

The Zen of PHP without Zend Server

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Open Source Experts

Develop web and mobile applications
Support Community PHP
Troubleshoot the toughest issues
Train developers in open source & IBM i

PHP | APIs | Git
Node.js | Db2 | Python

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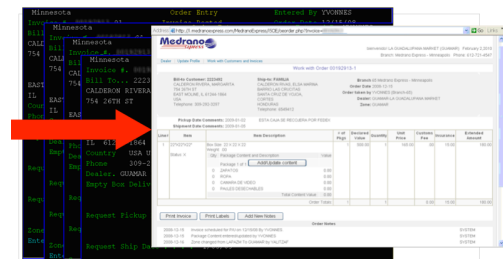


Why PHP?



Web apps and APIs

- ◆ PHP has been pivotal in bringing web applications to IBM i
- ◆ Open source applications: CMSes, eCommerce
 - ◆ Mantis Bug Tracker was an oldie but goodie
- ◆ Award-winning applications across all industries
 - ◆ Continue to access your Db2 data, RPG code, and more
 - ◆ PHP Toolkit helped compatibility and integration
 - ◆ Web services and APIs
 - ◆ First taste of calling external APIs from IBM i
 - ◆ Credit card payments... Salesforce... many more
 - ◆ Converting green screens to web
- ◆ Community and conference sites
- ◆ Blogs
 - ◆ Wordpress.. beyond blogs.. Star Wars site, more!



Use PHP from RPG, CL, etc.

- ◆ PHP can be called from CL and RPG too!
 - ◆ Often software development kits (SDKs) were written in PHP
 - ◆ Easy to get started
 - ◆ Still control flow from traditional RPG
 - ◆ Use new PHP power to access APIs and other functionality, create spreadsheets, graphics, etc.
- ◆ PHP has always contained all the basics to serve web pages and access APIs
 - ◆ SOAP in the beginning, REST now
- ◆ Millions of users; present on all web hosts
- ◆ Helped make the IBM i more mainstream

PHP on IBM i timeline

- ◆ 2004: Alan needed PHP on i5!
 - ◆ i5php.net—Rob Ward's site
 - ◆ Included ODBC but was missing mail() function!
- ◆ 2006: Zend Core—IBM shipped in its DVDs
 - ◆ Zend Platform paid add-on
- ◆ 2008-9 Zend Server
 - ◆ No-cost OSS + admin pages + paid add-ons bundled
 - ◆ Basic / Professional / Enterprise licenses
- ◆ 2019: Community PHP
 - ◆ RPM-based
 - ◆ Includes ODBC again

PHP in 2020-2021

- ◆ Zend Server Basic license withdrawn by June 2021
- ◆ PHP is widespread on IBM i
 - ◆ A no-charge option is still needed
- ◆ RPM-based PHP to the rescue!
 - ◆ Launched by IBM and Zend (Perforce)
 - ◆ Can be adapted/enhanced
 - ◆ It works well
- ◆ Still an option to pay for Zend Server Professional and Enterprise
- ◆ Give RPMs a try for license-free PHP



Why RPM your PHP?



Quick installation

- ◆ Minutes instead of hours
- ◆ No laborious FTP'ing, unzipping, SAVF, no hours-long installation
- ◆ Industry-standard Yum command
 - ◆ Same as other IBM i open source these days
 - ◆ Under /QOpenSys
 - ◆ The “cool kids” like it!
- ◆ Quick upgrades, too
 - ◆ `Yum update`
- ◆ Gain even more speed by automating / scripting the installation

Flexible installation

- ◆ Choose Apache or nginx
- ◆ Your existing Apache and FastCGI configs still work!
- ◆ Multiple web server instances for different workloads
- ◆ Test in parallel with existing Zend Server
- ◆ Could install multiple versions via chroot

More bits = more data!

- ◆ RPM PHP is 64-bit, while Zend Server is still 32-bit
 - ◆ (as of May 2020)
- ◆ What does that mean?
- ◆ More data without errors (no more memory dump errors)
- ◆ Good-bye, “LDR_CNTRL” memory hack!

Hot Tip: If you get out-of-memory errors when running Composer, try these steps:

1. Increase PASE memory:

```
export LDR_CNTRL=MAXMEM=8G@DSO
```

before executing your PHP composer commands.

Improved performance

- ◆ PHP 7 was already fast
- ◆ PHP 7 with RPMs is even faster
 - ◆ A CPU type benchmark test I ran showed 0.11 seconds instead of Zend Server 0.31 seconds
 - ◆ That wasn't a realistic database-type test, but was a great start!
- ◆ Lighter distribution is quicker to start up, too
 - ◆ Especially PHP-CLI called from CL, RPG, etc.

This PHP is open and flexible

- ◆ Although Community PHP is missing some of the extensions that were bundled in Zend Server....
- ◆ “We can rebuild them!”
- ◆ Several popular ones
 - ◆ Ibm_db2
 - ◆ Ldap
 - ◆ Imagemagick
 - ◆ Implementing mail() with sendmail
- ◆ IBM has done a great job in building infrastructure to let us add the extensions we want and need



On PHP 7 Yet?



PHP 7's Faster than PHP 5.x

- ◆ Spurred by competition with Facebook's "Hack"
- ◆ Noticeable speedup on large sites—pages "pop"

Time and number of machine instructions for 100 requests against Wordpress-3.6.0 front page



What else about PHP 7?

