



TUG

TEC 20i8

"TEC it to the limit"

TEC 25th edition -- Wednesday May 30 & Thursday May 31, 2018



FRESCHESOLUTIONS

Maria DB for IBM i

Agenda

- Brief discussion of MySQL
- History
- Installation
- Access
- GUI's
- Data Migration
- DB2 Storage Engine
- Q & A

Section title page

What is MySQL?

- Most popular and widely used OPEN SOURCE database solution
- Relational Database management System (RDBMS)
- Like DB2, but not really (we'll talk some more about this)
- Command line interface, no r
- Many GUI alternatives



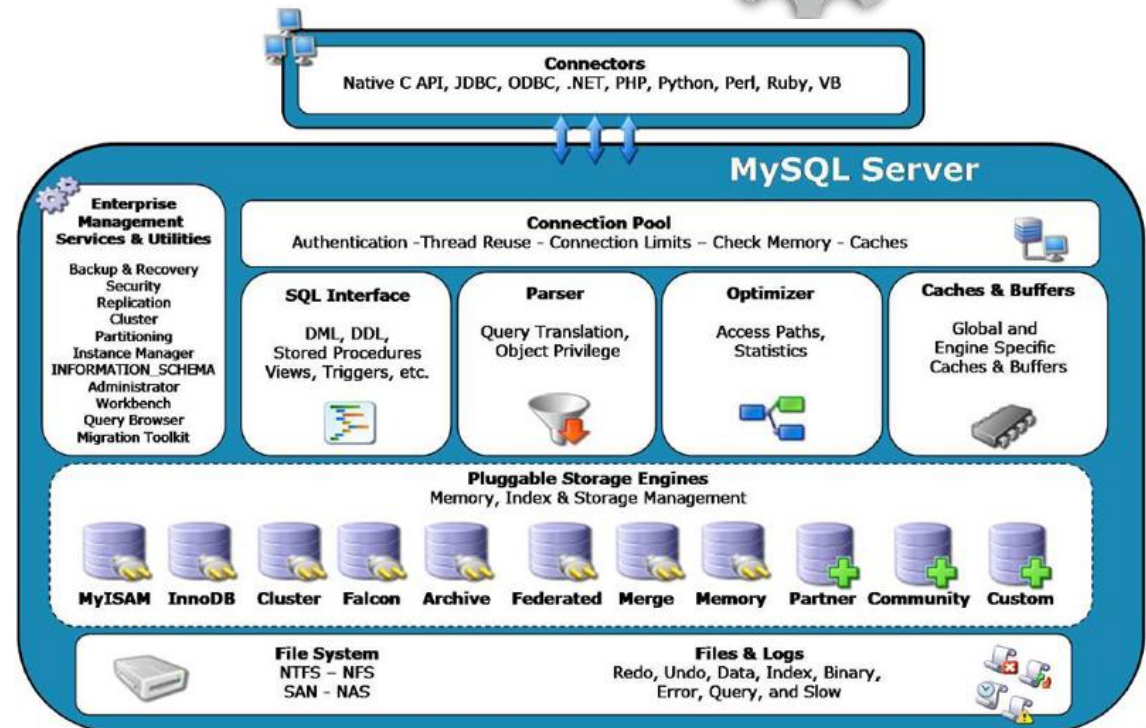
How does it work?

- Essentially flat files in the IFS
- Has two major parts

▶ UI Layer

▶ Storage Engines

- MyISAM
- INNODB
- IBMDB2



History

In the beginning, there was MySQL

- Founded in 1994 by
 - ▶ David Axmark
 - ▶ Allan Larson
 - ▶ Michael “Monty” Widenius
- Named after Monty’s daughter My (pronounced “Mee”)
- Monty now working on MariaDB, so let’s shift the focus...



Ownership

■ MySQL

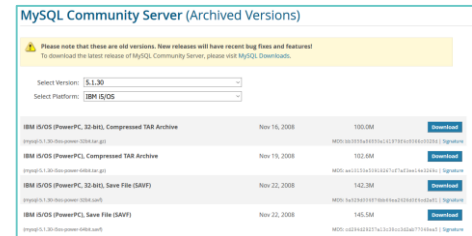
- ▶ Remember MySQL is open source: Anyone can compile the source code and use the binaries as long as they follow the rules of the license.
- ▶ Jan 2008 – Sun purchased MySQL for \$1B
- ▶ Jan 2010 – Oracle completes acquisition of Sun for \$7.4B
- ▶ FUD ensues...
- ▶ Today, MySQL continues to live on, but Maria is waiting in the wings should MySQL fall away

■ Maria

- ▶ Monty created a foundation so no one will ever “own” Maria

What about on IBM i? *Zend DBI == MariaDB*

- A few years ago, Oracle dropped support for MySQL on Power and discontinued compiling the binaries.
- Old binaries are on the Oracle archive site.
- IBM began looking for a new suitor
- Zend stepped up & took over binary distribution for MySQL for Ibm I and the new product is called ZendDBi
- Same wonderful MySQL, just compiled for IBM i
- Supported on IBM i 7.1 and higher
- Available at no charge at <http://www.zend.com/solutions/modernize-ibm-i/ibm-i-product/dbi>
- What is currently available?
 - ▣ MySQL 5.1
 - ▣ Maria 10.1 with MySQL 5.7 compatibility

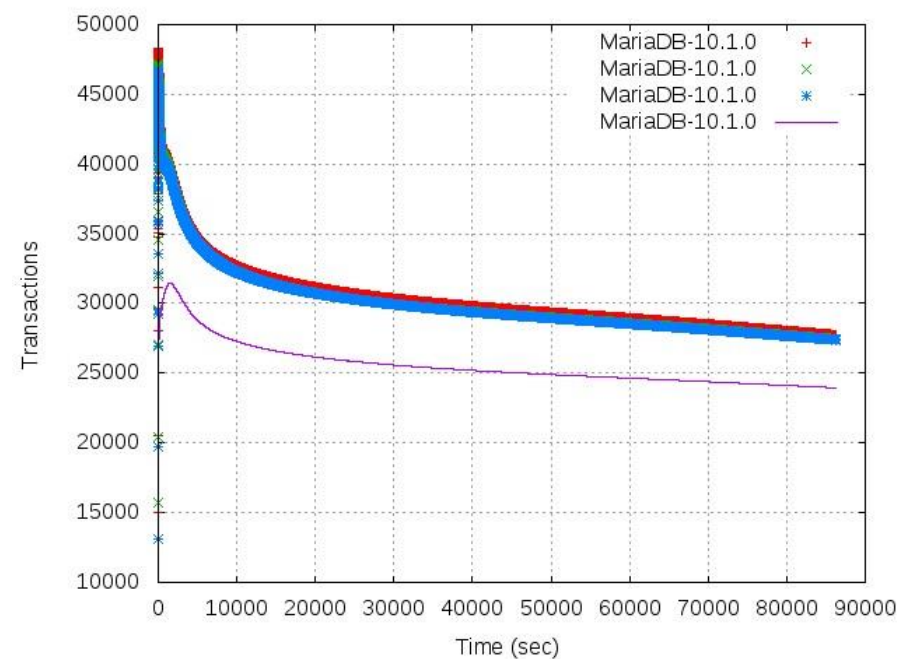
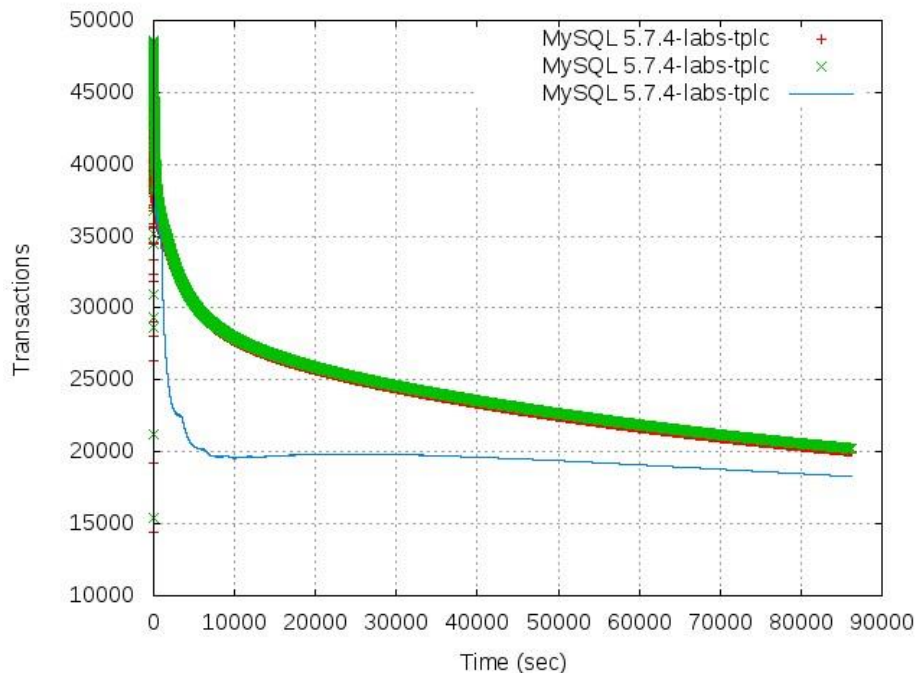


Why Maria?

