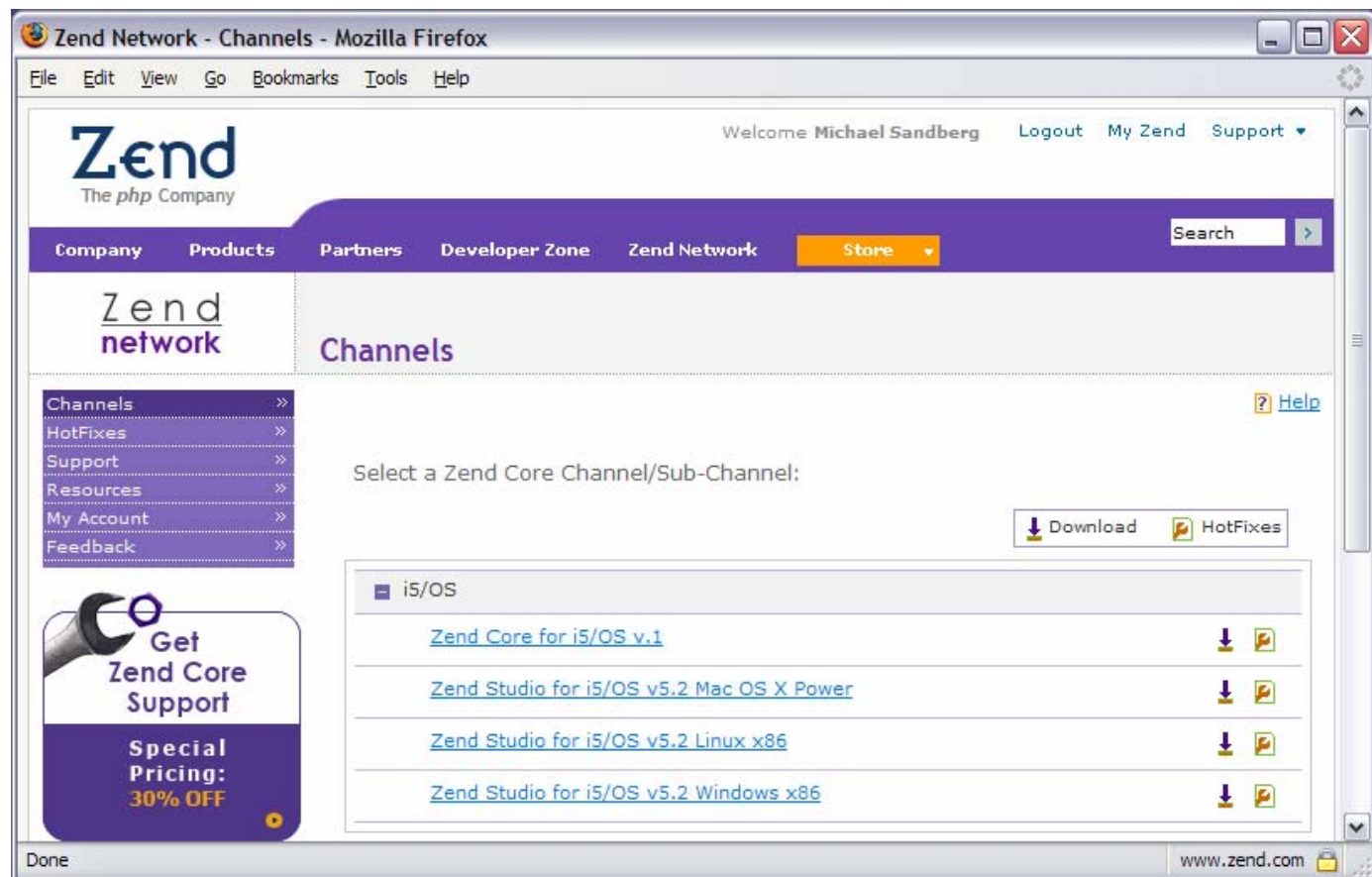
- i5/OS V5R4
- i5/OS V5R3
 - Zend Core for i5/OS Version 1.6 or later required
 - i5/OS V5R3 database PTF SI25802 is required
 - Zend Core for i5/OS does not support remote debugging from a Zend Studio client
- Plus

– Portable App Solutions Environment	33	5722ss1
– IBM Portable Utilities For i5/OS	*base	5733sc1
– OpenSSH ,OpenSST,Zlib	1	5733sc1
– Crypto Access Provider 128 bit	*base	5722ac3
– Qshell	30	5722ss1
– System Openness Includes	13	5722ss1
– Digital Certificate Manager	34	5722ss1
- System i servers that run i5/OS V5R4 or V5R3



Obtaining Zend Core & Zend Studio for i5/OS





- Zend.com Registration
- Download (to your PC) Zend Core for i5/OS & Zend Studio for i5/OS



Unzip Zend Core for i5/OS

- Unzip ZendCoreFori5_OS-v1.4.1GA.zip
 - README
 - RELEASE_NOTES
 - zcoreprod.savf
 - Zend_Core_User_Guide_i5OS.pdf

Name ▲	Size	Type
 ZendCoreFori5_OS-v1.4.1GA.zip	47,648 KB	Compressed (zipped) Folder

Name ▲	Size	Type
 README	2 KB	File
 RELEASE_NOTES	7 KB	File
 zcoreprod.savf	301,889 KB	SAVF File
 Zend_Core_User_Guide_i5OS.pdf	1,082 KB	Adobe Acrobat 7.0 Document

ZCOREPROD SAVF Creation

- CRTSAVF FILE(QGPL/ZCOREPROD) TEXT('Zend Core for i5/OS Product SAVF')

```
Command Entry                                PHPSYSTEM
                                           Request level:  1

All previous commands and messages:
  Job 102073/SANDBERG/QPADEV0007 started on 08:02:06 at 15:06:57 in
    subsystem QINTER in QSYS. Job entered system on 08/02/06 at 15:06:57.
  > CRTSAVF FILE(QGPL/ZCOREPROD) TEXT('ZEND Core for i5/OS Product SAVF')
    FILE ZCOREPROD created in library QGPL.
```

Bottom

Type command. Press ENTER

====> _____

F3=Exit F4=Prompt F9=Retrieve F10=Exclude detailed messages
F11=Display full F12=Cancel F13=Information Assistant F24=More Keys

FTP of SAVF to System i

- Open a Command Prompt on the PC
- Change the directory to the location of zcoreprod.savf (cd c:\ in this example)
- Start a ftp session with the System i (ftp <System i host name>)
- Log in using your System i User & Password
- Change the transfer type to binary (bin)
- Transfer zcoreprod.savf (put zcoreprod.savf QGPL/ZCOREPROD)
- When the transfer is complete exit (quit)

```
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Administrator>cd c:\

c:\>ftp phpsystem.ibmdemo.com
Connected to phpsystem.ibmdemo.com
220-QTCP at phpsystem.ibmdemo.com
220 Connection will close if idle more than 5 minutes.
User (phpsystem.ibmdemo.com:(none)): phpuser
331 Enter password.
Password:
230 PHPUSER logged on.
ftp> bin
200 Representation type is binary IMAGE.
ftp> put zcoreprod.savf QGPL/QCOREPROD.
200 PORT subcommand request successful.
150 Sending file to member ZCOREPROD to file ZCOREPROD in library
QGPL.
226 File transfer completed successfully.
ftp: 309133440 bytes entin 40.72Seconds 7591.87Kbytes/sec.
ftp> _
```