- ◆ New features:
 - ◆ <https://www.php.net/manual/en/migration70.new-features.php>
- ◆ Code changes required? Long-deprecated functions removed
 - ◆ https://wiki.php.net/rfc/remove_deprecated_functionality_in_php7
 - ◆ Old MySQL code using the `mysql_*` functions should be updated to `mysqli_*` (“IMySQL Improved”) or PDO
 - ◆ Old regular expression syntax “`ereg()`” was removed
 - ◆ <https://www.scriptarticle.com/function-ereg-is-deprecated-in-php-5-3-x/>

Upgrading from PHP 5.6 to PHP 7

- ◆ Your code should “just work” with a few exceptions
 - ◆ <https://www.seidengroup.com/2017/07/24/resources-for-upgrading-to-php-7-on-ibm-i/>
 - ◆ RPM upgrade to PHP 7 is the same except use the path /QOpenSys/pkg/bin/php
 - ◆ Check /usr/local/zendsvr6/var/log/php.log for deprecation notices
 - ◆ Test your code with <https://github.com/Alexia/php7mar>
- ◆ PHP 7 can run in parallel with older versions such as PHP 5.6
 - ◆ (If you find PHP 6, let us know! 😊)

Simple Speed Test Script (SSTS)

```
<?php
// homemade profiler using microtime(true), current time in seconds
$start = microtime( true );

    for ($i=0 ; $i<1000000 ; $i++) {
        serialize($i);
    }
$end = microtime( true );
$duration = $end - $start;
echo "Took " . $duration . " seconds.\n";
```

PHP 5.6 vs 7.3

```
$start = microtime( true );  
    for ($i=0 ; $i<1000000 ; $i++) {  
        serialize($i);  
    }  
$end = microtime( true );  
$duration = $end - $start;  
echo "Took " . $duration . " seconds.\n";
```

Run from CALL QP2TERM or SSH terminal

```
cd /www/myserver/htdocs [location of speedtest.php]
```

1. /usr/local/zendsvr6/bin/php -n speedtest.php
"Took 0.37887215614319 seconds." (PHP 5.6.18)
2. /usr/local/zendphp7/bin/php -n speedtest.php
"Took 0.30699110031128 seconds." (PHP 7.3.11)
3. /QOpenSys/pkg/bin/php -n speedtest.php
"Took [really short/quick time; but it's a narrow, made-up
benchmark] seconds" (PHP 7.3.17)



Let's Install PHP!



Install PHP using Yum

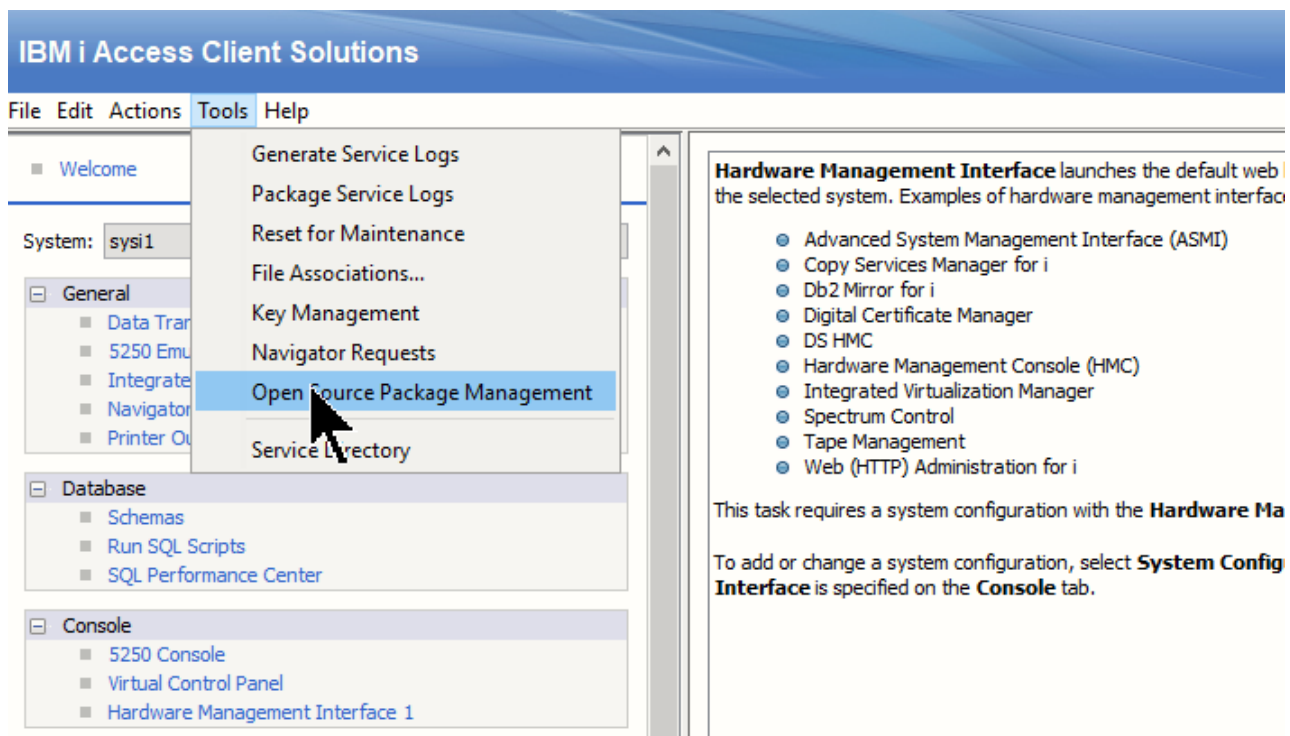
- ◆ To install Community PHP with ODBC, we like these instructions from King Harrison (K3S):
 - ◆ <https://odbcphp.k3s.com/>
- ◆ We recommend SSH to get into PASE
 - ◆ STRTCPSVR *SSHD
 - ◆ Industry-standard: your younger developers will thank you (install the **bash** shell for them!)
 - ◆ (In bash, the up-arrow key works like F9 to bring back prior commands)
 - ◆ Open source software works better in SSH than in QP2TERM or QSH

Getting Yum ready

- ◆ Follow the K3S instructions to make sure Yum and the Open Source Package Management window of ACS are set up
 - ◆ <https://www.ibm.com/support/pages/getting-started-open-source-package-management-ibm-i-acs>
- ◆ Add the Community PHP repository to your IBM i's Yum/RPM environment
 - ◆ `yum-config-manager --add-repo http://repos.zend.com/ibmiphp/`
 - ◆ (Or other non-IBM repo you need to add)
 - ◆ You could even create your own repository
 - ◆ For example, we maintain our own “repos” containing additional RPM-based modules