- Primarily the license
- Performance benefits
- More storage engines
- Ton of optimizer enhancements
- Extensions and new features
 - ▣ KILL feature for runaway queries
 - ▣ Faster join and subquery
 - ▣ SHOW EXPLAIN
 - ▣ Extended user statistics

Maria Performance

- <https://mariadb.org/update-on-performance-measurement-on-mariadb-10-1-and-mysql-5-7-4-labs->



Turbo LAMP Whitepaper

- <https://www.ibm.com/developerworks/community/groups/community/turbolamp>

- Exclusive parallel slave architecture which delivers nearly 10x better cluster replication performance than MySQL. MariaDB 10's advanced replication algorithms will likely deliver an even bigger boost when coupled with the speed and throughput of Mellanox networking in the Turbo LAMP architecture.

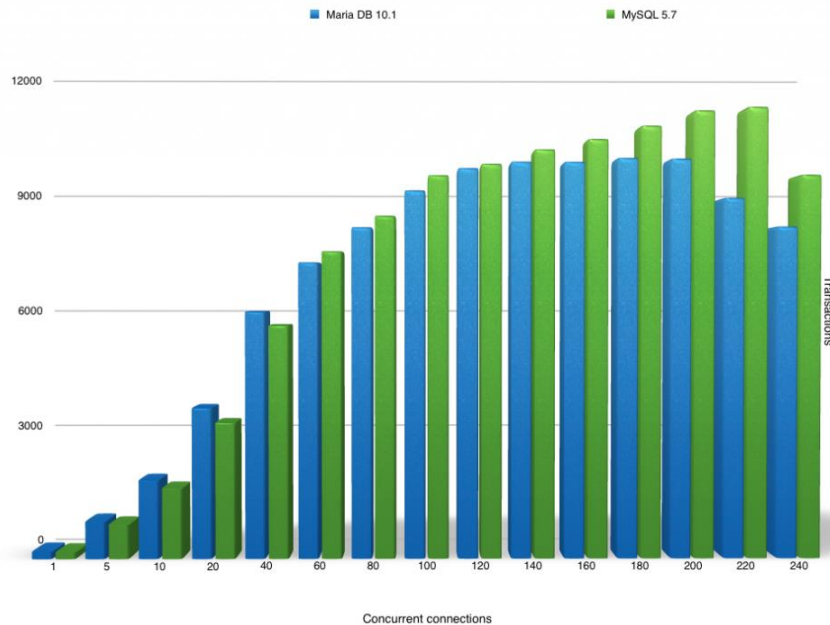
UP TO 10 TIMES FASTER QUERIES

Foedus experienced a significant improvement in the Octopus performance when switching from MySQL 5.6 to MariaDB 10.0. "We realized that one of our longest running queries on MariaDB was almost 10 times faster than the same query executed on MySQL. And once we built the system on MariaDB with IBM POWER8 the execution time of the same query improved from "hours" to "seconds". During this migration the MariaDB team provided us with all the support we needed and was a great back-up for us," said Paolo Messina, CEO of Foedus Group.

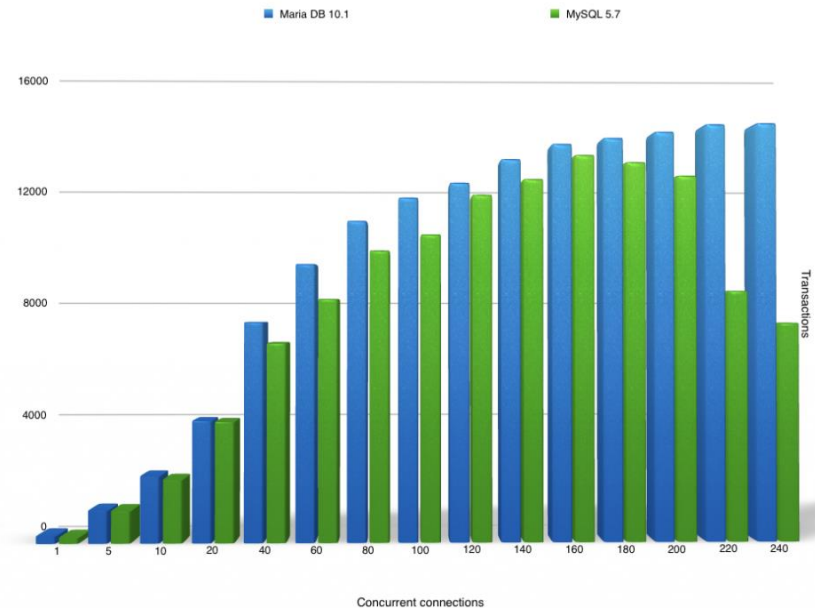
Sofitzy Performance

■ Cache is KING!

MariaDB 10.1 vs MySQL 5.7 on Prestashop 1.6.1.2, no Query Cache



MariaDB 10.1 vs MySQL 5.7 on Prestashop 1.6.1.2, with Query Cache



<https://www.softizy.com/blog/mariadb-10-1-mysql-5-7-performances-ibm-power-8/>

Who is using Maria?

- <http://www.zdnet.com/article/google-quietly-dumps-oracle-mysql-for-mariadb/>

Google quietly dumps Oracle MySQL for MariaDB

Linux distributors have been moving from Oracle's MySQL to its popular fork, MariaDB - and now Google is also moving to MariaDB.

- <http://www.infoworld.com/article/2614268/open-source-software/wikipedia-dumps-mysql--hooks-up-with-mariadb.html>

Wikipedia dumps MySQL, hooks up with MariaDB

Driven by preference for open source software 'without bifurcated code bases,' Wikipedia embraces MariaDB, a MySQL fork free of Oracle baggage

MORE LIKE THIS




SkySQL, MariaDB to merge

Fedora, OpenSuse ditch MySQL, in a

Installation

Download and unzip

- Move zdbisavf10 to local directory
- I use FileZilla...
- Instruction in the quick_reference.txt

Name	Date modified	Type	Size
 quick_reference	3/13/2017 11:37 AM	Text Document	3 KB
 zdbisavf10	3/13/2017 11:37 AM	File	576,558 KB
 ZendDBIUserManual	3/13/2017 11:37 AM	Text Document	8 KB

Create the save file

- Copy text from instructions:

▶ CRTSAVF FILE(QGPL/ZDBISAVF10) TEXT('ZendDBi 10 product save file')

```
                                Create Save File (CRTSAVF)
Type choices, press Enter.
Save file . . . . . > ZDBISAVF10      Name
Library . . . . . > QGPL             Name, *CURLIB
Text 'description' . . . . . > 'ZendDBi 10 product save file'

F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
F13=How to use this display   F24=More keys
```

After FTP...

- Check the SAVF: DSPSAVF FILE(QGPL/ZDBISAVF10)

Display Saved Objects

Library saved : QTEMP

Type Options, press Enter.
5=Display

Opt	Object	Type	Attribute	Owner	Size (K)	Data
—	QM.0001	*FILE	SAVF	QSYS	444	YES
—	QM.0002	*FILE	SAVF	QSYS	549400	YES
—	QLPSVPRDDA	*DTAARA		QSYS	8	YES

F3=Exit F11=Alternate view F12=Cancel F16=Display header

Bottom

MA A MW 09/003

Start the install

- RSTLICPGM LICPGM(1ZENDDDB) DEV(*SAVF) SAVF(QGPL/ZDBISAVF10)

```
Zend Technologies Ltd. - Welcome
System: I71SALES
Please read the documentation and License Agreement.
You are about to install ZendDBi product.
This installation procedure will create
o MYSQL User Profile
o ZMARIADB ZendDBI Library
o mariadb and mariadbdata dir will be placed under /usr/local
o Auto start jobs in ZENDDBI10 subsystem
o Note: ZendDBi default port is 3306
F3=Exit Enter=Accept
Copyright Zend Technologies LTD (2016)
Bottom
01/001
```