Install Zend Core for i5/OS

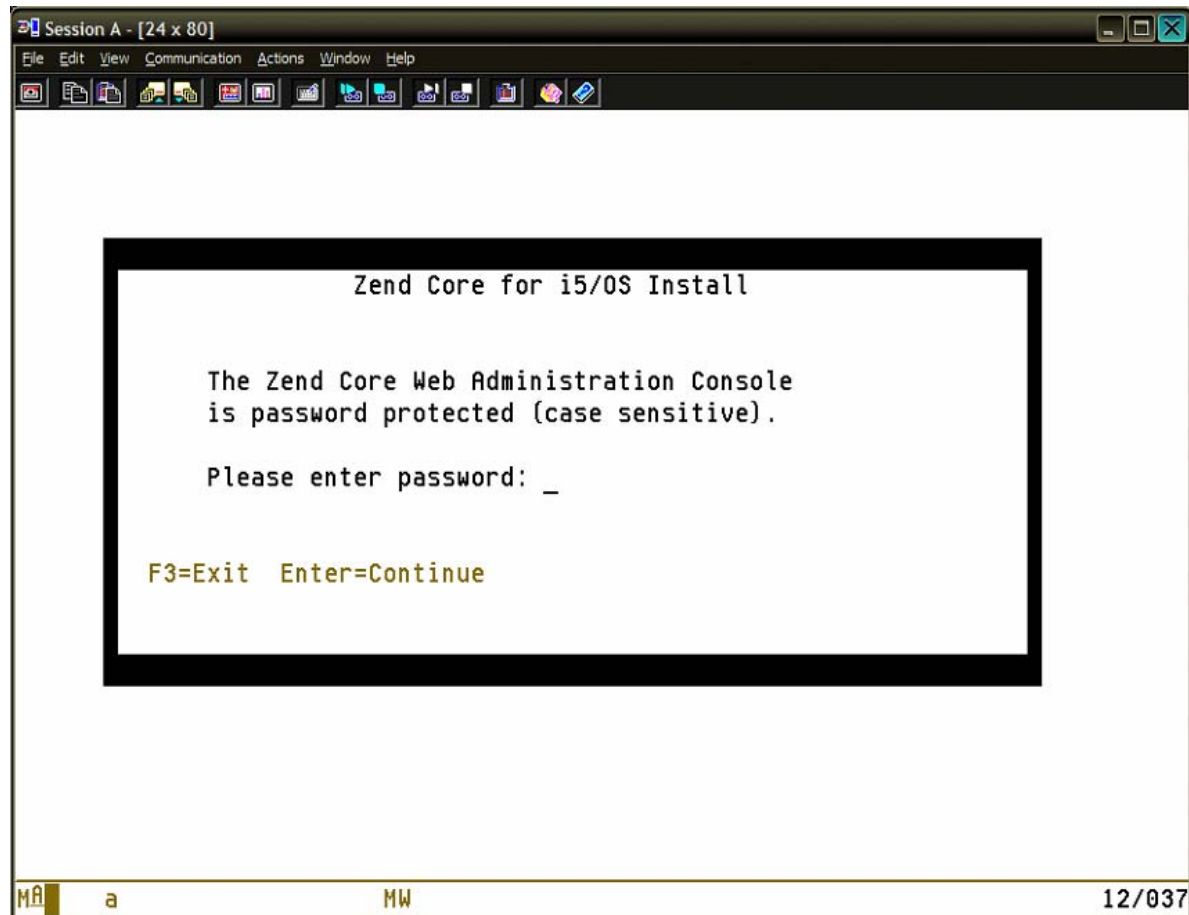
- Open a 5250 session with the System i
- Issue the restore license program command RSTLICPGM LICPGM(1ZCORE5) DEV(*SAVF) SAVF(QGPL/ZCOREPROD) This will launch the install process to install and start the environment. NOTE: The user profile must be of *SECOFR user class, and the QGPL and QTEMP libraries must be in the library list. You will be prompted through several screens.

```
Command Entry                                PHPSYSTEM                                Request level: 1
All previous commands and messages:
  Job 102093/PHPUSER/QPADEV0007 started on 08/03/06 at 09:59:20 in
  subsystem QINTER in QSYS. Job entered system on 08/03:06 at 09:59:20.

Type command. Press ENTER
====> _____
_____
_____
F3=Exit  F4=Prompt  F9=Retrieve  F10=Exclude detailed messages
F11=Display full  F12=Cancel  F13=Information Assistant  F24=More Keys
```

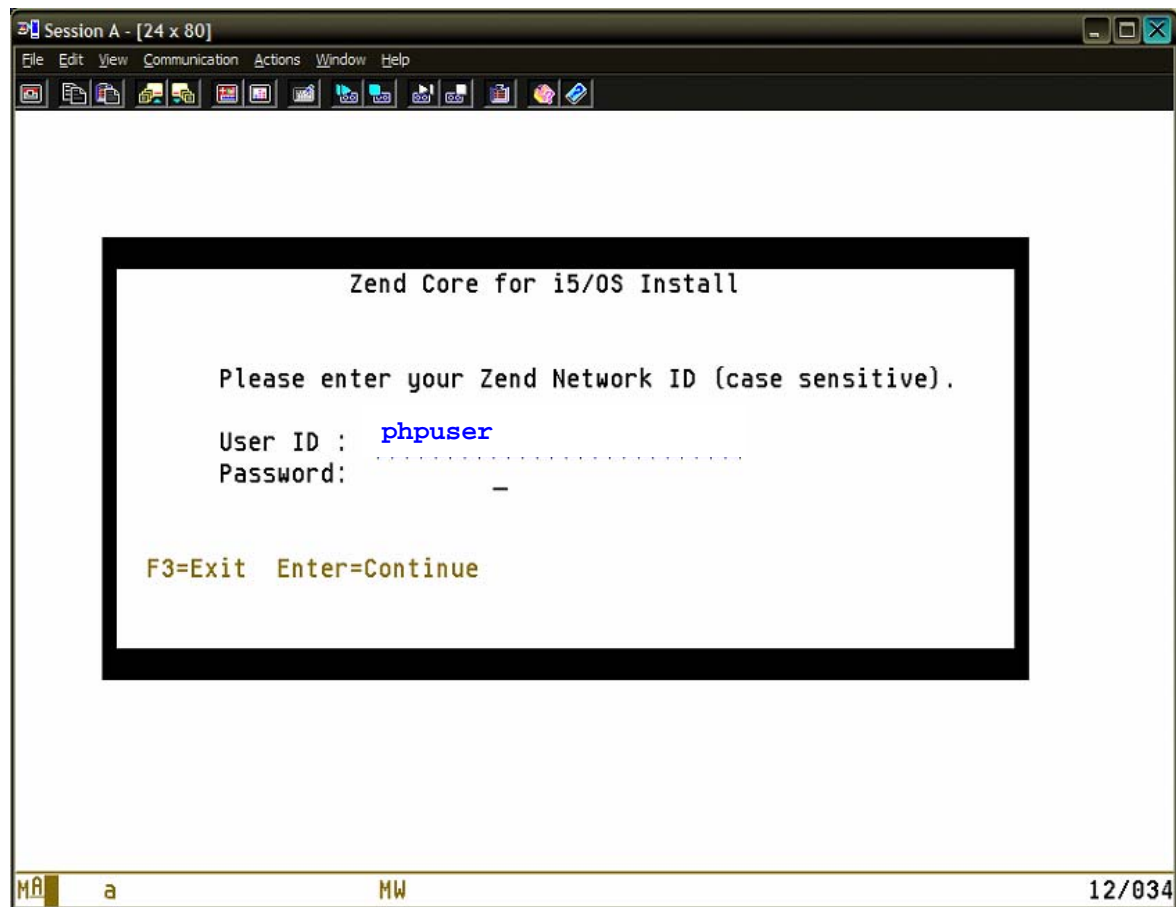
Install Zend Core for i5/OS

- This is the password that will be used when you use the browser based administration for Zend Core.



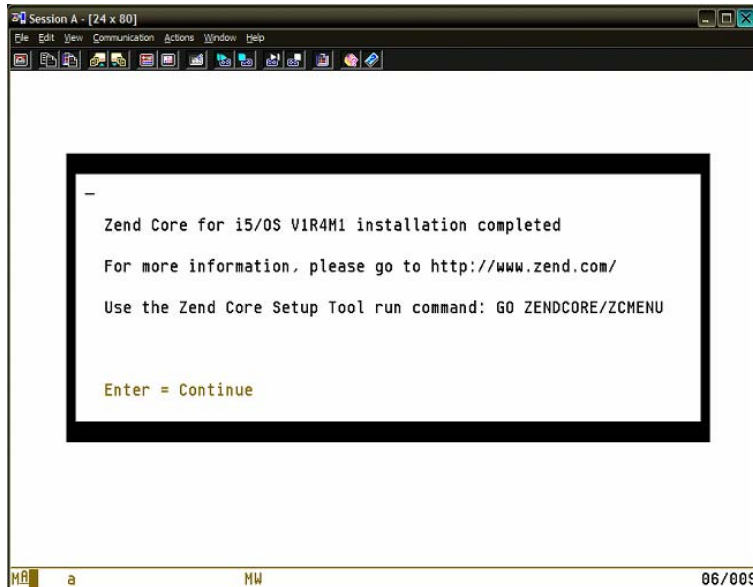
Install Zend Core for i5/OS

- On this screen you will need to enter the User ID and Password you registered on zend.com



Install Zend Core for i5/OS

- Once installation is complete the environment is installed and running ready for use.



Command Entry

PHPDEMO

Request level: 1

All previous commands and messages:

```
Member ZCPINI100 file ZCPINI100 in ZENDCORE cleared.
Object ZCOREJOBDX in library ZENDCORE not found.
Job description ZCOREJOBDX created in library ZENDCORE.
Compare value conflicts with routing entry 735.
Subsystem description changed, but warnings exist.
Change effective next time subsystem starts.
Active subsystem description QSYSWRK in QSYS changed.
Subsystem ZEND in library ZENDCORE being started.
5 objects successfully changed.
Library ZENDCORE removed from library list.
*PGM objects for product 1ZCORE5 option *BASE release *FIRST restored.
Objects for product 1ZCORE5 option *BASE release *FIRST restored.
```

Bottom

Type command. Press ENTER

==> _____

```
F3=Exit   F4=Prompt   F9=Retrieve   F10=Exclude detailed messages
F11=Display full   F12=Cancel   F13=Information Assistant   F24=More Keys
```

Install Zend Core

```
MAIN                                i5/OS Main Menu                                System:  PHPDEMO

Select one of the following:

    1. User tasks
    2. Office tasks
    3. General system tasks
    4. Files, libraries, and folders
    5. Programming
    6. Communications
    7. Define or change the system
    8. Problem handling
    9. Display a menu
   10. Information Assistant options
   11. iSeries Access tasks

   90. Sign off

Selection or command
===> go zendcore/zcmenu_____

F3=Exit   F4=Prompt   F9=Retrieve   F12=cancel   F13=Information Assistant
F23=Set initial menu
*PGM objects for product IZCORE5 option *BASE release *FIRST restored.      +
```