Open Source Package Management

- ◆ IBM i ssh server service must be running on port 22



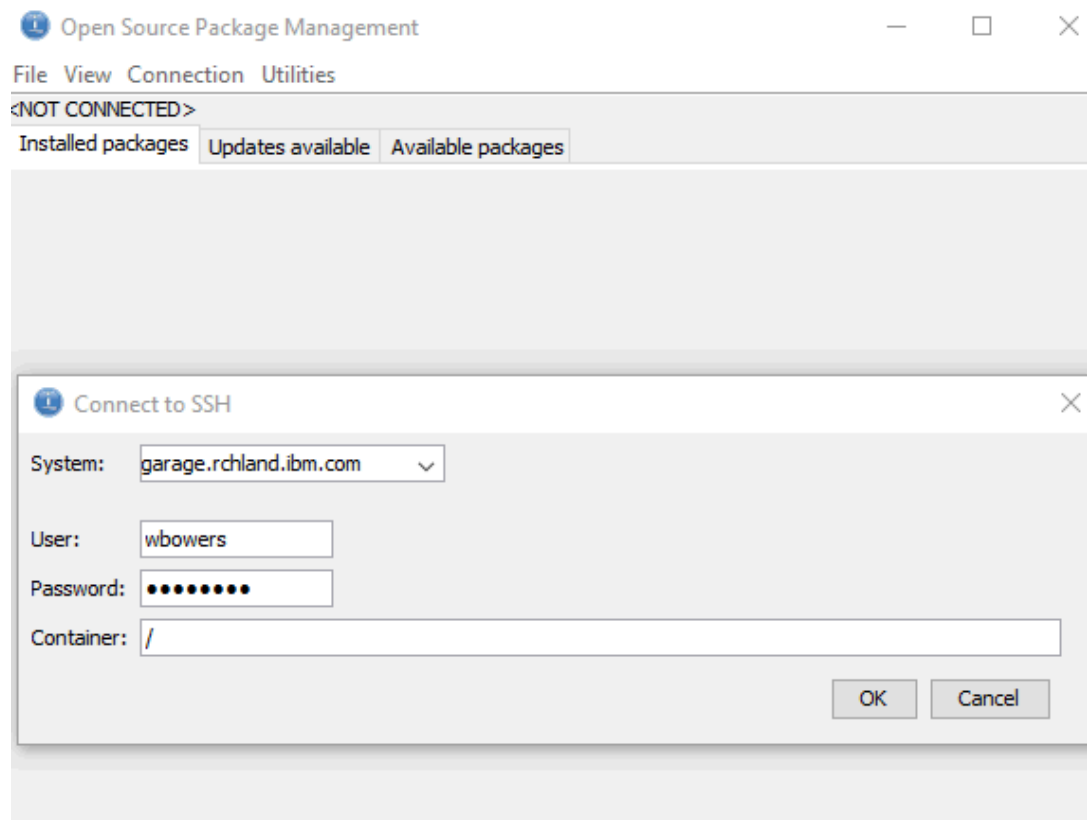
The screenshot displays the IBM i Access Client Solutions web interface. The title bar reads "IBM i Access Client Solutions". Below it is a menu bar with "File", "Edit", "Actions", "Tools", and "Help". The "Tools" menu is open, showing a list of options: "Generate Service Logs", "Package Service Logs", "Reset for Maintenance", "File Associations...", "Key Management", "Navigator Requests", "Open Source Package Management" (highlighted with a blue background and a mouse cursor), and "Service Directory".

On the left side of the interface, there is a navigation pane with a "System:" dropdown set to "sysi1". Below this are several expandable sections: "General" (containing "Data Tran...", "5250 Emu...", "Integrate...", "Navigator...", and "Printer Ou..."), "Database" (containing "Schemas", "Run SQL Scripts", and "SQL Performance Center"), and "Console" (containing "5250 Console", "Virtual Control Panel", and "Hardware Management Interface 1").

On the right side, there is a "Hardware Management Interface" section. It contains a paragraph: "Hardware Management Interface launches the default web the selected system. Examples of hardware management interfac". Below this is a list of bullet points: "Advanced System Management Interface (ASMI)", "Copy Services Manager for i", "Db2 Mirror for i", "Digital Certificate Manager", "DS HMC", "Hardware Management Console (HMC)", "Integrated Virtualization Manager", "Spectrum Control", "Tape Management", and "Web (HTTP) Administration for i". Below the list is a paragraph: "This task requires a system configuration with the Hardware Ma". At the bottom of this section is another paragraph: "To add or change a system configuration, select System Config Interface is specified on the Console tab."

Open Source Package Management (ACS)

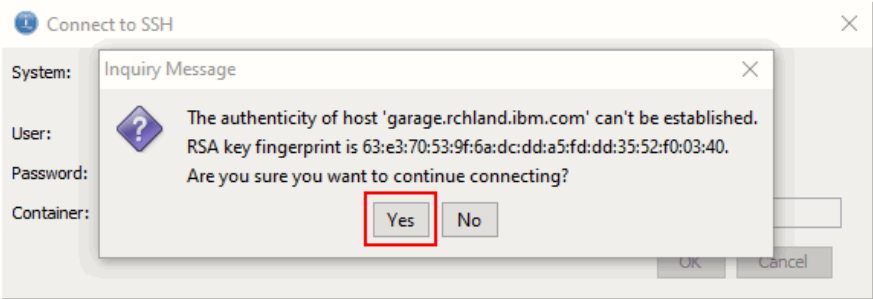
- ◆ Log in with a QSECOFR or *ALLOBJ level user



Open Source Package Management

- ◆ You may receive these prompts. Just say Yes !

If you receive the following warning, select "Yes" to continue.