License

```
Zend Technologies Ltd. - License                                System:  I71SALES

GNU GENERAL PUBLIC LICENSE   Version 2, June 1991
Copyright (C) 1989, 1991 Free Software Foundation, Inc.,
51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA
Everyone is permitted to copy and distribute verbatim copies
of this license document, but changing it is not allowed.
Preamble

The licenses for most software are designed to take away your
freedom to share and change it.  By contrast, the GNU General Public Lic
ense
is intended to guarantee your freedom to share and change free
software--to make sure the software is free for all its users.  This
General Public License applies to most of the Free Software
Foundation's software and to any other program whose authors commit to
using it.  (Some other Free Software Foundation software is covered by
the GNU Lesser General Public License instead.)  You can apply it to
your programs, too.

When we speak of free software, we are referring to freedom, not

F3=Exit  Enter=Accept                                         More...

MÄ  A  MW  01/001
```

```
Date: 3/13/17      ZendDBi Service Port Update      System: I71SALES
Time: 15:36:08

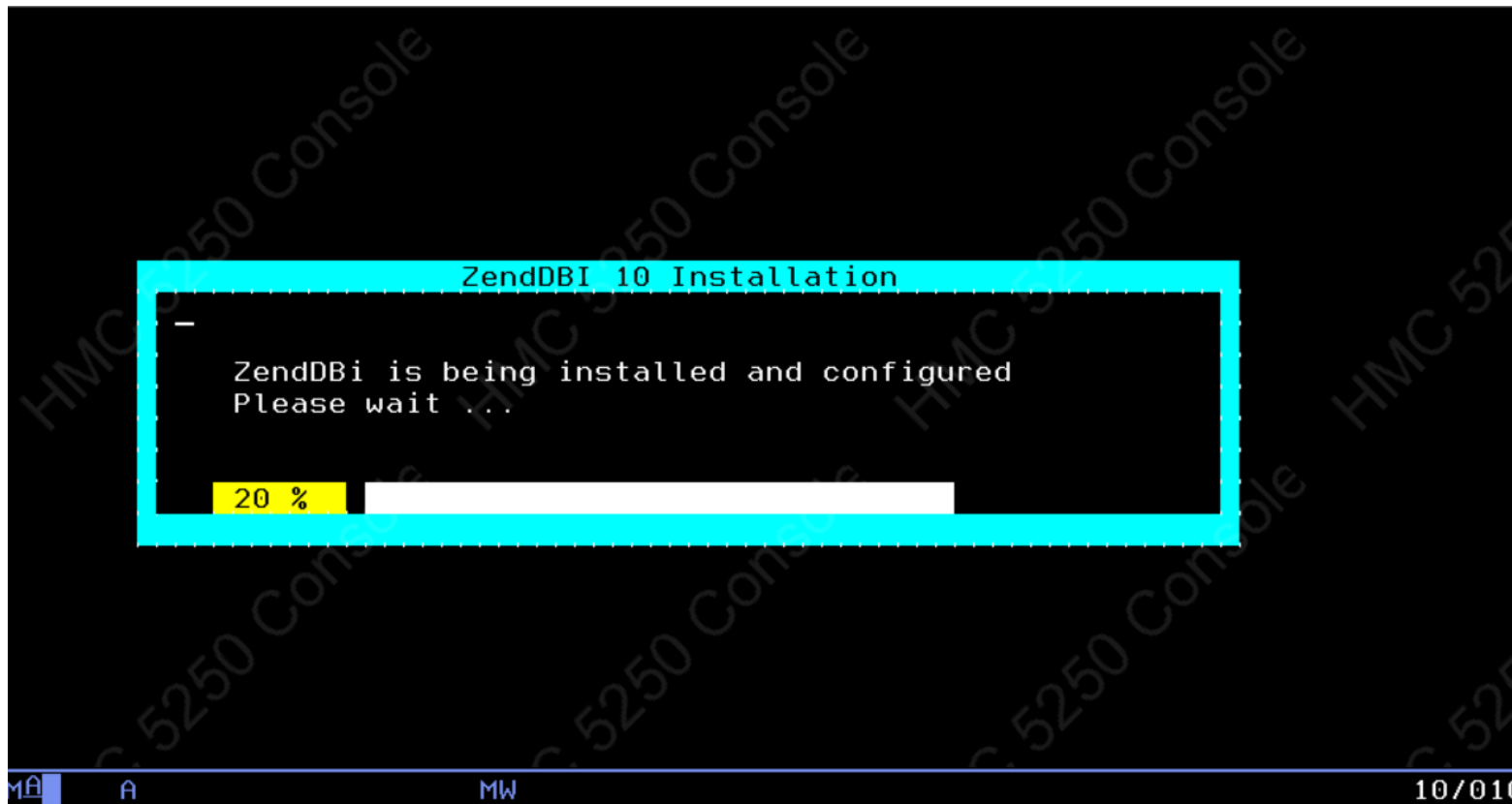
Port 3306 is in use by an existing MySQL installation

Please choose another port on which the ZendDBi service will listen

Enter port number: 3307

F3=Exit          F10=Update and Exit

MA A MW 09/045
```





Date: 3/13/17 ZendDBi Installation System: I71SALES
Time: 16:13:15

Thank you for installing ZendDBi

ZendDBi is installed in the ZMARIADB library and
/usr/local/mariadb directory using TCP/IP port 3307

Note: Press Enter to start ZENDDBI10 subsystem. Otherwise press F3

In order to manage and configure ZendDBi services use STRZDBI command or
GO ZMARIADB/ZDBMENU

F3=Exit Enter=Accept

Copyright Zend Technologies Ltd (2016)


```
Display Installed Licensed Programs

System: I71SALES

Licensed Program    Installed Status    Description
5770WDS             *COMPATIBLE    ILE COBOL *PRV Compiler
5770WDS             *COMPATIBLE    ILE C
5770WDS             *COMPATIBLE    ILE C++
5770WDS             *COMPATIBLE    IXLC for C/C++
5770WDS             *COMPATIBLE    Workstation Tools - Base
5770XE1             *COMPATIBLE    IBM i Access for Windows
5770XW1             *COMPATIBLE    IBM i Access Family
5770XW1             *COMPATIBLE    IBM i Access Enablement Support
1ZENDDDB            *INSTALLED     ZendDBI for IBM i 10.1.19
2ZSVRPI             *INSTALLED     Zend Server for IBM i 5.6.0 ( PHP 5.3 )
6ZSVRPI             *INSTALLED     Zend Server for IBM i 8.5.6 ( PHP 5.6 )

Press Enter to continue.

F3=Exit  F11=Display release  F12=Cancel  F19=Display trademarks

Bottom

01/001
```

Menu access

■ STRZDBI or GO ZMARIADB/ZCMYSQL

```
ZDBMENU                               ZendDBi Management Menu                               System: I71SALES
Select one of the following:

Subsystem Management (ZendDBi10)
  1. Start Subsystem
  2. Stop Subsystem
  3. Work with Subsystem

Service Management
  10. Start ZendDBi Service
  11. Stop ZendDBi Service

Configuration
  20. Work with MY.CNF configuration file
  21. ZendDBi subsystem action at IPL

Selection or command
===>
F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel
F13=Information Assistant   F16=System main menu

MA  A  MW  21/007
```

Job in Subsystem

```

Work with Active Jobs
                                03/13/17 16:35:19
CPU %: 116.3   Elapsed time: 05:15:11   Active jobs: 224

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
---  ---
  1  ZENDDBI        QSYS      SBS    .0      DEQW
  2  ZENDDBI        QSYS      SBS    .0      DEQW
  3  ZENDDBI10      QSYS      SBS    .0      DEQW
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220  ZENDDBI10      QSYS      SBS    .0      DEQW
221  ZENDDBI        QSYS      SBS    .0      DEQW
222  ZENDDBI        QSYS      SBS    .0      DEQW
223  ZENDDBI10      QSYS      SBS    .0      DEQW
224  ZENDDBI10      QSYS      SBS    .0      DEQW

Parameters or command
===>
F3=Exit   F5=Refresh   F7=Find   F10=Restart statistics
F11=Display elapsed data  F12=Cancel  F23=More options  F24=More keys

Bottom
  
```

Access – Command Line

Monitor

- Maria, like MySQL, has no native GUI interface
- Command line accessible form
 - ▣ SSH
 - ▣ QSHELL
 - ▣ QP2TERM
- Natural method for access, fully documented at Maria site
- Many books on subject (apply here, as well)

Using the native 5250

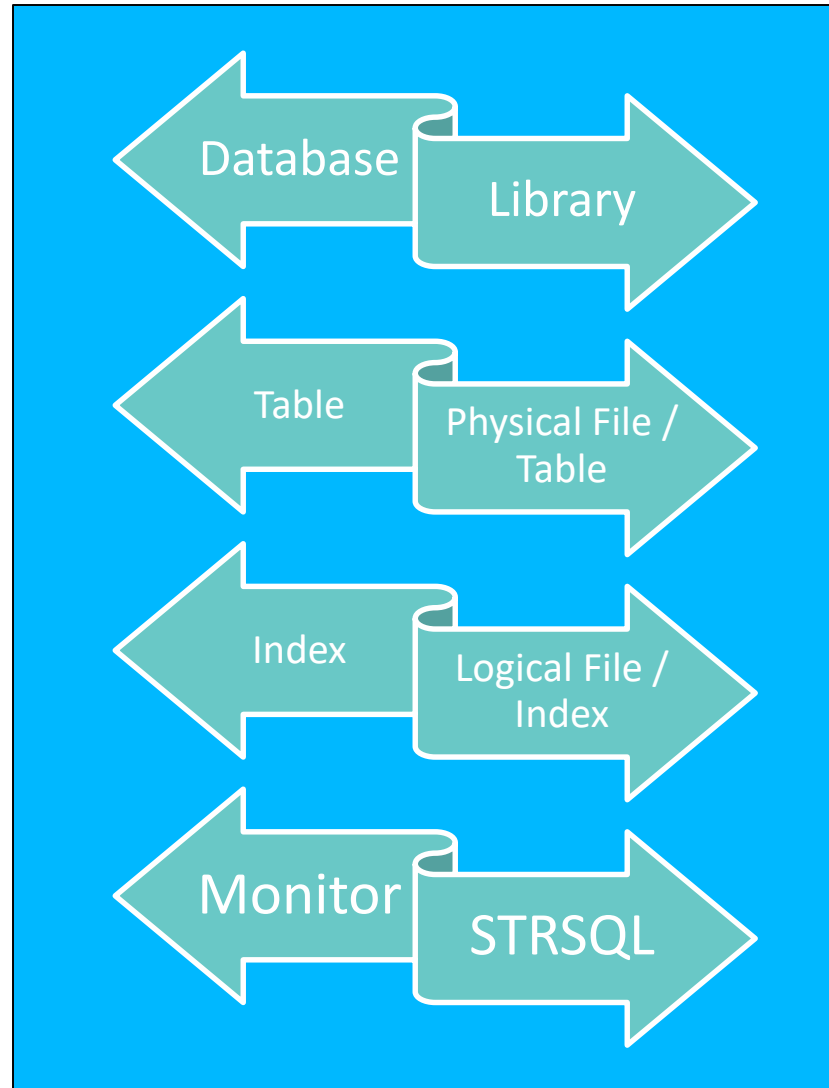
- CALL QP2TERM or QSH
- cd /usr/local/mariadb/bin
- To start the monitor: mysql -u root

```
> cd /usr/local/mariadb/bin
$
> mysql -u root
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 4
Server version: 10.1.21-MariaDB Source distribution

Copyright (c) 2000, 2016, Oracle, MariaDB Corporation Ab and others.
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement
.

MariaDB [(none)]>
===>
```