Open source Applications: PHP and MySQL



Customer Relationship Management



Help Desk



Portal



Portal



Portal



Course Management System



e-Commerce



Wiki



Bulletin Board



Content Management System

MySQL + PHP on i5/OS Applications

- Examples on i5/OS www.zend.com/forums
 - **MySQL** (Open Source DB) on i5/OS -
<http://www.zend.com/forums/index.php?t=msg&goto=3004>
 - **MediaWiki** (Open Source Wiki) on Zend Core for i5/OS -
<http://www.zend.com/forums/index.php?t=msg&th=3134>
 - **SugarCRM** (Open Source Customer Relationship Management (CRM)) on Zend Core for i5/OS -
<http://www.zend.com/forums/index.php?t=msg&th=3111>
 - **Joomla!** (Open Source Content Management System) on Zend Core for i5/OS - <http://www.zend.com/forums/index.php?t=msg&th=3068>
 - **Zen Cart** (Open Source Online Store) on Zend Core for i5/OS -
<http://www.zend.com/forums/index.php?t=msg&th=3041>
 - **PmWiki** (Open Source Wiki) on Zend Core for i5/OS -
<http://www.zend.com/forums/index.php?t=msg&goto=8085>
 - **PHP-Nuke** (Open Source Content Management System) on Zend Core for i5/OS - <http://www.zend.com/forums/index.php?t=msg&goto=3541>

Joomla! (Open Source Content Management System)



MySQL + PHP on i5/OS

- Application Website:
<http://joomla.org/>
- Description:
<http://en.wikipedia.org/wiki/Joomla>
- How To:
www.zend.com/forums/index.php?t=msg&th=3068
- Running on i5/OS:
<http://sei5a2.rchland.ibm.com:89/joomla>

SugarCRM (Open Source Customer Relationship Management (CRM))

My Upcoming Appointments through today (2006-08-15)

Close	Subject	Date	Accept?
<input checked="" type="checkbox"/>	Review needs	2006-04-04 19:37	Accepted
<input checked="" type="checkbox"/>	Discuss Review Process	2006-04-14 06:00	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Bad time, will call back	2006-04-29 20:15	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Initial discussion	2006-05-26 19:37	Accepted
<input checked="" type="checkbox"/>	Introduce all players	2006-05-27 19:37	Accepted
<input checked="" type="checkbox"/>	Review needs	2006-05-27 19:37	Accepted
<input checked="" type="checkbox"/>	Left a message	2006-05-29 00:30	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Demo	2006-05-29 19:37	Accepted
<input checked="" type="checkbox"/>	Review needs	2006-05-31 19:37	Accepted
<input checked="" type="checkbox"/>	Discuss Review Process	2006-06-14 22:45	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Review needs	2006-06-17 19:37	Accepted
<input checked="" type="checkbox"/>	Left a message	2006-06-25 00:30	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Introduce all players	2006-06-27 19:37	Accepted
<input checked="" type="checkbox"/>	Discuss Review Process	2006-07-05 07:15	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Get More information on the proposed deal	2006-07-05 07:15	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Introduce all players	2006-07-05 19:36	Accepted
<input checked="" type="checkbox"/>	Left a message	2006-07-10 04:15	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Initial discussion	2006-07-14 19:37	Accepted
<input checked="" type="checkbox"/>	Get More information on the proposed deal	2006-08-02 04:45	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>

August 2006

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

My Pipeline Pipeline total is \$515.00K

Stage	Count
Prospecting	50
Qualification	50
Needs Analysis	125
Value Proposition	135
Id. Decision Makers	60
Perception Analysis	70
Proposal/Price Quote	25
Negotiation/Review	
Closed Won	
Closed Lost	

My Top Open Opportunities

Opportunity	Account Name	Amount	Close
Anytime Air Support Inc 141706 - 1000 units	Anytime Air Support Inc 141706	\$75,000.00	2006-05-30
COMPLETE HLDNG 865507 - 1000 units	COMPLETE HLDNG 865507	\$75,000.00	2006-09-09

MySQL + PHP on i5/OS

Application Website: www.sugarcrm.com

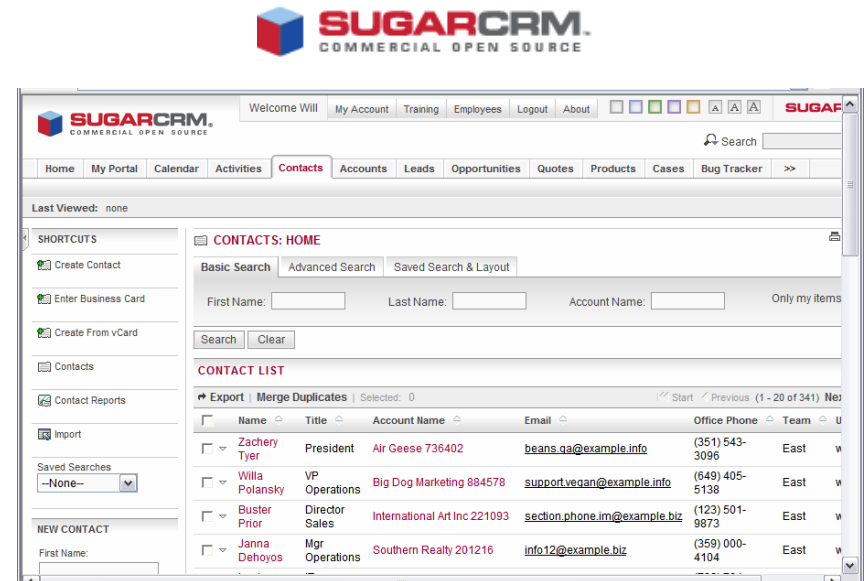
Description: <http://en.wikipedia.org/wiki/SugarCRM>

How To: www.zend.com/forums/index.php?t=msg&th=3111

Running on i5/OS: <http://sei5a2.rchland.ibm.com:89/sugarcrm/>

SugarCRM Announces Support for i5/OS

- SugarCRM is a leading provider of commercial open source customer relationship management (CRM) software for companies of all sizes
- Sugar Enterprise available for i5/OS
 - Runs with Zend Core and MySQL



ZenCart (Open Source Shopping Application)



MySQL + PHP on i5/OS

- Application Website:
<http://www.zen-cart.com/>
- Description:
http://en.wikipedia.org/wiki/Zen_Cart
- How To:
www.zend.com/forums/index.php?t=msg&th=3041
- Running on i5/OS:
<http://sei5a2.rchland.ibm.com:89/zen-cart-v1.3.7/>

Deploy Opensource Applications on i5/OS

- Solution
 - System i offers an integrated and open web application deployment environment based on Apache, MySQL, and PHP on i5/OS
- Value
 - **Deploy applications faster, maintain systems easier**
 - i5/OS provides a leading *integrated and complete environment* for LAMP-based applications.
 - Delivers enterprise *scalability* from one to 64-way POWER5 processors.
 - The integrated i5/OS architecture is *secure and virus resistant* by design
 - i5/OS delivers industry leading *availability and reliability*.
 - i5/OS provides ability to easily integrate web apps with business apps on the same server
 - i5/OS has a proven track record of delivering the *lowest TCO and highest customer satisfaction*
 - **Access i5/OS applications and data easier and faster**
 - PHP applications have *direct and easy access* to business apps and data running on i5/OS
 - **Run MySQL applications**

Objections for Opensource Applications

- Why should we deploy a LAMP application on i5/OS?
 - i5/OS provides leading reliability, security, and scalability for web applications.
 - The Zend toolkit for i5/OS provides easy and fast access to i5/OS applications and data.
 - Support of MySQL in i5/OS provides the ability to run PHP/MySQL applications unchanged in i5/OS.
- Is the System i community embracing PHP?
 - Yes, the System i community is an active participant in the PHP community. The Zend forum for i5/OS is 3x more active than the Zend forum for Oracle.
- Who provides support for the open-source (PHP, MySQL) components of the web development stack?
 - Zend offers a range of support options for their PHP development and deployment products. 3 years of standard support is included with Zend Core and Studio for i5/OS at no charge.
 - MySQL AB provides support for the enterprise deployment of MySQL

Announcing MySQL for i5/OS

- MySQL database available and supported on i5/OS V5R4
 - MySQL Community Server for i5/OS
 - Free download from mysql.com
 - No Support
 - MySQL Enterprise for i5/OS
 - Download from mysql.com
 - Annual Subscription
 - 3 support levels
 - Available directly from MySQL on 7/24
 - Can also be ordered from IBM

MySQL Enterprise	MySQL Enterprise	MySQL Enterprise
Silver	Gold	Platinum
\$1995.00 /Server/Year	\$2995.00 /Server/Year	\$4995.00 /Server/Year
Business Hours	24x7	24x7
4 Hours*	2 Hours*	1 Hour*
Advisory Services and Consultant Support Options		