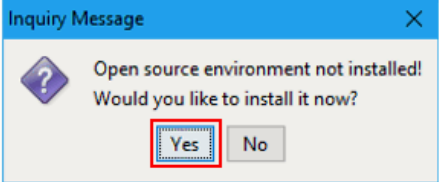
System: Inquiry Message

User: ? The authenticity of host 'garage.rchland.ibm.com' can't be established.
RSA key fingerprint is 63:e3:70:53:9f:6a:dc:dd:a5:fd:dd:35:52:f0:03:40.
Are you sure you want to continue connecting?

Container:

OK Cancel

If the underlying Open Source Package Management YUM utility is not already installed, the following message is displayed. Respond with "Yes" and the environment installs.

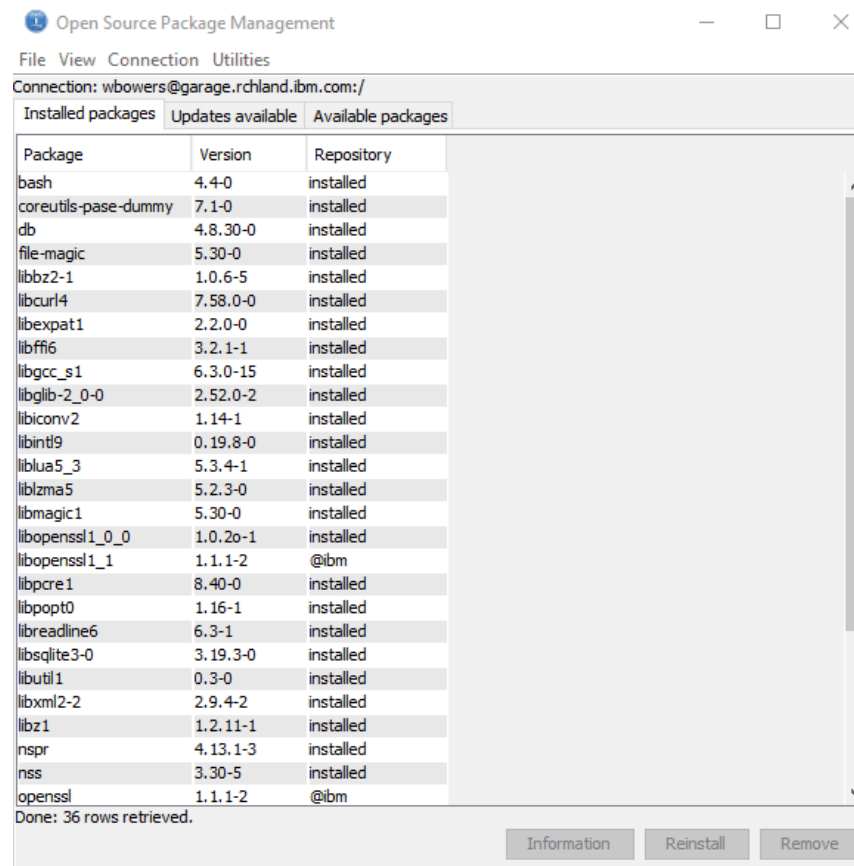


Inquiry Message

? Open source environment not installed!
Would you like to install it now?

Open Source Package Management

- ◆ All is working if you see list of packages !



The screenshot shows a window titled "Open Source Package Management" with a menu bar (File, View, Connection, Utilities) and a connection string "wbowers@garage.rchland.ibm.com:". Below the menu bar are three tabs: "Installed packages", "Updates available", and "Available packages". The "Installed packages" tab is active, displaying a table with three columns: "Package", "Version", and "Repository". The table lists 36 installed packages, including bash, coreutils-pase-dummy, db, file-magic, libbz2-1, libcurl4, libexpat1, libffi6, libgcc_s1, libglib-2_0-0, libiconv2, libintl9, liblua5_3, libzma5, libmagic1, libopenssl1_0_0, libopenssl1_1, libpcre1, libpopt0, libreadline6, libsqlite3-0, libutil1, libxml2-2, libz1, nspr, nss, and openssl. At the bottom of the window, there are three buttons: "Information", "Reinstall", and "Remove".

Package	Version	Repository
bash	4.4-0	installed
coreutils-pase-dummy	7.1-0	installed
db	4.8.30-0	installed
file-magic	5.30-0	installed
libbz2-1	1.0.6-5	installed
libcurl4	7.58.0-0	installed
libexpat1	2.2.0-0	installed
libffi6	3.2.1-1	installed
libgcc_s1	6.3.0-15	installed
libglib-2_0-0	2.52.0-2	installed
libiconv2	1.14-1	installed
libintl9	0.19.8-0	installed
liblua5_3	5.3.4-1	installed
libzma5	5.2.3-0	installed
libmagic1	5.30-0	installed
libopenssl1_0_0	1.0.2o-1	installed
libopenssl1_1	1.1.1-2	@ibm
libpcre1	8.40-0	installed
libpopt0	1.16-1	installed
libreadline6	6.3-1	installed
libsqlite3-0	3.19.3-0	installed
libutil1	0.3-0	installed
libxml2-2	2.9.4-2	installed
libz1	1.2.11-1	installed
nspr	4.13.1-3	installed
nss	3.30-5	installed
openssl	1.1.1-2	@ibm

Done: 36 rows retrieved.