MySQL to DB2 Terminology



Can issue MySQL commands

- Show Databases
- Then switch to a default DB kind of like CHGCURLIB
 - ▶ Selects the DB you will use for session
 - ▶ Don't forget semicolon

```
> show databases;
+-----+
| Database |
+-----+
| information_schema |
| mysql          |
| performance_schema |
| test           |
+-----+
4 rows in set (0.00 sec)
```

```
MariaDB [(none)]>
```

```
> use mysql;
```

```
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A
```

```
Database changed
MariaDB [mysql]>
```


Show tables

- This command list tables in the database selected by the “use” statement.

```
Database changed
MariaDB [mysql]>
> show tables;
```

```
+-----+
| Tables_in_mysql |
+-----+
| column_stats    |
| columns_priv    |
| db               |
| event           |
| func            |
| general_log      |
+-----+
```

Show some data

- Any MySQL compatible SQL statement can be processed here

```
> select host, user,password from user;
+-----+-----+-----+
| host          | user  | password |
+-----+-----+-----+
| localhost     | root  |          |
| sales1.cvo.roguewave.com | root  |          |
| 127.0.0.1     | root  |          |
| ::1           | root  |          |
| localhost     |       |          |
| sales1.cvo.roguewave.com |       |          |
+-----+-----+-----+
6 rows in set (0.00 sec)

MariaDB [mysql]>
```

End monitor

- This works really well, but is a little clunky.
- Let's get out of here and on to something a little more GUI

```
MariaDB [mysql]>  
> quit;  
Bye  
$
```

Maria Options

- Maria can install on clean LPAR and listen on port 3306
 - ▣ Install LP and go
- Maria can install side by side with older version of MySQL
 - ▣ Installer will ask you for another port (3307)
 - ▣ Export data from MySQL, import into Maria, test, go

Details on deleting MySQL

■ Steps for a clean removal

- ▶ ENDSBS ZMYSQL OPTION(*IMMED)
- ▶ DLTLIB ZMYSQL
- ▶ CALL QP2TERM
- ▶ `rm -f /usr/local/mysql`
- ▶ `rm -r -f /usr/local/mysql-5.1.50-i5os-power-64bit`
- ▶ `rm -r -f /user/local/mysqldata`
- ▶ `rm -f /etc/my.cnf`
- ▶ `rm -f /tmp/mysql.sock`



**Thanks
Rod!**

Access - GUI

Many GUI solutions, here's a couple

■ PHP Based

Adminer 3.3.4

▶ Adminer

- Single script
- Lightweight, powerful, easy to use

▶ phpMyAdmin

- Widely used and supported by community
- Installable with Zend Server



Adminer – <http://www.adminer.org/>

- Open source and lightweight
- All code in a single script

Language: English ▼

MySQL » [Server](#) » Database: a264133_9f2rp027

Adminer 3.3.4

[SQL command](#) [Dump](#) [Logout](#)

a264133_9f2rp027 ▼

[Create new table](#)

[select albums](#)
[select interprets](#)
[select songs](#)

[Alter database](#) [Database schema](#) [Privileges](#)

Tables and views

Search data in tables: [Search](#)

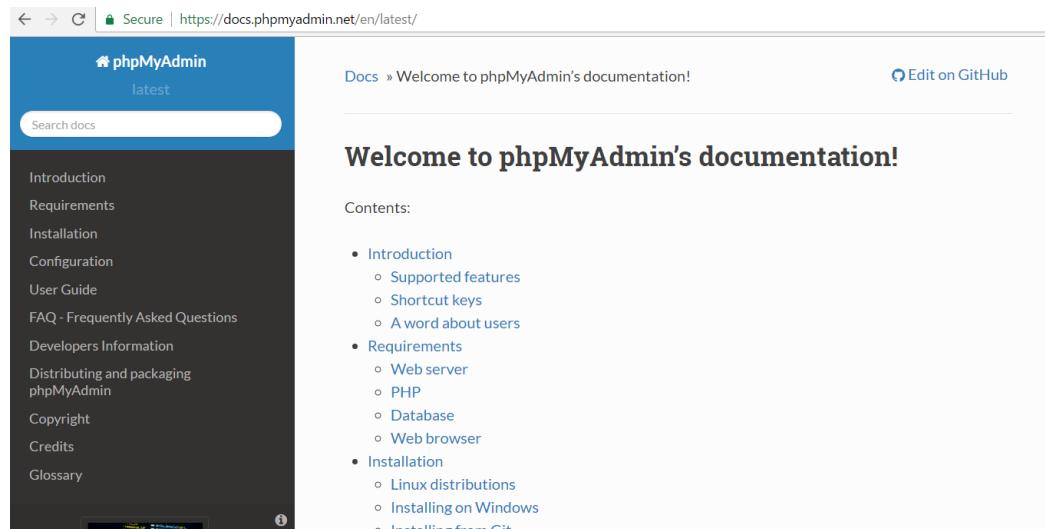
<input type="checkbox"/>	Table	Engine	Collation	Data Length	Index Length	Data Free	Auto Increment	Rows	Comment
<input type="checkbox"/>	albums	InnoDB	utf8_general_ci	16,384	16,384	0	2	~ 1	Albums
<input type="checkbox"/>	interprets	InnoDB	utf8_general_ci	16,384	0	0	2	~ 1	Interprets
<input type="checkbox"/>	songs	InnoDB	utf8_general_ci	16,384	16,384	0	15	~ 14	Songs
	3 in total	MyISAM	utf8_general_ci	49,152	32,768	0			

[Analyze](#) [Optimize](#) [Check](#) [Repair](#) [Truncate](#) [Drop](#)

Move to other database: a264133_9f2rp027 ▼ [Move](#) [Copy](#)

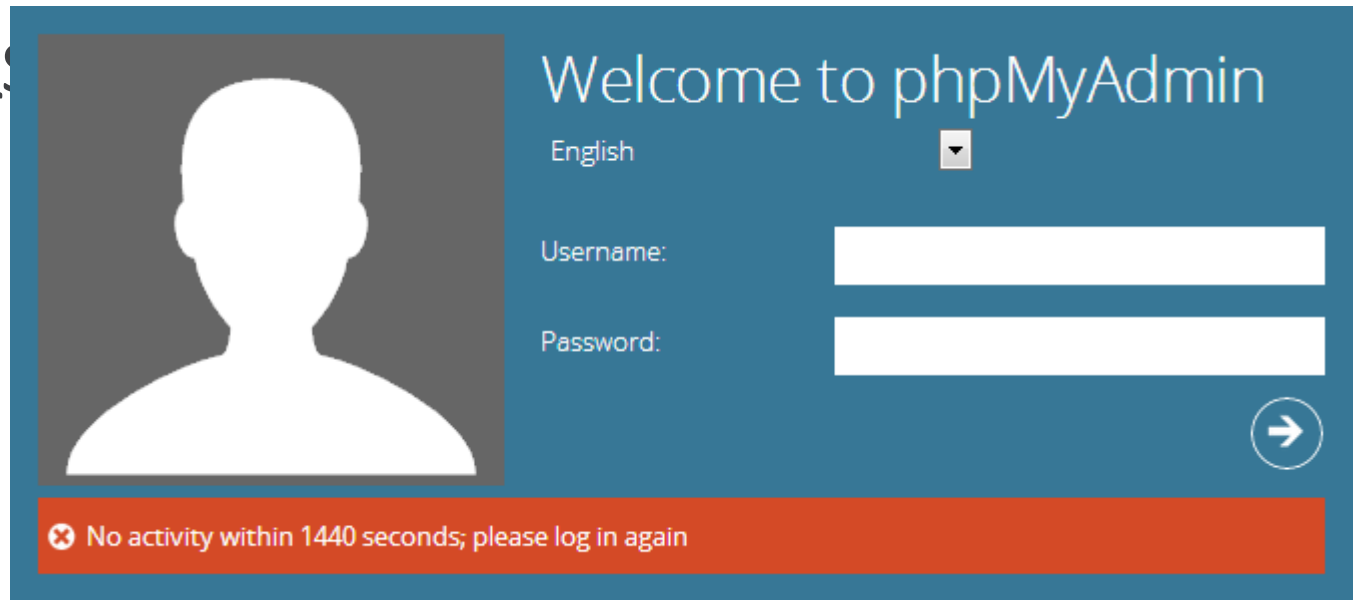
phpMyAdmin

- Open Source PHP Project
- Provides nearly every access to MySQL, including command line
- Can be deployed from Zend Server admin GUI
- Documentation at <https://docs.phpmyadmin.net/en/latest/>



phpMyAdmin – Password management

- Log in with “root” profile (no password, initially)
- Create your profile
- Test your profile
- Change “root” password IMMEDIATELY is not sooner
- Similar to Q\$