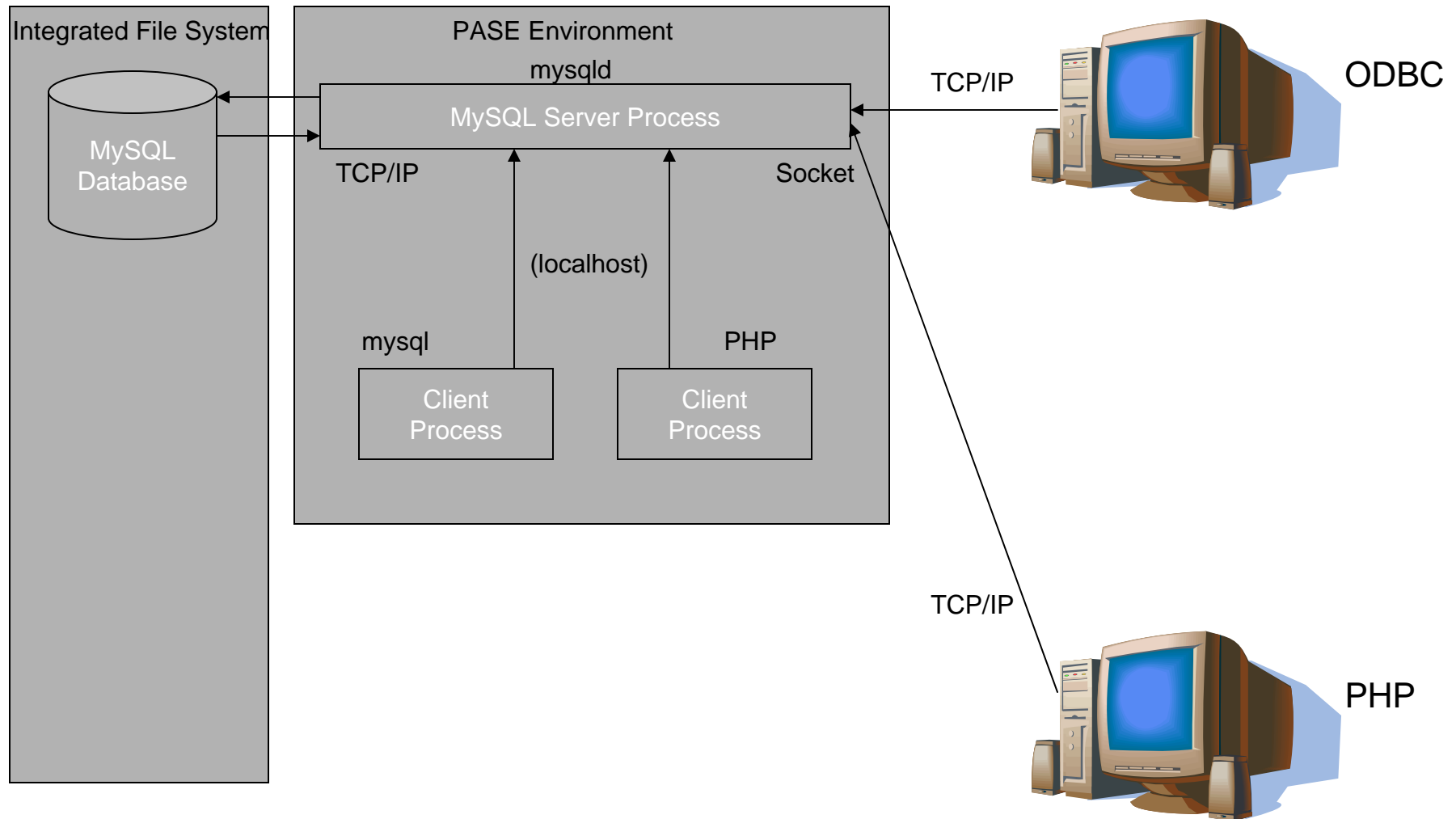
<http://www.ibm.com/systems/i/software/mysql/>

* Max Initial Response Time
MySQL US List Prices
<https://shop.mysql.com/enterprise/>

IBM Announcements for MySQL

- MySQL Enterprise for i5/OS can be ordered from IBM
 - Same product, license, support and price as direct from MySQL
 - 5639-MYS with 3 support levels
 - IBM passes order to MySQL for fulfillment
- Added Zend Core and MySQL to 550, 570, and 595 Enterprise Edition
 - Zend Core with standard support (5639-ZC1)
 - MySQL Enterprise with silver support (5639-MYS)
- Added Zend and MySQL Implementation service to voucher program for Enterprise and i5/OS Editions

MySQL in i5/OS High Level Architecture



Checking licensed programs

Licensed program	Option	Description test
5722SS1	*BASE	I5/OS Version 5 Release 4 (V5R4)
5722SS1	13	System Openness Includes ¹
5722SS1	30	Qshell
5722SS1	33	Portable Application Solutions Environment (PASE)
5722SC1	*BASE	IBM Portable Utilities for i5/OS ²

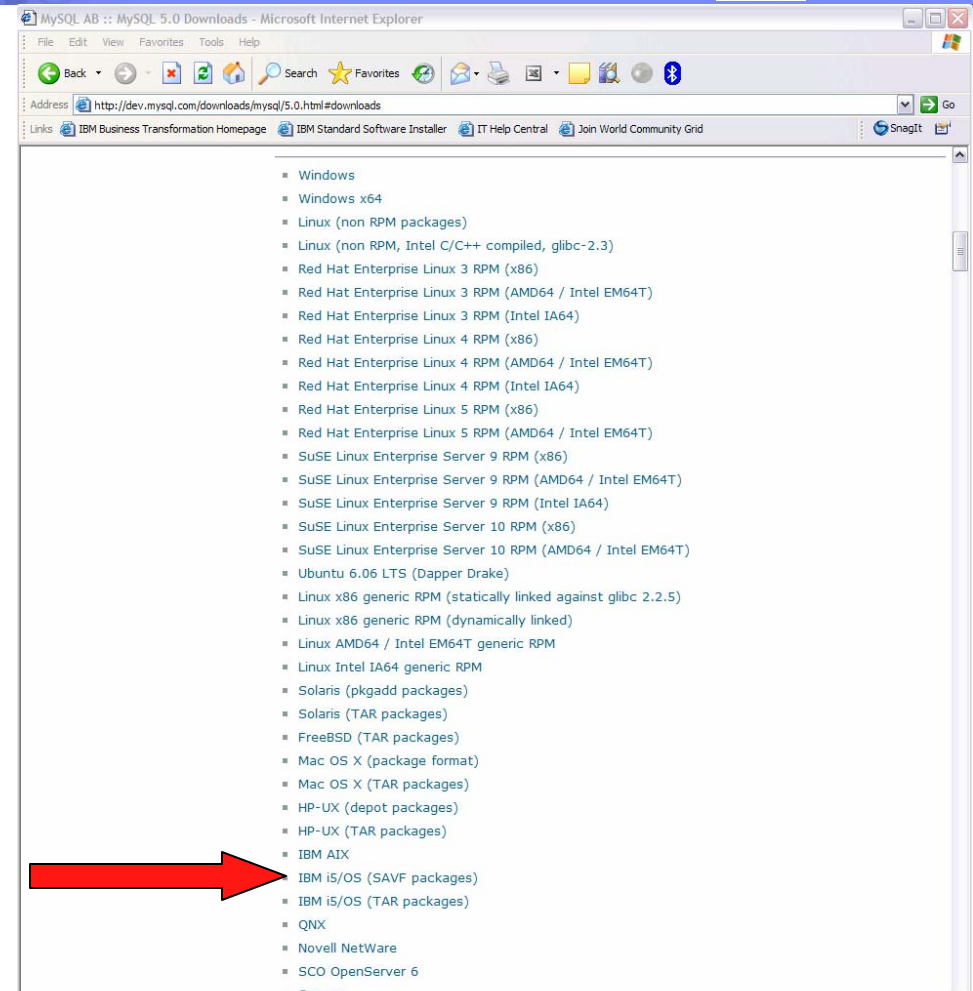
1. System Openness Includes is not completely necessary but may be useful. This licensed program provides all source includes for APIs shipped with i5/OS
2. IBM Portable Utilities for i5/OS is not completely necessary but may be useful.