Install PHP using Yum (continued)

- ◆ The yum command:
 - ◆ `Yum install php-*`
 - ◆ TIP: Your user profile must have *ALLOBJ to install via Yum
- ◆ More from the K3S setup document
 - ◆ Set up Apache or Nginx web server
 - ◆ You can continue to use your existing Apache instances that Zend Server created
 - ◆ Set up ODBC for Db2 access running on IBM i
 - ◆ How to use ODBC to connect from a Linux or Windows computer to the IBM i as well!
 - ◆ Tips for using the PHP Toolkit (XMLSERVICE)

FastCGI configuration

- ◆ FastCGI prestarts PHP jobs to handle web workloads
- ◆ Minimal contents of fastcgi.conf (in `/www/myserver/conf/`):
 - ◆ `Server type="application/x-httpd-php"`
`CommandLine="/QOpenSys/pkg/bin/php-cgi"`
`StartProcesses="1"`
- ◆ Additional/optional keys to include in fastcgi.conf:
 - ◆ How many PHP jobs to start
 - ◆ `SetEnv="PHP_FCGI_CHILDREN=20"`
 - ◆ How long to wait before a 408 timeout
 - ◆ `RequestTimeout="60"`

```
Work with Active Jobs SEIDEN
05/01/20 08:14:59 EDT
CPU %: .0 Elapsed time: 00:00:00 Active jobs: 317

Type options, press Enter.
2=Change 3=Hold 4=End 5=Work with 6=Release 7=Display message
8=Work with spooled files 13=Disconnect ...

Current
Opt Subsystem/Job User Type CPU % Function Status
---
--- RPMSEVER QTMHHTTP BCI .0 PGM-QZSRHTTP SIGM
--- RPMSEVER QTMHHTTP BCI .0 PGM-zfcgi SELM
--- RPMSEVER QTMHHTTP BCI .0 PGM-php-cgi THDW
--- RPMSEVER QTMHHTTP BCI .0 PGM-php-cgi TIMM
--- RPMSEVER QTMHHTTP BCI .0 PGM-php-cgi TIMM
--- RPMSEVER QTMHHTTP BCI .0 PGM-php-cgi TIMM
--- RPMSEVER QTMHHTTP BCI .0 PGM-php-cgi TIMM
--- RPMSEVER QTMHHTTP BCI .0 PGM-php-cgi TIMM
--- RPMSEVER QTMHHTTP BCI .0 PGM-php-cgi TIMM
More...
```

Enabling and optimizing FastCGI—Details

```
# fastcgi.conf
Server type="application/x-httpd-php" CommandLine="/QOpenSys/pkgs/bin/php-cgi" StartProcesses="1" SetEnv="LIBPATH=/QOpenSys/pkgs/lib" SetEnv="PHPRC=/QOpenSys/etc/" SetEnv="PHP_FCGI_CHILDREN=20" SetEnv="PHP_FCGI_MAX_REQUESTS=0" ConnectionTimeout="30" RequestTimeout="60" SetEnv="CCSID=1208"
SetEnv="LANG=C"
```

◆ PHP_FCGI_CHILDREN

- ◆ Max number of PHP jobs needed at one time
- ◆ Default of 10 is low. Try 20, 30, 40, 50, and test.
- ◆ We run a monitor to track how many PHP jobs are used at a time.

◆ RequestTimeout

- ◆ Seconds before FastCGI returns an HTTP 408 error
- ◆ **Consider setting up multiple web server instances to handle varying workloads (slow vs. fast)**

Other options

- ◆ nginx web server
 - ◆ Flexible web server alternative to Apache
 - ◆ Full open source--not covered by SWMA as Apache is, but you could buy IBM TSS support if needed
 - ◆ Allows automated setup, including of SSL (no DCM)
 - ◆ Nginx works well with alternate FastCGI called php-fpm
- ◆ Php.ini settings
 - ◆ Edit directly in the Php.ini file using EDTF or your favorite editor or vim 😊
 - ◆ date.timezone
 - ◆ <https://www.php.net/manual/en/timezones.php>
 - ◆ `date.timezone = America/New_York`



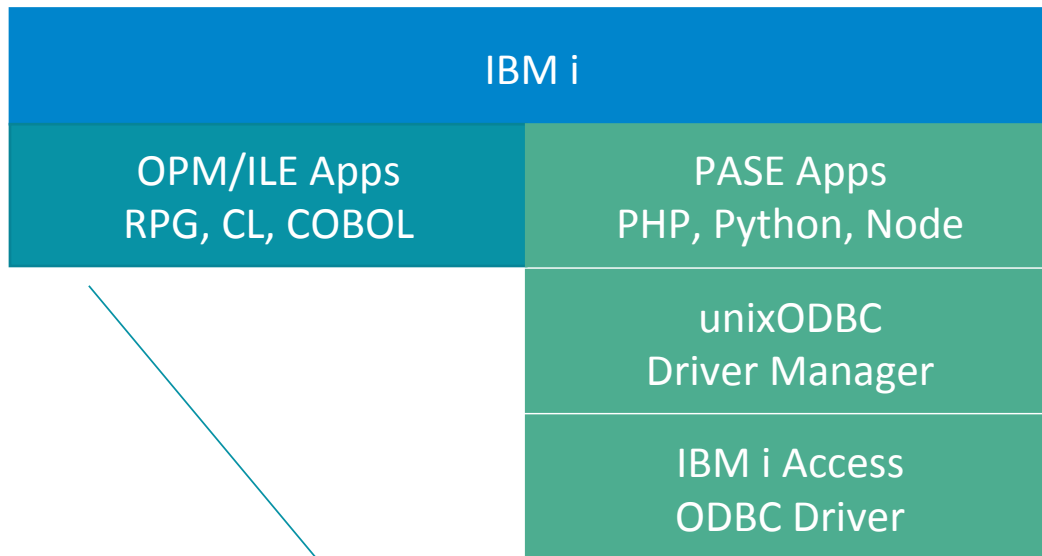
ODBC is Back!