Welcome to phpMyAdmin

English ▼

Username:

Password:

→

⊗ No activity within 1440 seconds; please log in again

The dashboard...then on to users

The screenshot displays the phpMyAdmin interface. On the left is a sidebar with the 'phpMyAdmin' logo and a list of recent tables (PHP01 to PHP16). The main content area is titled '127.0.0.1:3306' and features a navigation bar with links: Databases, SQL, Status, Users, Export, Import, Settings, and More. The 'Settings' link is active, showing four sections:

- General Settings**: Includes 'CHANGE PASSWORD' and 'SERVER CONNECTION COLLATION' set to 'utf8_general_ci'.
- Appearance Settings**: Includes 'LANGUAGE' set to 'English' and 'THEME' set to 'metro'. A 'MORE SETTINGS' link is also present.
- Database server**: Lists server details: Server: 127.0.0.1 via TCP/IP, Software: MySQL, Software version: 5.1.59 - MySQL Community Server (GPL), Protocol version: 10, User: mpavlak@localhost, and Server charset: UTF-8 Unicode (utf8).
- Web server**: Lists web server details: Apache, Database client version: libmysql - mysqlnd 5.0.10 - 20111026 - \$Id: e707c415db32080b3752b232487a435ee03...\$, and PHP extension: mysqli.

The 'phpMyAdmin' logo is also visible at the bottom right of the main content area.

Users

- Click “Add user”
- Fill out details

ADD USER

Add user

User name: Use text field:

Host: Any host ⓘ

Password: Use text field:

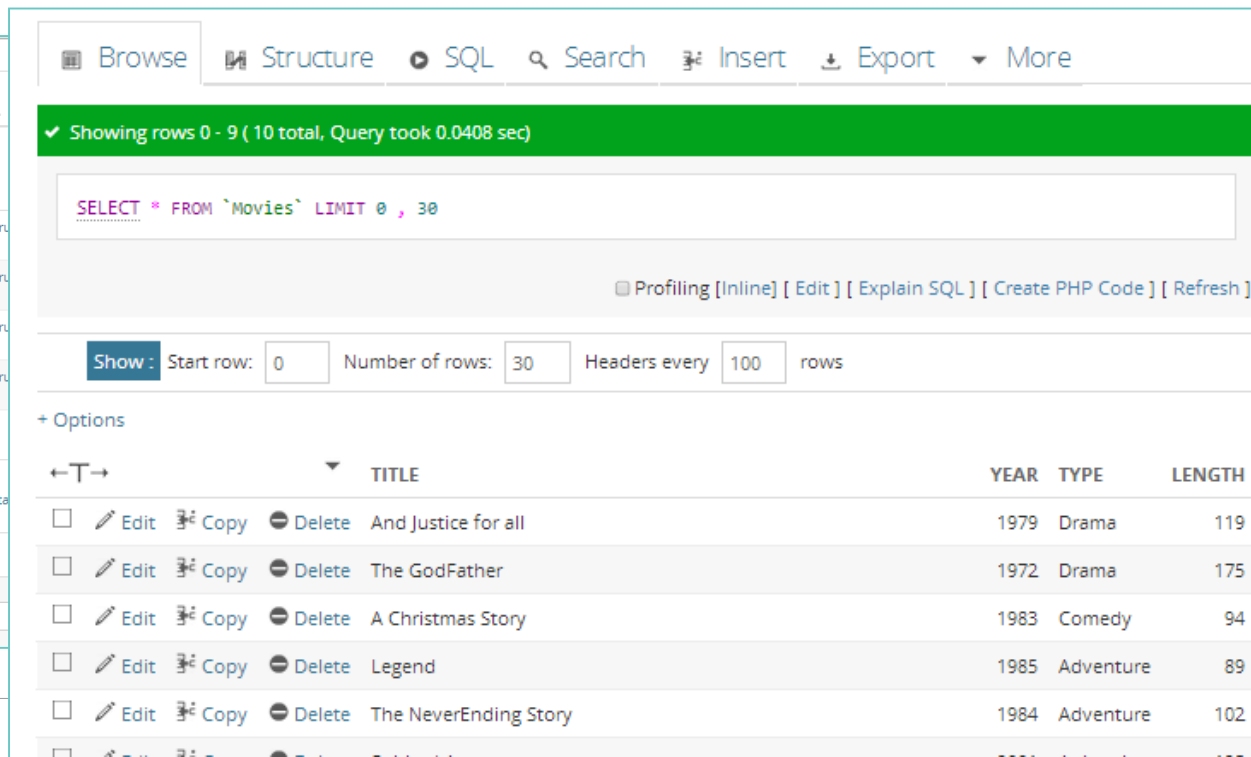
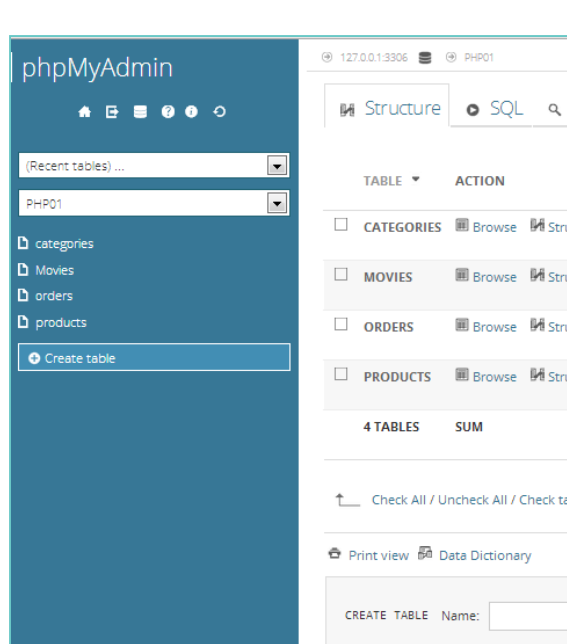
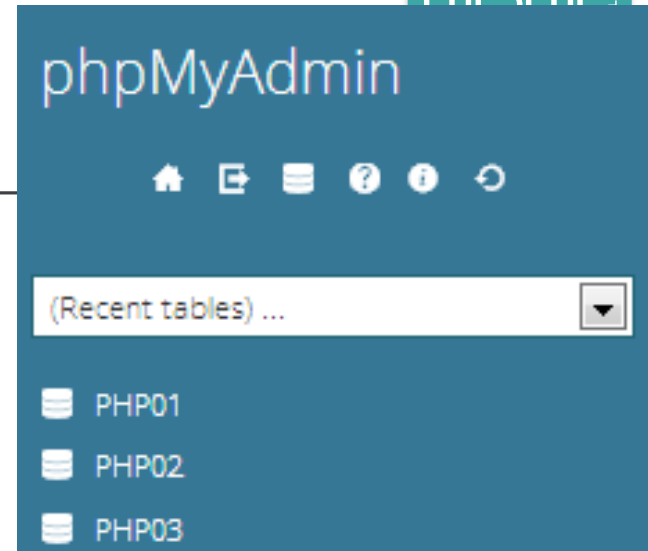
Re-type:

Generate password:

☒ None ☐ Create database with same name and grant all privileges ☐ Grant all privileges on wildcard name (username_%)