Other pre-installation tasks

- Checking i5/OS fixes
 - Make sure you have the latest individual and group fixes for your system
 - i5/OS fixes (including database)
 - http://www-912.ibm.com/s_dir/slkbase.nsf/recommendedfixes
 - I5/OS PASE fixes
 - <http://www.ibm.com/servers/enable/site/porting/series/pase/misc.html>
- Checking user profile authorities
 - For installation process – a user profile with *SECOFR user class (with all special authorities) is required.
- Verify TCP/IP configuration

Installing MySQL

- Download MySQL from the following web site:
 - <http://dev.mysql.com/downloads/mysql/5.0.html#downloads>
- Click on the IBM i5/OS (SAVF packages) link
- Click on the i5/OS (POWER, 64 bit) package (Pick a mirror)



IBM i5/OS (SAVF packages) downloads

 i5/OS (POWER, 64-bit)	5.0.45b	59.8M	Pick a mirror
	MD5: 8cff6061b9326dce6e4ef704a2c15952 Signature		
i5/OS (POWER, 32-bit)	5.0.45b	58.9M	Pick a mirror
	MD5: aef58c97f82d7410e72f5258acc472d7 Signature		

Installing MySQL

- Save the file to a folder on your PC

- In i5/OS
 - Logon to the i5/OS system with a user profile of *SECOFR user class with all special authorities

 - Create a save file:

```
CRTSAVF FILE(QGPL/MYSQLINST) TEXT('MySQL 5.0 save file')
```

- On your PC
 - Open a command prompt and change directory to the directory where the mysql file was downloaded to
 - Start an ftp session to your i5/OS system
 - Enter a valid user-name / password
 - Type 'bin' to enter binary transfer mode
 - Transfer the save file:

```
put mysql-5.0.45b-i5os-power-64bit.savf mysqlinst.savf
```
 - When the transfer is complete type 'quit' to terminate the ftp session

Installing MySQL

- Back In i5/OS
 - Verify the contents of the save file:

```
DSPSAVF FILE(MYSQLINST)
```

Display Saved Objects						
Library saved : MYSQLINST						
Type Options, press Enter.						
5=Display						
Opt	Object	Type	Attribute	Owner	Size (K)	Data
	MYSQLINST	*LIB	PROD	MYSQLDEV	84	YES
	INSMYSQL	*PGM	CLP	MYSQLDEV	68	YES
	TARF	*FILE	SAVF	MYSQLDEV	59416	YES
	INSMYSQL	*CMD		MYSQLDEV	8	YES
						Bottom
F3=Exit F11=Alternate view F12=Cancel F16=Display header						

- Restore the library included in the save file:

```
RSTLIB SAVLIB(MYSQLINST) DEV(*SAVF) SAVF(MYSQLINST)
MBROPT(*ALL) ALLWOBJDEF(*ALL)
```

Installing MySQL

- Verify that all objects required for installation are in the restored library:

```
DSPLIB LIB(MYSQLINST)
```

```

                                Display Library
Library . . . . . : MYSQLINST      Number of objects . : 3
Type . . . . .   : PROD           Library ASP Number . : 1
Create Authority. . : *SYSVAL      Library ASP group . : *SYSBAS
                                           Library ASP group . : *SYSBAS

Type Options, press Enter.
  5=Display full attributes   8=Display service attributes

Opt  Object      Type      Attribute      Size      Text
----  -----      ---      -
INSMYSQL *PGM      CLP          69632      Install MySQL
TARF     *FILE     SAVF         60841984
INSMYSQL *CMD

```

Bottom

F3=Exit F12=Cancel F17=Top F18=Bottom

Installing MySQL

- Start the actual MySQL Installation:

MYSQLINST/INSMYSQL

- NOTE: Press <F4> to show the installation settings

- Installation directory will be created if it does not exist
- Data Directory is the location where MySQL database files and binary logs will be located
- Owing User Profile is the user profile that will own the files that are installed

```

                                Install MySQL (INSMYSQL)

Type choices, press Enter.

INSTALLATION DIRECTORY . . . . . '/usr/local'

DATA DIRECTORY . . . . . '/QOpenSys/mysql/data'

OWNING USER PROFILE . . . . . MYSQL                Character value

                                                    Bottom
F3=Exit  F4=Prompt  F5=Refresh  F12=Cancel  F13=How to use this display
F24=More keys

```

Installation Completed

- When the installation is completed you should see messages similar to the following:

```
PLEASE REMEMBER TO SET A PASSWORD FOR THE MySQL root USER ]
To do so, start the server, then issue the following commands:
./bin/mysqladmin -u root password 'new-password'
./bin/mysqladmin -u root -h RCHASM27.RCHLAND.IBM.COM password 'new-password'
See the manual for more instructions.
You can start the MySQL daemon with:
cd . ; ./bin/mysqld_safe &

You can test the MySQL daemon with mysql-test-run.pl
cd mysql-test ; perl mysql-test-run.pl

Please report any problems with the ./bin/mysqlbug script]

The latest information about MySQL is available on the web at
http://www.mysql.com
Support MySQL but buying support/licenses at http://shop.mysql.com
Press ENTER to end terminal session

===>

F3=Exit  F4=End of File  F6=Print  F9=Retrieve  F17=Top
F18=Bottom  F19=Left  F20=Right  F21=User Window
```

Verifying the Installation

- Display the job log:

DSPJOBLOG

```
Display All Messages
System: RCHASM27
Job . . : QPADEV0001 User . . : JAVIER Number . . . : 013126

Special authorities granted *NONE.
User profile MYSQL created.
Command ended normally with exit status 0.
Command ended normally with exit status 0.
Owner changed for object /tmp/mysql_i5os_install.tar.
Security changes occurred for 1 objects.
1 object rewstored. 0 objects not restored.
Current directory changed.
Command ended normally with exit status 0.
Object not found. Object is mysql.
Command ended normally with exit status 0.
Command ended normally with exit status 0.
Command ended normally with exit status 0.
Link Removed.

More...

Press Enter to continue.

F3=Exit F5=Refresh F12=Cancel F17=Top F18=Bottom
```

Starting the MySQL Server

- Enter the PASE Environment:
CALL QP2TERM (or qsh)
- Change directory to the MySQL binary directory:
cd /usr/local/mysql/bin
- Start the MySQL Server:
./mysqld_safe -u root &
- Verify that the MySQL server is running:
ps -ef ./mys grep mysqld

```
/QOpenSys/usr/bin/-sh
$
> cd /usr/local/mysql/bin
$
> ./mysqld_safe -u root &
$ Starting mysqld daemon with databases from /QOpenSys/mysql/data
> ps -ef | grep mysqld
javier 182 181 0 10:36:55 - 0:00 /bin/sh ./mysqld_safe -u root
javier 202 182 0 10:37:04 - 0:00 /usr/local/mysql/bin/mysqld -
-basedir=/usr/local/mysql --datadir=/QOpenSys/mysql/data --user=MYSQL --
pid-file=/QOpenSys/mysql/data/RCHASM27.RCHLAND.IBM.COPM/id -u root
$
====>
F3=Exit F6=Print F9=Retrieve F11=Truncate
F13=Clear F17=Top F18=Bottom F21=CL command entry
```

Stopping the MySQL Server

- In the PASE environment enter the command:

```
./mysqladmin -u root shutdown
```

Common Installation Errors

- Your user profile does not have sufficient authority
- Structures from a previous installation are found by the installer
- Your library list does not contain the QGPL or QTEMP libraries
- Prerequisite software products or fixes are missing

Post installation Tasks

- Creating a MySQL administrator user:
 - Enter the PASE environment
`CALL QP2TERM`
 - Change directory to the mysql binary directory:
`cd /usr/local/mysql/bin`
 - Verify that the MySQL server is running:
`mysqladmin -u root status`
`mysqladmin -u root ping`

```
> mysqladmin -u root status
Uptime: 80618  Threads: 1  Questions: 254  Slow queries: 0  Opens: 32  Flush tables: 2  Open tables: 19  Queries
per second avg: 0.003
> mysqladmin -u root ping
mysqld is alive
$
```

Post installation Tasks

- Create the administrative user profile

```
mysql -u root mysql -e "insert into user (host, user, password) values ('%', 'itso', 'itso')"
```

- Grant administrative privileges and encrypt the password

```
mysql -u root mysql -e "grant all privileges on *.* to 'itso'@'%' identified by 'itso' with grant option"
```

```
mysql -u root mysql -e "flush privileges"
```

```
> mysql -u root mysql -e "insert into user (host, user, password) values ('%', 'itso', 'itso')"  
$  
> mysql -u root mysql -e "grant all privileges on *.* to 'itso'@'%' identified by 'itso' with grant option"  
$  
> mysql -u root mysql -e "flush privileges"  
$
```

Post Installation Tasks

- Check the administrative account
 - Run the interactive mysql client:
`mysql -u root`
 - Select the mysql schema
`use mysql;`
 - Execute a query over the table 'user'
`select user, password from user`

```
> Mysql -u root
Welcome to the MySQL monitor, Commands end with ; or \g.
Your MySQL connection id is 2
Server version: 5.0.45 MySQL Community Server (GPL)

Type 'help;' or '\n' for help. Type '\c' to clear the buffer.

mysql>
> select user, password from user;
+-----+-----+
| user  | password |
+-----+-----+
| root  |          |
| root  |          |
| root  |          |
| javier| *B174F2517BA8F7BD62D6AF171D91AB2F537BCB94 |
| itso  | *63C5A3E03987225C0620E974CD173F0A77FF888D |
+-----+-----+
5 rows in set (0.01 sec)
```