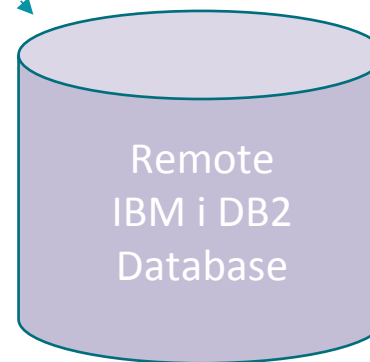
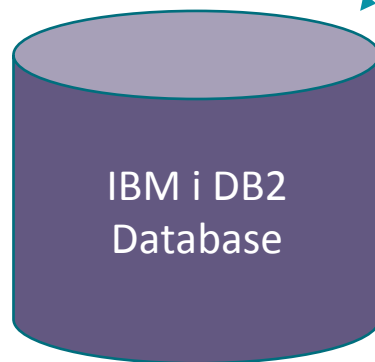
History of Open Source Connectivity

- ◆ Before, IBM **built custom middleware** for each lang for the CLI. Pro was could customize for IBM i and Db2. Problems in CLI though.
- ◆ **Db2 Connect** product allowed same code LUW and IBM i. “Want to code on PC/laptop and then run on IBM i.” Local debugging with favorite IDE. **Two versions of code:** ODBC free or pay / config Db2 Connect.
- ◆ **Open source on the rise** and to the rescue, **unixODBC** driver. Was on Windows and Linux but not IBM i. Needed db2 driver underneath that worked in PASE.
- ◆ NOW ODBC on IBM i. Making IBM i work as mainstream as possible. Generic connector! Don’t need to create special versions anymore.
 - ◆ Frameworks that have ODBC can work now.
 - ◆ **You may develop on PC, then deploy to IBM i**

ODBC Architecture

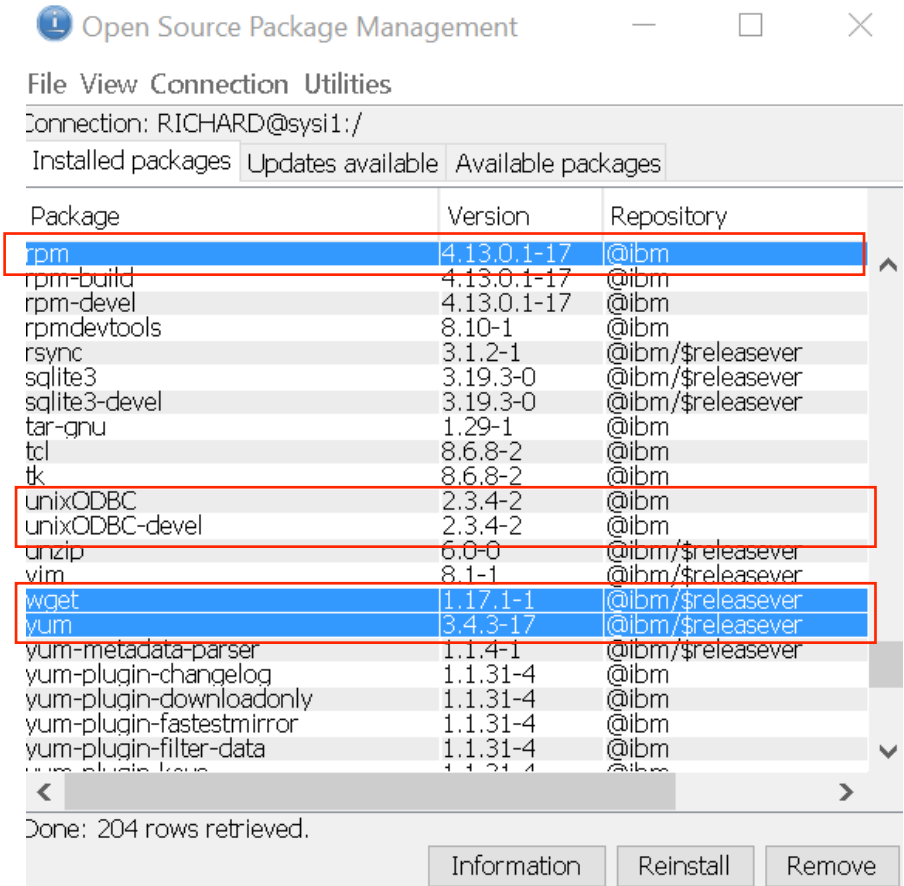


Windows, Linux, Mac and native IBM i Developers can use exact same codebase with no changes



Install ODBC Yum Package Prerequisites

- ◆ Install yum
- ◆ Install wget
- ◆ Install rpm installed
- ◆ Install unixODBC
- ◆ Install unixODBC-devel
- ◆ We will use rpm command when we install the IBM i Access ODBC driver



Open Source Package Management

File View Connection Utilities

Connection: RICHARD@sys1:/

Installed packages Updates available Available packages

Package	Version	Repository
rpm	4.13.0.1-17	@ibm
rpm-build	4.13.0.1-17	@ibm
rpm-devel	4.13.0.1-17	@ibm
rpmdevtools	8.10-1	@ibm
rsync	3.1.2-1	@ibm/\$releasever
sqlite3	3.19.3-0	@ibm/\$releasever
sqlite3-devel	3.19.3-0	@ibm/\$releasever
tar-gnu	1.29-1	@ibm
tcl	8.6.8-2	@ibm
tk	8.6.8-2	@ibm
unixODBC	2.3.4-2	@ibm
unixODBC-devel	2.3.4-2	@ibm
unzip	6.0-0	@ibm/\$releasever
vim	8.1-1	@ibm/\$releasever
wget	1.17.1-1	@ibm/\$releasever
yum	3.4.3-17	@ibm/\$releasever
yum-metadata-parser	1.1.4-1	@ibm/\$releasever
yum-plugin-changelog	1.1.31-4	@ibm
yum-plugin-downloadonly	1.1.31-4	@ibm
yum-plugin-fastestmirror	1.1.31-4	@ibm
yum-plugin-filter-data	1.1.31-4	@ibm
yum-plugin-keep	1.1.31-4	@ibm

Done: 204 rows retrieved.

Information Reinstall Remove

Download IBM i PASE ODBC Driver

- ◆ IBM i Access Client Solutions Site:
<https://www.ibm.com/support/pages/ibm-i-access-client-solutions>

**Note: You will need an IBM account to log in and download

IBM i Access

Overview Client Solutions Web/Mobile Windows

IBM i Access Client Solutions provides a Java based, platform-independent interface that runs on most operating systems that support Java, including Linux, Mac, and Windows™. IBM i Access Client Solutions consolidates the most commonly used tasks for managing your IBM i into one simplified location. The latest version of IBM i Access Client Solutions is available to customers with an IBM i software maintenance contract.