Lok at database and tables

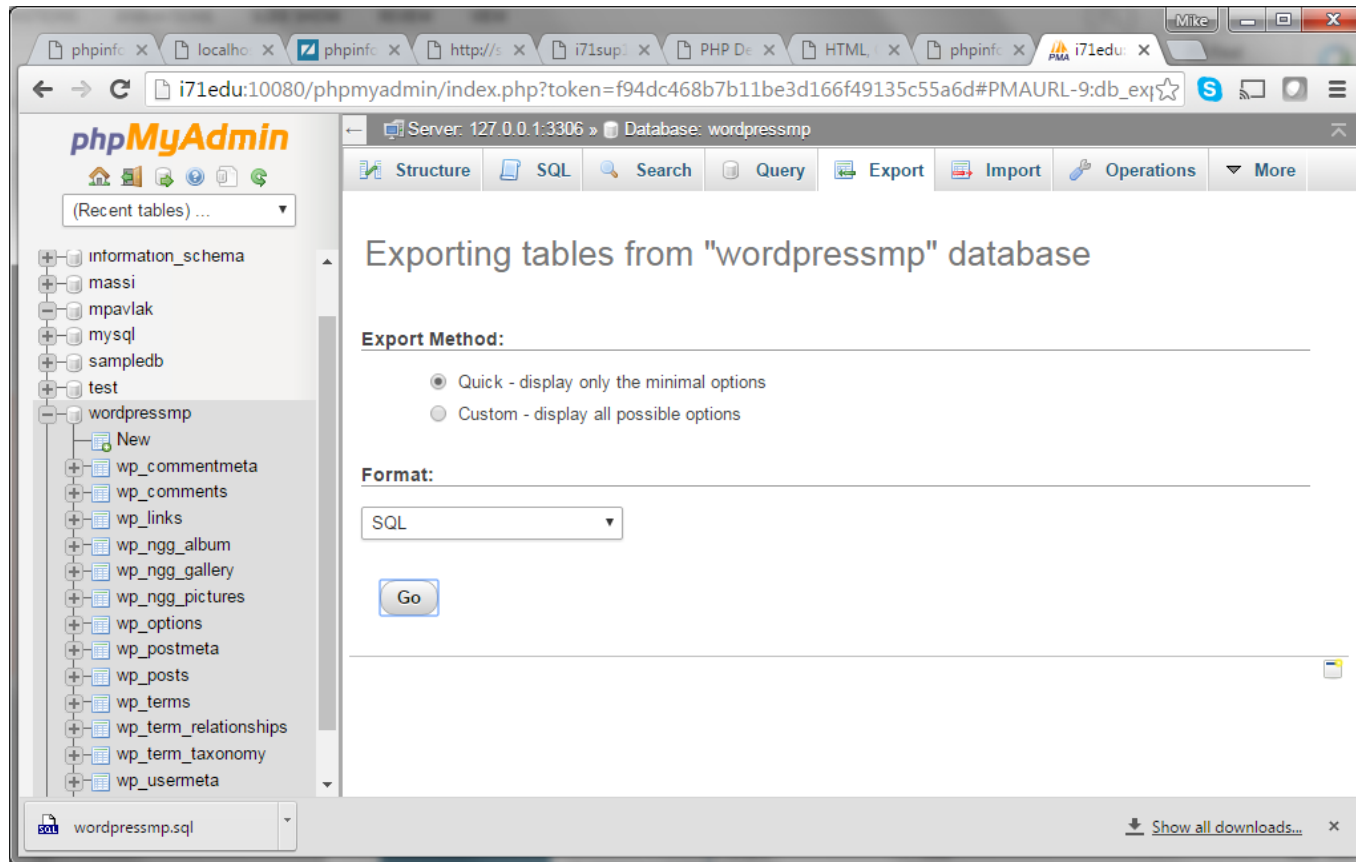
- Left hand navigation
- Right hand work space
- FULL CRUD capabilities (DBU for Maria)



Data Migration

Export data using phpMyAdmin

- Navigate to the database/table and click export

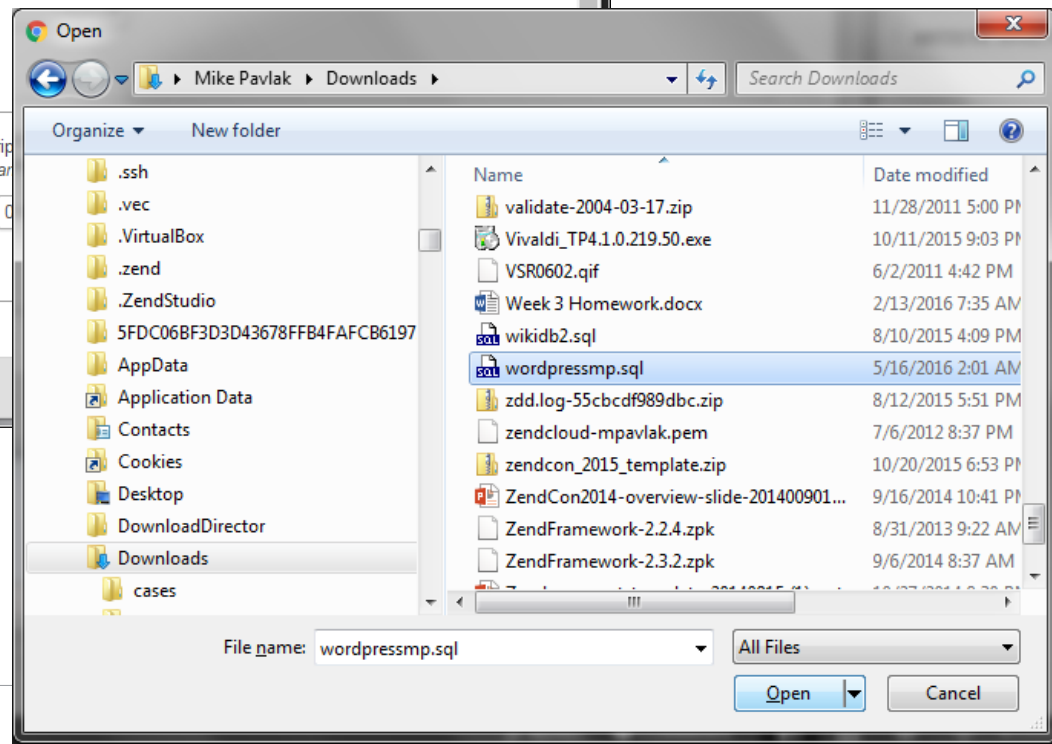
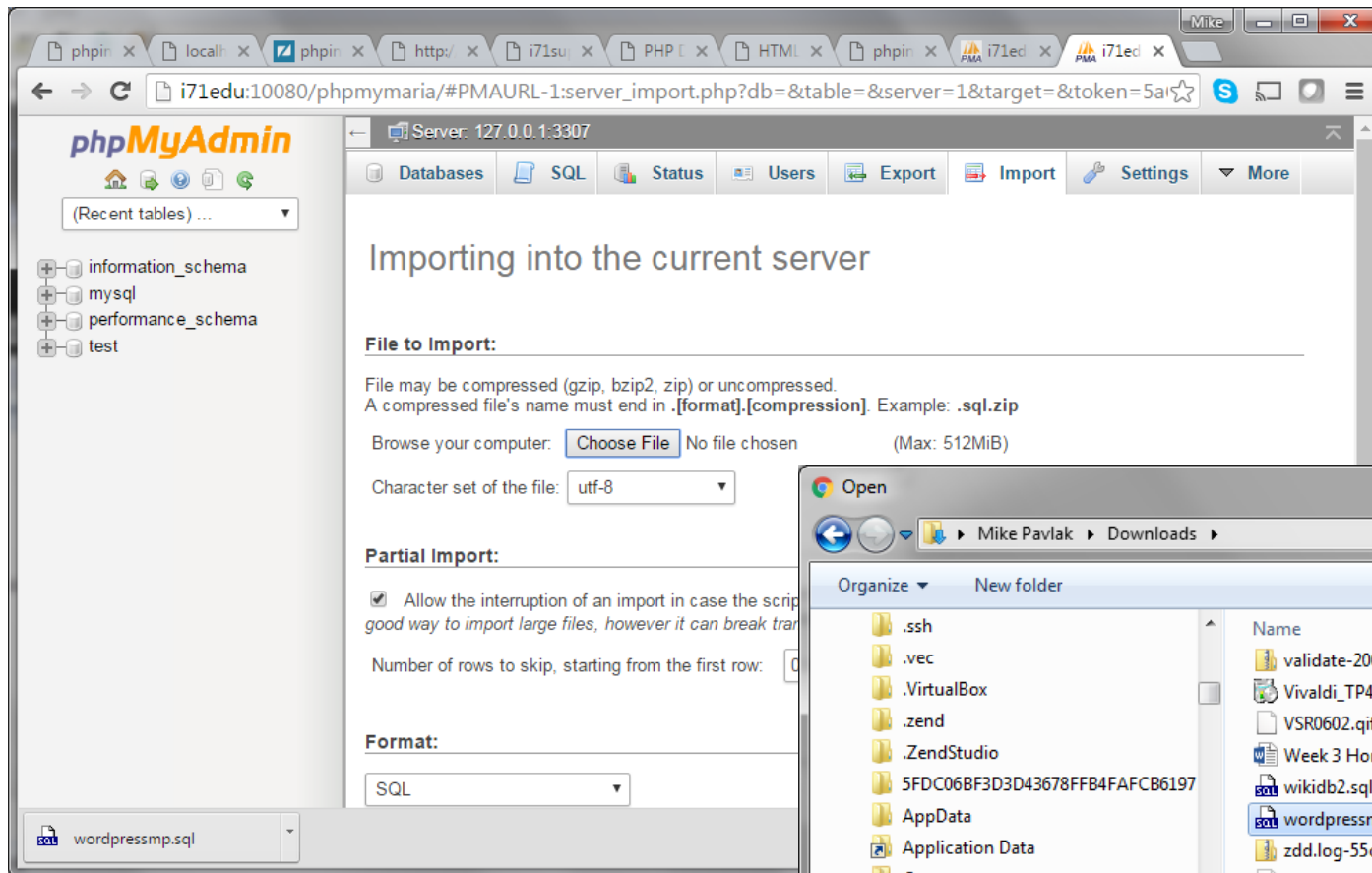