MySQL Useful commands

- Starting the MySQL server:

```
bin/mysqld_safe --user=mysql &
```

- Stopping the MySQL server:

```
bin/mysqladmin -u root_shutdown
```

- Displaying the version number:

```
bin/mysqladmin version
```

- Displaying MySQL environment variables:

```
bin/mysqladmin variables
```

- Tests to verify the ability to retrieve information from the MySQL Server

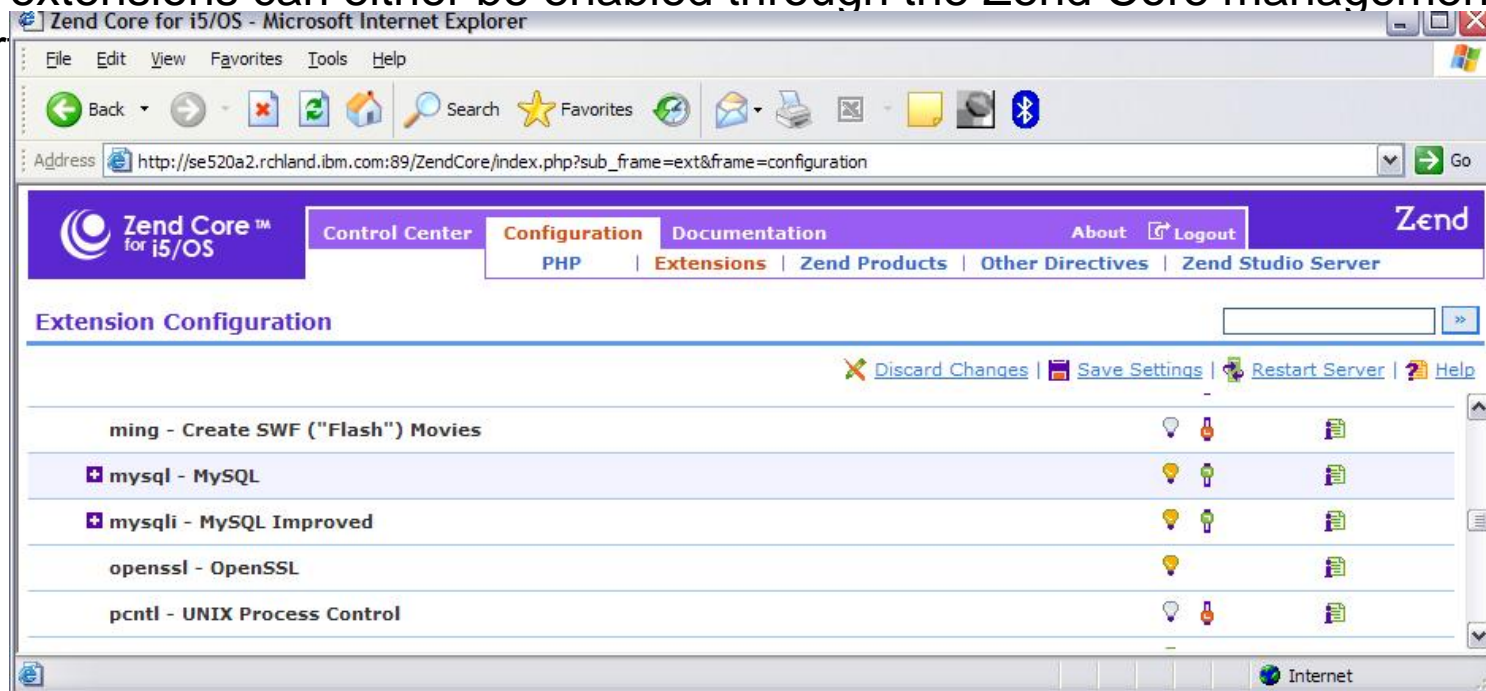
```
bin/mysqlshow
```

```
bin/mysqlshow mysql
```

NOTE: These commands assume you are in the PASE environment and the current working directory is `/usr/local/mysql`

Enabling MySQL Extensions in Zend Core

- To utilize MySQL with PHP in Zend Core, the MySQL extensions must be enabled.
- The extensions can either be enabled through the Zend Core management interface



- The ini file is `\usr\local\Zend\core\etc\php.ini`
 - Uncomment the `mysql.so` & `mysqli.so` extensions
 - `extension=mysql.so`
 - `extension=mysqli.so`

MySQL Overview

- MySQL has attracted a strong developer base over the years
- Features of MySQL include:
 - Portability – supported on a wide variety of operating systems and hardware
 - Ease of Use
 - Multi-User support
 - Scalability
 - Standards Compliant
 - Replication
 - Full text searching
 - Support for transactions
 - Wide application support

MySQL Overview

- Portability
 - MySQL is portable – platforms include i5/OS, Mac OS/X, Linux, Windows, Solaris
 - MySQL can run on small embedded systems as well as mainframes handling massive data stores. Hardware platforms supported by MySQL include: Intel X86, SPARC, PowerPC, IA64
 - Moving data from one platform to another is a simple task
- Ease of Use
 - Good documentation is readily available
 - Many tutorials are available
 - The MySQL client program allows access to both local and remote servers
 - Structure Query Language (SQL) is standards based and easy to learn/implement

MySQL Overview

- Multi-User support
 - MySQL supports multiple users
 - Access control can be based on location and username/password
 - Access can also be restricted at the Database or Table level
 - Access can be restricted based on the type of query (ex: read access but not write)
- Scalability
 - MySQL can scale up to large and complex databases
 - Databases of 50 million records are in use at the MySQL website.
 - Hundreds of users can access MySQL simultaneously
 - Examples of large MySQL database installations include: SAP, Yahoo, NASA, US Census bureau, Google.

MySQL Overview

- Standards Compliant
 - MySQL strives to maintain compliance with the appropriate standards.
 - MySQL supports most of the features of the ANSI/ISO SQL Standard standard.
- Replication
 - MySQL supports replication
 - It is possible to setup a master server and a series of slave servers that copy the content of the master
 - It is possible to stop the slave and run a backup utility without taking down the master
 - Load balancing can be implemented where reads are satisfied by the slave servers and writes are satisfied by the master server
 - Replication occurs over a TCP/IP network so the slave servers can be remote
 - Replication is incremental and can survive network disruptions

MySQL Overview

- Support for transactions
 - MySQL supports transactions on a table-by-table basis
 - This facilitates fine-grained optimization

- Wide application support
 - MySQL has APIs for many programming languages including C, C++, ODBC, Java, PHP, Perl, Python, and Tcl (tool Command Language)

Porting Open Source Application to IAMP Example *SugarCRM*

- There are several changes that need to be made to the ini file for Zend Core (\usr\local\Zend\Core\etc\php.ini)

- The path that php uses to save files needs to be uncommented (remove the leading semicolon:

```
;session.save_path = "/tmp"
```

- The memory limit needs to be increased to 32 megabytes:

```
memory_limit = 8M
```

Becomes

```
memory_limit = 32M
```

- Zend Core will need to be stopped and then restarted to activate the changes:

```
go zendcore/zcmenu
```

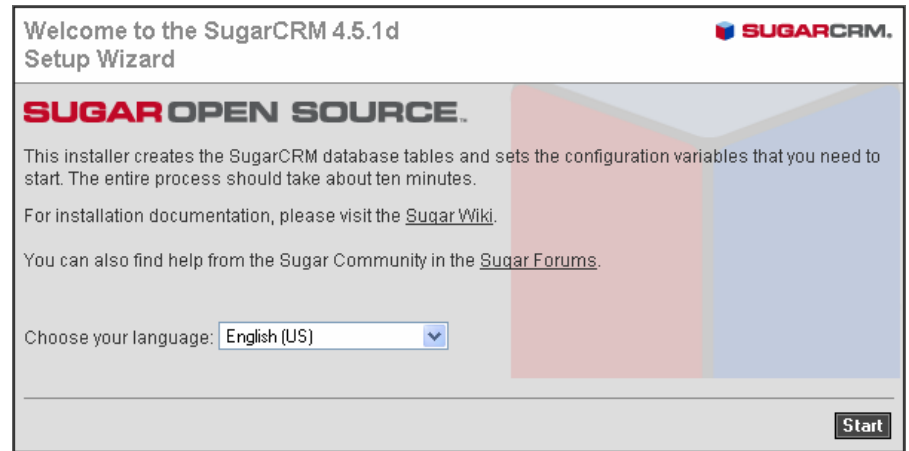
- Download the SugarCRM Open Source Code from the SugarCRM web site:

```
www.sugarCRM.com
```

Porting Open Source Application to IAMP Example *SugarCRM*

- Unpack the SugarCRM zip file
- Copy the program folder (sugarcrm) to \www\zendcore\htdocs
- Launch a browser and go to <http://<i5 host>:89/sugarcrm/install.php>
- The first screen prompts for the language selection.

Select the desired language and then click the <Start> button to begin the installation



Welcome to the SugarCRM 4.5.1d Setup Wizard

SUGAR OPEN SOURCE.

This installer creates the SugarCRM database tables and sets the configuration variables that you need to start. The entire process should take about ten minutes.

For installation documentation, please visit the [Sugar Wiki](#).

You can also find help from the Sugar Community in the [Sugar Forums](#).

Choose your language:

Start

Porting Open Source Application to IAMP Example

SugarCRM

Read and accept the
License agreement

Click <Next>

At this point the installation will
check the system configuration to
ensure that all dependencies are
properly met

Click <Next>

Step 1: License Acceptance SUGARCRM.

SUGAR OPEN SOURCE.

The Sugar Public License Version 1.1.3 ("SPL") consists of the Mozilla Public License Version 1.1, modified to be specific to SugarCRM, with the Additional Terms in Exhibit B. The original Mozilla Public License 1.1 can be found at: <http://www.mozilla.org/MPL/MPL-1.1.html>

SUGARCRM PUBLIC LICENSE
Version 1.1.3

1. Definitions.

1.0.1. "Commercial Use" means distribution or otherwise making the Covered Code available to a third party.