→ [Downloads for IBM i Access Client Solutions](#)

→ [QuickStartGuide](#)

→ [GettingStarted](#)

Features

Download IBM i PASE ODBC Driver

Download using http		Download using Download Director	
Show <input type="text" value="10"/> entries		Search: <input type="text"/>	
Description	Filename	Size	Action
IBM i Access Client Solutions	IBMIAccess_v1r1.zip	128074995 B	Download ↓
Readme file for 5733-XJ1	Readme.txt	5 KB	Download ↓
Quick Start Guide	QuickStartGuide_en.html	11 KB	Download ↓
Getting Started	GettingStarted_en.html	110 KB	Download ↓
ACS EHLLAPI - Version 8.19.338	acshllapi.exe	1120093 B	Download ↓
ACS Windows App Pkg English (64bit)	IBMIAccess_v1r1_WindowsAP_English.zip	53311376 B	Download ↓
ACS Linux App Pkg	IBMIAccess_v1r1_LinuxAP.zip	20797233 B	Download ↓
ACS PASE App Pkg	IBMIAccess_v1r1_PASE_AP.zip	8577229 B	Download ↓

Upload IBM i Access PASE ODBC Driver

- ◆ Unzip `ibm-iaccess-1.1.0.xx-0.ibm7.2.ppc64.rpm` from `IBMiAccess_v1r1_PASE_AP.zip`
- ◆ Upload `ibm-iaccess-1.1.0.xx-0.ibm7.2.ppc64.rpm` to IFS root dir as: `/ibm-iaccess-1.1.0.xx-0.ibm7.2.ppc64.rpm` using your favorite file transfer tool.
- ◆ **Note:** “xx” above is file version number in your download. As of May 2020, it was “14”.

Install IBM i Access PASE ODBC Driver

- ◆ Start Qshell (`STRQSH`), PASE (`CALL QP2TERM`) or (BEST) ssh terminal session using putty, MobaXterm, Mac Terminal, or other ssh terminal client
- ◆ Run command list below to install the IBM i Access ODBC driver
- ◆ `cd /`
`PATH=/QOpenSys/pkg/bin`
`export PATH`
`rpm -i ibm-iaccess-1.1.0.xx-0.ibm7.2.ppc64.rpm`
- ◆ Once install has completed you will be notified on the command line.

Check for Default ODBC Data Source

- ◆ From your terminal (again, SSH is best)
- ◆ Run command list below to list the IBM i Access ODBC driver defaults from `odbc.ini`
- ◆ `cd /QOpenSys/etc`
`cat odbc.ini`
- ◆ **Cat** command displays contents of `odbc.ini`

Check for Default ODBC Data Source

- ◆ Contents of default odbc.ini file
- ◆ You should be able to connect to other IBM i systems
- ◆ Change localhost to other system host name or IP address
- ◆ Use Password

```
### IBM provided DSN - do not remove this line ###  
[*LOCAL]  
Description = Default IBM i local database  
Driver      = IBM i Access ODBC Driver  
System      = localhost  
UserID      = *CURRENT  
### Start of DSN customization  
### End of DSN customization  
### IBM provided DSN - do not remove this line ###
```

Potential PTFs Needed

- ◆ PTF needed for *CURRENT user to work without password
 - ◆ 7.2: SI68113
 - ◆ 7.3: SI69058
 - ◆ 7.4: (none needed; comes with the operating system)
- ◆ *CURRENT only works on localhost system (same partition as your code)



First ODBC Connections

isql command line

- ◆ Type isql and press Enter
- ◆ Shows command line options
- ◆ Option details:
 - ◆ <https://www.mankier.com/1/isql>

```
-bash-4.4$ isql
*****
* unixODBC - isql
*****
* Syntax
*
*      isql DSN [UID [PWD]] [options]
*
* Options
*
* -b      batch.(no prompting etc)
* -dx     delimit columns with x
* -x0xXX  delimit columns with XX, where
*          x is in hex, ie 0x09 is tab
* -w      wrap results in an HTML table
* -c      column names on first row.
*          (only used when -d)
* -mn     limit column display width to n
* -v      verbose.
* -lx     set locale to x
* -q      wrap char fields in dquotes
* -3      Use ODBC 3 calls
* -n      Use new line processing
* -e      Use SQLExecDirect not Prepare
* -k      Use SQLDriverConnect
* -L      Length of col display (def:300)
* --version version
*
* Commands
*
* help - list tables
* help table - list columns in table
* help help - list all help options
*
* Examples
*
*      isql WebDB MyID MyPWD -w < My.sql
*
```

Connecting to DB2 via ODBC

- ◆ Type: `isql *LOCAL -v` and press Enter

```
QSH Command Entry

$
> isql *LOCAL -v
+-----+
| Connected!
|
| sql-statement
| help [tablename]
| quit
+-----+
SQL>
```

```
-bash-4.4$ isql *LOCAL -v
+-----+
| Connected!
|
| sql-statement
| help [tablename]
| quit
+-----+
SQL>
```

Running a Query Test

- ◆ Type: `select * from qiws.qcustcdt` and press Enter
- ◆ When done, type `quit` and press Enter to exit isql

```
SQL> select * from qiws.qcustcdt
```

CUSNUM	LSTNAM	INIT	STREET	CITY	STATE	ZIPCOD	CDTLMT	CHGCOD	BALDUE	CDTDUE
938472	Henning2	G K	4859 Elm Ave	Dallas	TX	75217	5000	3	37.00	1234.56
839283	Jones	B D	21B NW 135 St	Clay	NY	13041	400	1	100.00	0
392859	Vine	S S	P0 Box 79	Broton	VT	5046	700	1	439.00	0
938485	Johnson	J A	3 Alpine Way	Helen	GA	30545	9999	2	3987.50	33.50
397267	Tyron	W E	13 Myrtle Dr	Hector	NY	14841	1000	1	0	0
389572	Stevens	K L	208 Snow Pass	Denver	CO	80226	400	1	58.75	1.50
846283	Alison	J S	787 Lake Dr	Isle	MN	56342	5000	3	10.00	0
475938	Doe	J W	59 Archer Rd	Sutter	CA	95685	700	2	250.00	100.00
693829	Thomas	A N	3 Dove Circle	Casper	WY	82609	9999	2	0	0
593029	Williams	E D	485 SE 2 Ave	Dallas	TX	75218	200	1	25.00	0
192837	Lee	F L	5963 Oak St	Hector	NY	14841	700	2	489.50	.50
583990	Abraham	M T	392 Mill St	Isle	MN	56342	9999	3	500.00	0

```
SQLRowCount returns -1  
12 rows fetched
```