Exported tables look like SQL

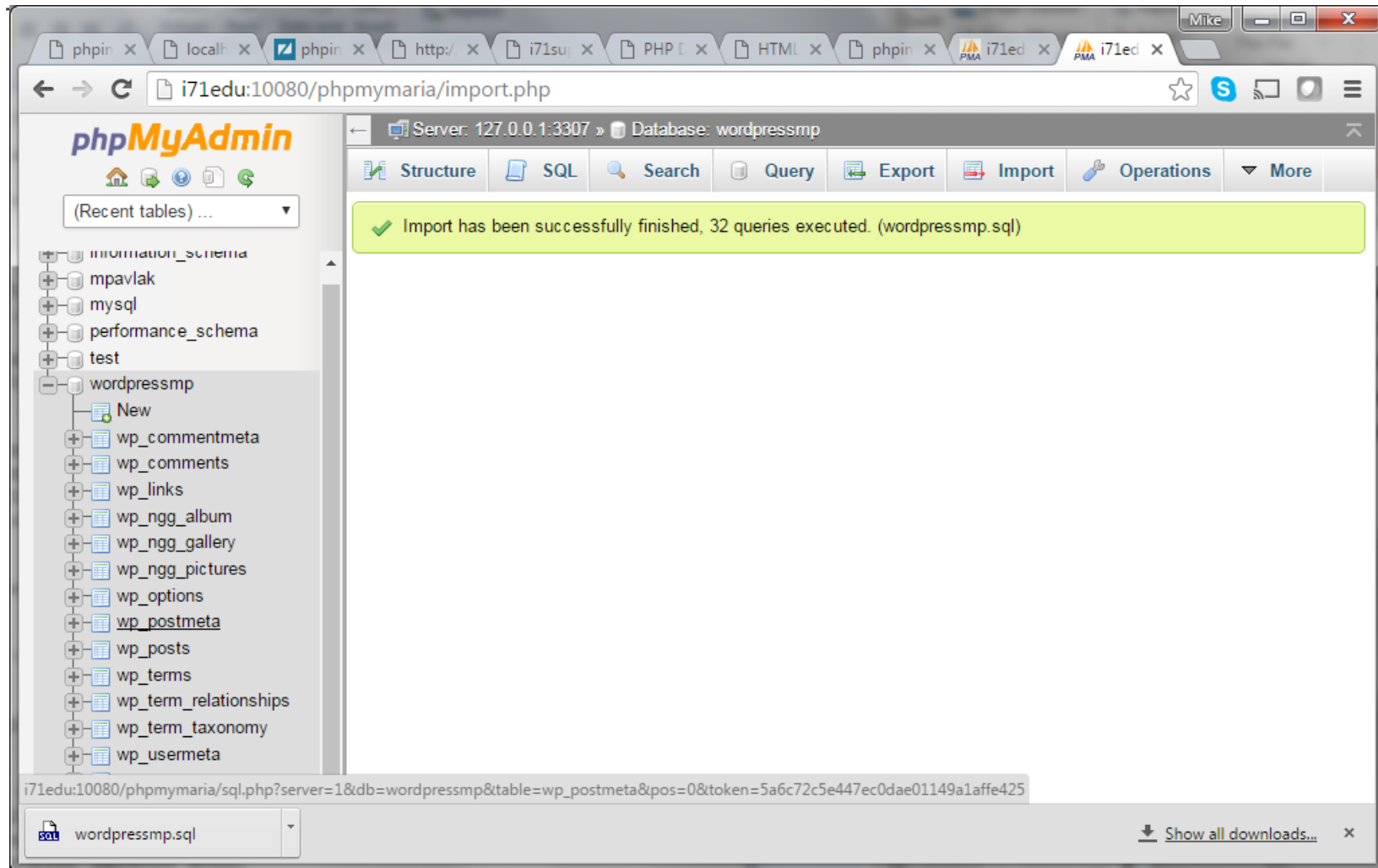
- Process uses SQL as the meta language
- No savobj/rstobj

```
CREATE TABLE IF NOT EXISTS `wp_comments` (  
  `comment_ID` bigint(20) unsigned NOT NULL AUTO_INCREMENT,  
  `comment_post_ID` bigint(20) unsigned NOT NULL DEFAULT '0',  
  `comment_author` tinytext NOT NULL,  
  `comment_author_email` varchar(100) NOT NULL DEFAULT '',  
  `comment_author_url` varchar(200) NOT NULL DEFAULT '',  
  `comment_author_IP` varchar(100) NOT NULL DEFAULT '',  
  `comment_date` datetime NOT NULL DEFAULT '0000-00-00 00:00:00',  
  `comment_date_gmt` datetime NOT NULL DEFAULT '0000-00-00 00:00:00',  
  `comment_content` text NOT NULL,  
  `comment_karma` int(11) NOT NULL DEFAULT '0',  
  `comment_approved` varchar(20) NOT NULL DEFAULT '1',  
  `comment_agent` varchar(255) NOT NULL DEFAULT '',  
  `comment_type` varchar(20) NOT NULL DEFAULT '',  
  `comment_parent` bigint(20) unsigned NOT NULL DEFAULT '0',  
  `user_id` bigint(20) unsigned NOT NULL DEFAULT '0',  
  PRIMARY KEY (`comment_ID`),  
  KEY `comment_post_ID` (`comment_post_ID`),  
  KEY `comment_approved_date_gmt` (`comment_approved`,  
  `comment_date_gmt`),  
  KEY `comment_date_gmt` (`comment_date_gmt`),  
  KEY `comment_parent` (`comment_parent`),  
  KEY `comment_author_email` (`comment_author_email`(10))  
) ENGINE=MyISAM DEFAULT CHARSET=utf8 AUTO_INCREMENT=2 ;  
  
--  
-- Dumping data for table `wp_comments`  
--  
  
INSERT INTO `wp_comments` (`comment_ID`, `comment_post_ID`,  
  `comment_author`, `comment_author_email`, `comment_author_url`,
```


Now import into Maria



Was it OK?



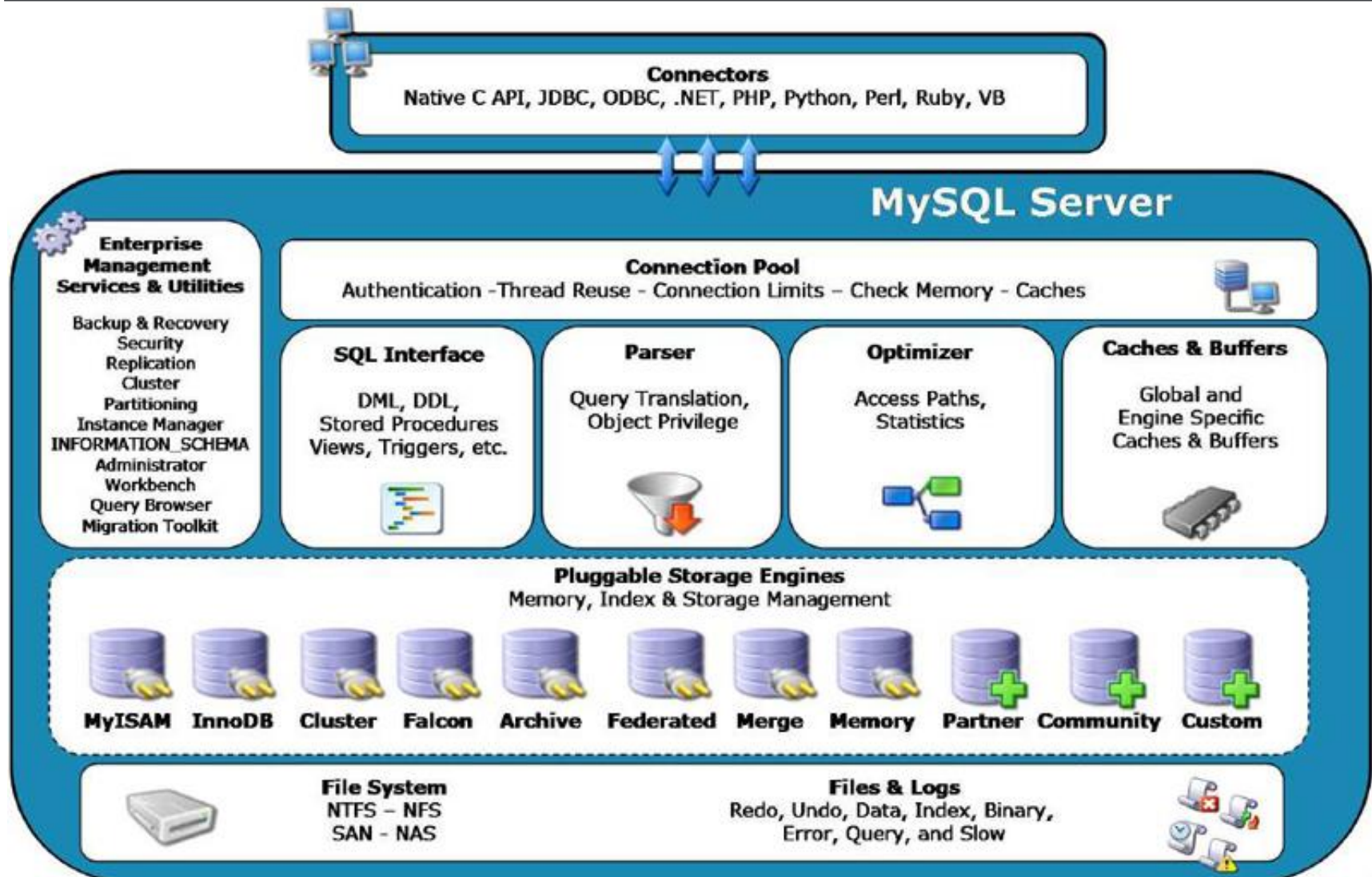
IBM DB2 Storage Engine

Why use MySQL to store data in DB2?