1.1. "Contributor" means each entity that creates or contributes to the creation of Modifications.

1.2. "Contributor Version" means the combination of the Original Code, prior Modifications used by a Contributor, and the Modifications made by that

[Accept](#) Printable View

[Help](#) [Back](#) [Next](#)

Step 2: System Check Acceptance SUGARCRM.

In order for your SugarCRM installation to function properly, please ensure all of the system check items listed below are green. If any are red, please take the necessary steps to fix them.

Component	Status
PHP version	OK (ver 5.1.4)
MySQL Database	OK
XML Parsing	OK
cURL Library	Not found: scheduler will not be functional
Writable SugarCRM Configuration File (config.php)	OK
Writable Custom Directory	OK
Writable Modules Sub-Directories and Files	OK
Writable Data Sub-Directories	OK
Writable Cache Sub-Directories	OK
Writable Session Save Path (/tmp)	OK
PHP Safe Mode Turned Off	OK
PHP Allow Call Time Pass Reference Turned On	OK
PHP Memory Limit >= 32M	OK (32M)

Note: Your php configuration file (php.ini) is located at:
`/usr/local/Zend/core/etc/php.ini`

[Help](#) [Re-check](#) [Back](#) [Next](#)

Porting Open Source Application to IAMP Example

SugarCRM

Configure the database definition for SugarCRM

Step 3: Database Configuration SUGARCRM.

Please enter your database configuration information below. If you are unsure of what to fill in, we suggest that you use the default values.

*** Required field**

Database Configuration

* Host Name

* Database Name Create database

* Database username Create user

Database password

Re-enter database password

Drop and recreate existing Sugar tables?
Caution: All Sugar data will be erased if this box is checked.

Populate database with demo data?

Database account above is a privileged user?

* Privileged Database User Name
This privileged database user must have the proper permissions to create a database, drop/create tables, and create a user. This privileged database user will only be used to perform these tasks as needed during the installation process. You may also use the same database user as above if that user has sufficient privileges.

Privileged Database User Name

Privileged Database User Password

[Help](#) [Back](#) [Next](#)

Define the Site Configuration information.

The URL will be http://<system i>:89/sugarcrm

Step 4: Site Configuration SUGARCRM.

Please enter your site configuration information below. If you are unsure of the fields, we suggest that you use the default values.

*** Required field**

Site Configuration

* URL of Sugar instance

* Sugar admin password
Caution: This will override the admin password of any previous installation.

* Re-enter Sugar admin password

Sugar Updates Config

Send Anonymous Usage Statistics?
If checked, Sugar will send anonymous statistics about your installation to SugarCRM Inc. every time your system checks for new versions. This information will help us better understand how the application is used and guide improvements to the product.

Automatically Check For Updates?
If checked, the system will periodically check to see if updated versions of the application are available.

Advanced Site Security

Use defaults?

[Help](#) [Back](#) [Next](#)

Porting Open Source Application to IAMP Example

SugarCRM

Confirm the configuration settings

Step 5: Confirm Settings SUGARCRM.

Please confirm the settings below. If you would like to change any of the values, click "Back" to edit. Otherwise, click "Next" to start the installation.

Database Settings	
Host Name	localhost
Database Name	sugarcrm (will be created)
Database Username	sugarcrm (will be created)
Drop and recreate existing Sugar tables?	No
Populate database with demo data?	Yes
Privileged Database User Name	root
Site Configuration	
URL of Sugar Instance	http://sei5a2:89/sugarcrm
Enable Sugar Updates	
Sugar updates enabled?	No
Advanced Site Security	
Use a Custom Session Directory for Sugar?	No
Use a Custom Log Directory for Sugar?	No
Owm Application ID Provided?	No

[Help](#) [Back](#) [Next](#)

At this point the installation of sugarCRM will proceed

```

emails_repos... done
emails_opportunities... done
emails_project_task... done
emails_projects... done
emails_prospects... done
emails_tasks... done
emails_users... done
files... done
meetings_contacts... done
meetings_users... done
opportunities_contacts... done
users_feeds... done
tracker... done
prospect_list_campaigns... done
prospect_lists_prospects... done
roles_modules... done
roles_users... done
project_relations... done
acl_roles_actions... done
acl_roles_users... done
inboundemail_autoreply... done
email_marketing_prospect_lists... done
usersignature... done
linked_documents... done

Creating default Sugar data
Inserting default settings... done
Creating default users... done
Creating default scheduler jobs... done

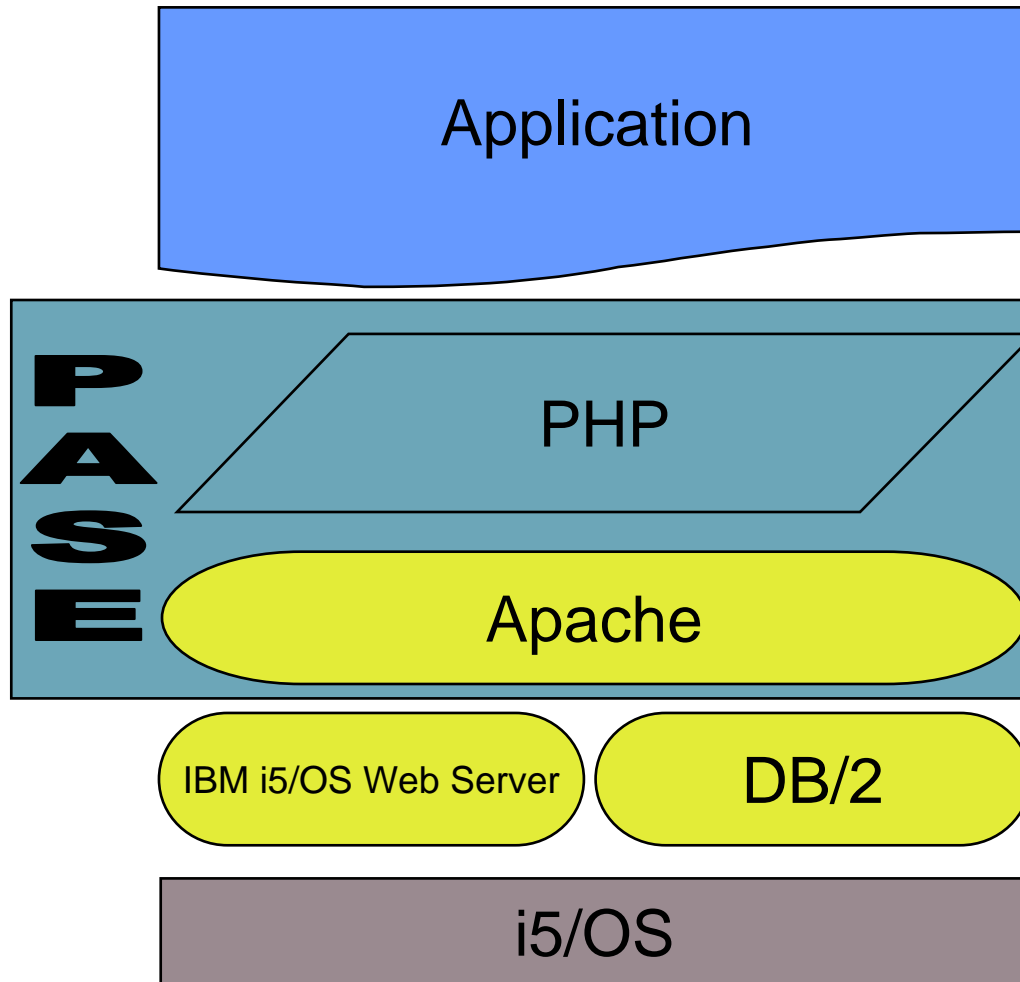
The setup of Sugar 4.2.1b is now complete.

Total time: 1.522664 seconds
Approximate memory used: 11155544 bytes.
Your system is now installed and configured for use.

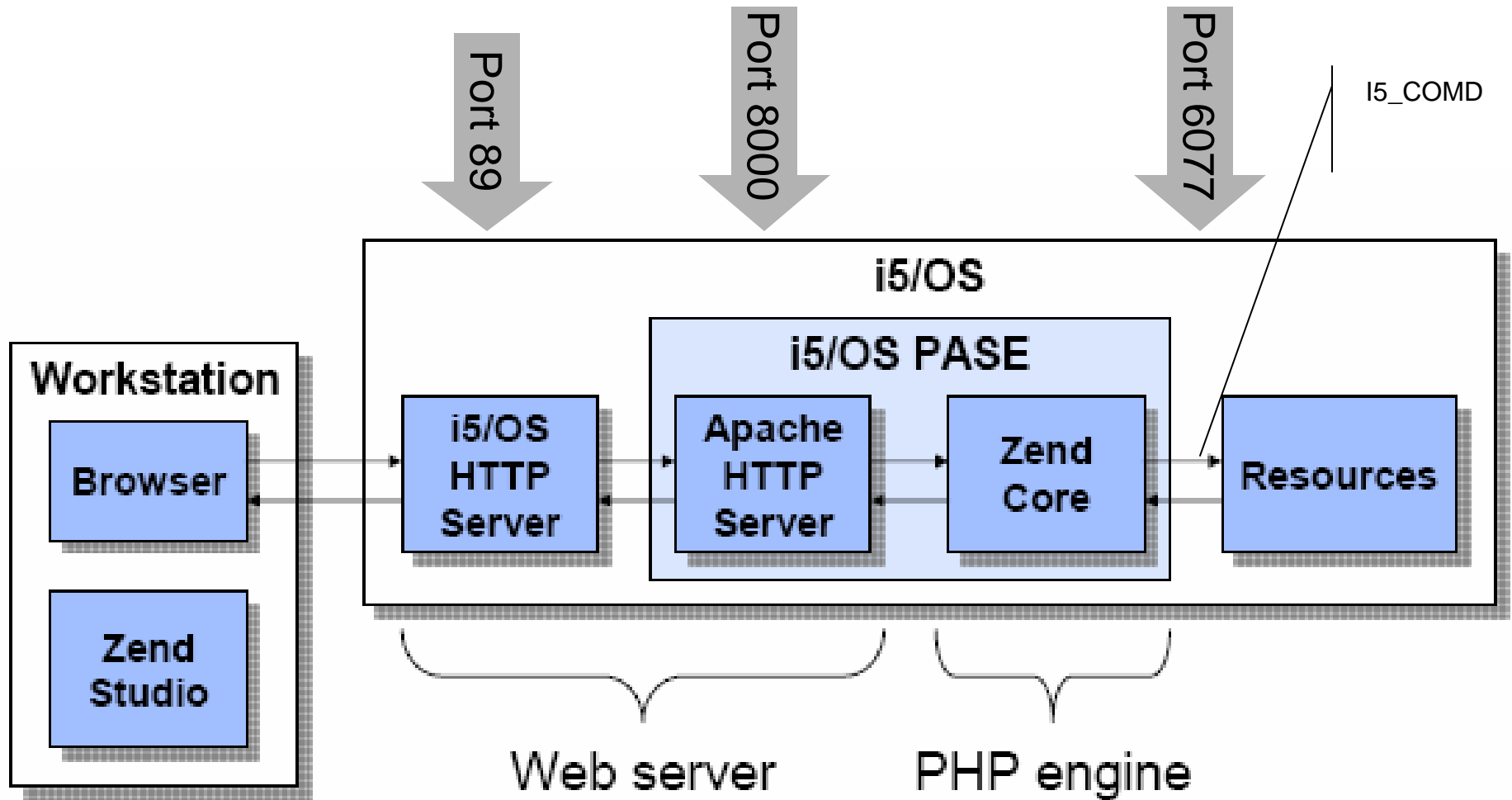
```