Your PHP on ODBC

```
<?php  
  
$connection = odbc_connect('*LOCAL', '', '');  
  
$stmt = odbc_exec($connection, 'select * from  
                                QIWS.QCUSTCDT');  
  
while ($row = odbc_fetch_array($stmt)) {  
    print_r($row);  
}
```


It works!

```
<?php

$connection =
odbc_connect('*LOCAL', '', '');

$stmt = odbc_exec($connection,
'select * from
QIWS.QCUSTCDT');

while ($row =
odbc_fetch_array($stmt)) {

    print_r($row);

}
}
```

```
Array
(
    [CUSNUM] => 938472
    [LSTNAM] => Henning
    [INIT] => G K
    [STREET] => 4859 Elm Ave
    [CITY] => Dallas
    [STATE] => TX
    [ZIPCOD] => 75217
    [CDTLMT] => 5000
    [CHGCOD] => 3
    [BALDUE] => 37.00
    [CTDUE] => 0
)
Array
(
    [CUSNUM] => 839283
    [LSTNAM] => Jones
    [INIT] => B D
    [STREET] => 21B NW 135 St
    [CITY] => Clay
    [STATE] => NY
    [ZIPCOD] => 13041
    [CDTLMT] => 400
)
```



Optimizing ODBC

Configure ODBC Prestart Jobs

- ◆ Prestart jobs named QZDASOINIT run in QUSRWRK
- ◆ Check out current configuration:
 - ◆ DSPSBSD SBSD(qusrwrk)
 - ◆ Then choose 10, Prestart job entries
 - ◆ Type 5 next to QZDASOINIT
- ◆ Defaults are **very** low.
 - ◆ Initial jobs = 1, threshold = 1, adljobs = 2

- ◆ Configure as needed:

```
CHGPJE SBSD(QSYS/QUSRWRK) PGM(QSYS/QZDASOINIT)
STRJOBS(*YES) INLJOBS(XX) THRESHOLD(XX)
ADLJOBS(XX)
```

Display Prestart Job Usage Statistics

- ◆ DSPACTPJ SBS(QSYSWRK) PGM(QSQSRVR) [ibm_db2]
- ◆ DSPACTPJ SBS(QUSRWRK) PGM(QZDASOINIT) [odbc]

```
Prestart jobs:
-
  Current number . . . . . : 29
  Average number . . . . . : 21.9
  Peak number . . . . . : 49

Prestart jobs in use:
  Current number . . . . . : 27
  Average number . . . . . : 18.4
  Peak number . . . . . : 46

Program start requests:
-
  Current number waiting . . . . . : 0
  Average number waiting . . . . . : .0
  Peak number waiting . . . . . : 6
  Average wait time . . . . . : 00:00:00.0
  Number accepted . . . . . : 100299
  Number rejected . . . . . : 0
```





Choose an IDE



Editors, editors, editors! And more!

- ◆ Eclipse-based IDEs

- ◆ NetBeans

- ◆ <https://netbeans.org>

- ◆ Zend Studio

- ◆ <https://store.zend.com/zend-studio-for-ibm-i-basic>

- ◆ (formerly free for IBM i, now paid)

- ◆ Microsoft Visual Studio and VSCode

- ◆ <https://code.visualstudio.com/docs/languages/php>

- ◆ TIP: Install SSH plugin (<https://code.visualstudio.com/docs/remote/ssh>)

- ◆ PHPStorm (<https://www.jetbrains.com/phpstorm>)

- ◆ Paid product for power users (Seiden developers' fave)

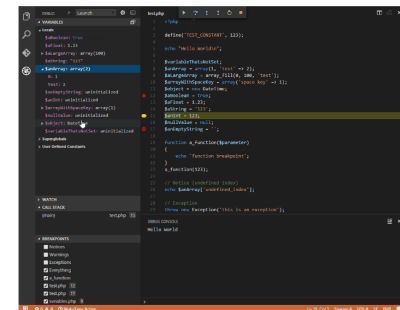




Debugging techniques

Interactive debugging with PHP

- ◆ Var_dump() and error_log() are great but limited
- ◆ Xdebug
 - ◆ <https://xdebug.org/>
 - ◆ Industry-standard famous PHP extension
 - ◆ Single-step debugger, including remote debugging (on the IBM i), stack traces, and more
- ◆ IDE debuggers
 - ◆ Nearly IDEs have debugging. Examples:
 - ◆ VSCode: <https://marketplace.visualstudio.com/items?itemName=felixfbecker.php-debug>
 - ◆ PHPStorm with xdebug: <https://www.jetbrains.com/help/phpstorm/debugging-with-phpstorm-ultimate-guide.html>
 - ◆ Visual Studio PHP Tools





Let's Code!



Live coding session with Richard

- ◆ See where our imaginations take us!



Support Options

How is RPM PHP Supported?

- ◆ Community support options
 - ◆ Get PHP version updates from Community PHP repository
 - ◆ Ryver (<https://ibmioss.ryver.com>)
 - ◆ IBMiOSS midrange.com list (<https://archive.midrange.com/opensource>)
- ◆ Paid support options (including break/fix)
 - ◆ Perforce (Zend)
 - ◆ Break/fix + extras + tools
 - ◆ Seiden
 - ◆ Migration help + break/fix + tools + repo of extensions (e.g. ibm_db2)
 - ◆ IBM (TSS)
 - ◆ Break/fix
 - ◆ There may be others—Let us know

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