[Help](#) [Back](#) [Next](#)

The iADP Stack



How does iADP Work?



<http://<server name>:2001/HTTPAdmin>

<http://<server name>:89/ZendCore>

What are System i Customer's Doing with iADP?

- Consolidation: Moving PHP applications that are running on Windows or Linux that access data in DB2 to run in i5/OS to speed up or reduce complexity of the application
- Modernization: Using iADP to web-enable green-screen applications
- New application development: Creating new applications with iADP including applications for the intranet, reporting, websites, and extranets.

Parts Depot

- Background
 - Parts Depot is one of the largest distributors and resellers of automotive aftermarket parts and paints in the U.S.
- Objectives
 - Update its applications that enable business partners to conduct a variety of online transactions, ranging from price quotations to fulfillment to the reviewing of historical data.
- Solution
 - Three System i 520s support the business.
 - Production, Development and HA
 - Developed new web application with PHP integrating with backend RPG applications



“It’s about the speed of delivery to the market. When you have a new idea for an application, you have to build it quickly, implement it and get it into the market. If you’re going to keep a competitive advantage, you have to be nimble.”

Jonathan George, CIO

Cremer

- Background
 - Distributor and manufacture of disposable health products in Brazil
- Challenge
 - Improve customer satisfaction with a streamlined call center application – inventory, prices, credit, invoices
 - Reduce software costs
- Solution
 - Developed new PHP web-based call center application accessing DB2 on i5/OS V5R3
- Benefits
 - Reduction in software costs
 - Short development cycle – even though started with no PHP skills
 - Faster access to DB2 information



Icon Fitness

- Background
 - World's large home fitness manufacturer...and includes brands such as NordicTrack, HealthRider, and Proform
- Challenge
 - Quickly develop fitness/nutrition web sites to meet January demand peak
- Solution
 - Developed new consumer web sites with PHP tying into existing WebSphere Commerce Server on i5/OS V5R4

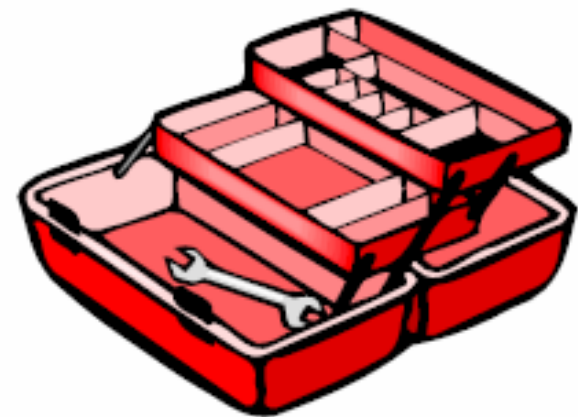
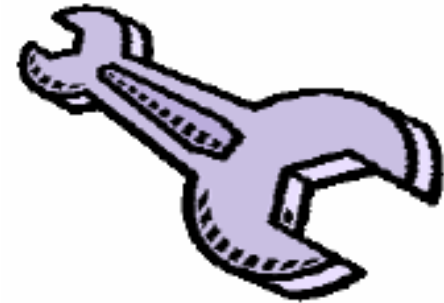


www.ifit.com

www.iconfitness.com

iADP – it's all about the API toolkit

- Are shipped with Zend products
 - Zend core for i5/OS
 - Zend Platform for i5/OS
- Geared towards accessing i5 data and resources from PHP
 - Similar in purpose to the IBM Toolbox for Java
- Note: the I5_COMD job must be running in the ZEND subsystem
 - Use the Zend menu to start:
 - GO ZENDCORE/ZCMENU
 - Option 5 (Service Management menu)
 - Option 8 (Start I5_COMD service)



I5 Toolkit APIs – Zend Core Version 1.4.1

- **Connection management**
 - i5_connect
 - i5_close
 - i5_adopt_authority
 - i5_error
 - i5_errno
 - i5_errormsg
- **Command calls**
 - i5_command
 - i5_cmdget
- **Program calls**
 - i5_program_prepare
 - 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_get_keys
- **System values**
 - i5_get_system_value
- **Data areas**
 - i5_data_area_create
 - i5_data_area_read
 - i5_data_area_write
 - i5_data_area_delete

More are coming

Record-level access

- `i5_open`
 - Pass in library/file and type of "open" mode
 - `i5_open_read`, `i5_open_readwrite`, `i5_open_commit`, `i5_openshrdd`, `i5_open_shrupd`
 - Etc

- `i5_list_fields`
 - Get an array of the names of the fields in the file

- `i5_fetch_row`
 - Get an array of the fields in a record, passing in which record to fetch
 - `i5_read_seek` (current)
 - `i5_read_next` (default)
 - `i5_read_prev`
 - `i5_read_first`
 - `i5_read_last`

Record-level access: HTML code

```
<form method="post" action=i5_fetch.php">
```

```
Library (schema): <input type="text" name="lib"><br>
```

```
File (table): <input type="text" name="tbl"><br>
```

```
<input type="reset"> <input type="submit"  
  value="Display records">
```

```
</form>
```

Record-level access: PHP code

```
// Get input data
$dbfile = $_POST['tbl'];
$dblib = $_POST['lib'];

// Open the file
$file = i5_open("$dblib/$dbfile", i5_open_read);
if (!$file)
    die("Error while attempting to open file mode=READ");

// Print a table row of field names
$fields = i5_list_fields($file); // returns an array
print "<table border=1 cellpadding=3><tr bgcolor=#CCCCCC>";

// Parse the array
foreach ($fields as $value) {
    print "<th>$value</th>";
}
print "</tr>\n";
```

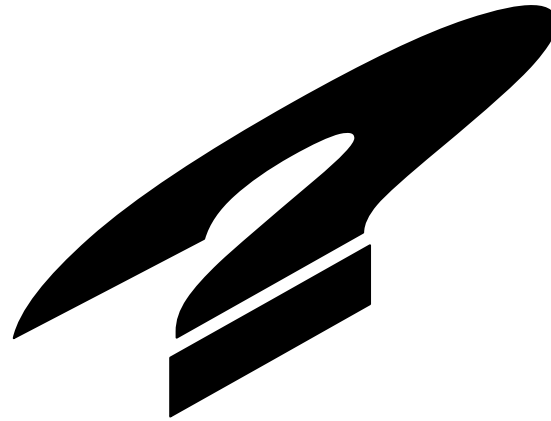
Record-level access: PHP code

```
// Print records
$rec = i5_fetch_row($file, i5_read_first); // get array
while ($rec) { // while there is a record...
    // Print each field in the array
    foreach ($rec as $value) {
        print <"td">$value</td>";
    }
    print "</tr>\n";
    // Get next record
    $rec = i5_fetch_row($file, i5_read_next);
} // loop

print "</table>"; // finish off the table
```



Questions



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