- Many PHP applications in the open source arena
- Can be easily installed
- Modifying apps to access DB2 can be cumbersome
- ZendDBi includes the Db2 Storage Engine



Architecture



How to install

- From the MySQL Monitor in QP2TERM or QSH

```
MariaDB [(none)]>  
> install plugin ibmdb2i soname "ha_ibmdb2i.so";  
Query OK, 0 rows affected (0.06 sec)  
  
MariaDB [(none)]>
```

```
NO | | NO | NO |  
| IBMDB2I | YES | IBM DB2 for i Storage Engine | YES | NO |  
YES | | | |  
| Aria | YES | Crash-safe tables with MyISAM heritage | NO | NO |  
NO | | NO | NO |
```

IBM DB2 Storage Engine:phpMyAdmin

- Create table, set number of fields
- Select storage engine (drop down)

Table name: Add column(s)

STRUCTURE ⓘ

NAME	TYPE ⓘ	LENGTH/VALUES ⓘ	DEFAULT ⓘ	COLLATION	ATTRIBUTES
<input type="text"/>	INT <input type="button" value="v"/>	<input type="text"/>	None <input type="button" value="v"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	INT <input type="button" value="v"/>	<input type="text"/>	None <input type="button" value="v"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	INT <input type="button" value="v"/>	<input type="text"/>	None <input type="button" value="v"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	INT <input type="button" value="v"/>	<input type="text"/>	None <input type="button" value="v"/>	<input type="text"/>	<input type="text"/>

TABLE COMMENTS:

PARTITION DEFINITION: ⓘ

STORAGE ENGINE: ⓘ

IBMDB2I

InnoDB
MRG_MYISAM
BLACKHOLE
CSV
MEMORY
IBMDB2I
ARCHIVE
MyISAM

COLLATION:

From SQL statement

- Command line or scripted
- Use the parameter option “engine = IBMDB2I

```
CREATE TABLE IF NOT EXISTS `exampleDB2` (  
  `name` varchar(20) NOT NULL,  
  `Address` varchar(20) NOT NULL,  
  `City` varchar(20) NOT NULL,  
  `State` text NOT NULL,  
  `Zip` text NOT NULL  
) ENGINE=IBMDB2I DEFAULT CHARSET=latin1 COMMENT='Customer info';
```


Add records to the table

✓ Showing rows 0 - 3 (4 total, Query took 0.0905 sec)

```
SELECT * FROM `exampleDB2` LIMIT 0 , 30
```

☐ Profiling [Inline] [Edit] [Explain SQL] [Create PHP Code] [Refresh]

Show : Start row: Number of rows: Headers every rows

+ Options

← T →			NAME	ADDRESS	CITY	STATE	ZIP
<input type="checkbox"/>	Edit	Copy	Delete	Sheldon Cooper	Somewhere in CalTech	Pasadena	CA 91051
<input type="checkbox"/>	Edit	Copy	Delete	Leonard Hofstadter	Somewhere Else in Ca	Pasadena	CA 91051
<input type="checkbox"/>	Edit	Copy	Delete	Raj Koothrapali	Sheldons Office at C	Pasadena	CA 91051
<input type="checkbox"/>	Edit	Copy	Delete	Howard Walowitz	Engineering @CatTech	Pasadena	CA 91051

Switch over to emulator and look

- Library “TEST” was created
- Table “EXAMPLEDB2” was created
- Records populated

```
Session A - [24 x 80]

Work with Objects

Type options, press Enter.
 2=Edit authority    3=Copy    4=Delete    5=Display authority    7=Rename
 8=Display description 13=Change description

Opt  Object  Type  Library  Attribute  Text
___  _____  _____  _____  _____  _____

Parameters for options 5, 7 and 13 or command
===>
F3=Exit  F4=Prompt  F5=Refresh  F9=Retrieve  F11=Display names and types
F12=Cancel  F16=Repeat position to  F17=Position to

MA A MW 21/007
```

Records, please?

- STRSQL
- Select * from test/exampleldb2

Display Data

```
Position to line . . . . .
....+....1....+....2....+....3....+....4....+....5....+....6....
NAME                ADDRESS                CITY
Sheldon Cooper      Somewhere in CalTech  Pasadena
Leonard Hofstadter  Somewhere Else in Ca  Pasadena
Raj Koothrapali     Sheldons Office at C  Pasadena
Howard Walowitz      Engineering @CatTech   Pasadena
***** End of data *****
```

Wrap it up

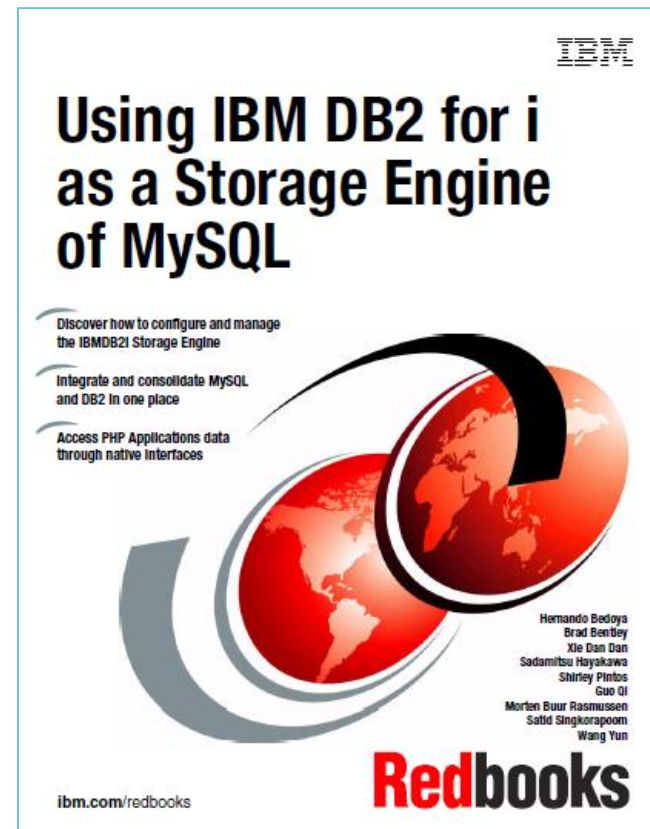
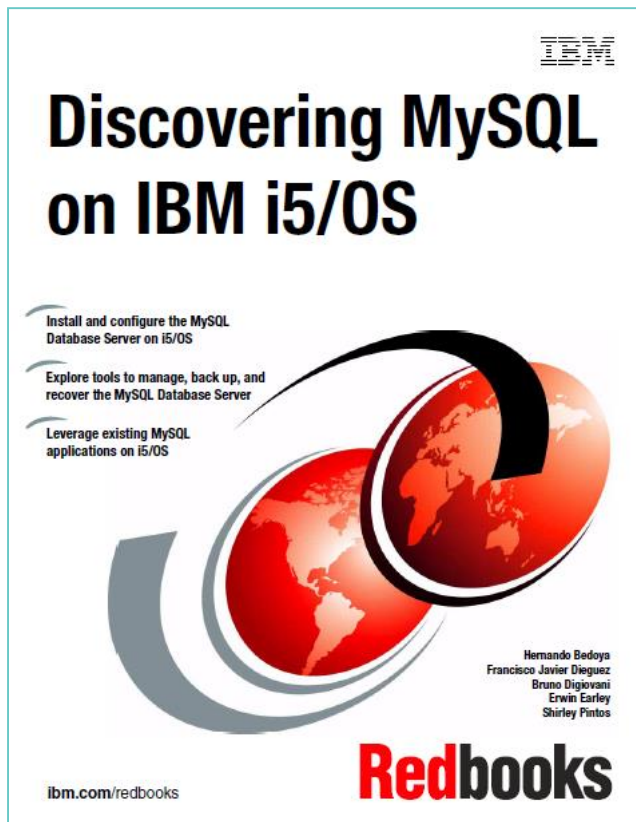
Reminders

- ZendDBi == MySQL == Maria
- Command line or GUI
- root profile
 - ▣ Should have a password
 - ▣ Rarely used
- DB2 Storage Engine available with ZendDBi
 - ▣ Data is actually stored in DB2, not replicated
- Base for thousands of open source applications

IBM Redbook and Redpiece

Discovering MySQL

Using the DB2 Storage Engine



Q&A

www.zend.com

mike.p@zend.com

***Please fill out your Session
Evaluation!***



The image shows a screenshot of a "Zend Academy & Networking Evaluation" form. It includes a header with the Zend logo and title. Below the header, there are several sections for evaluation, each with a list of items and a corresponding grid of checkboxes or rating scales. The sections include "Overall Session Evaluation", "Session Content", "Session Delivery", "Session Materials", and "Session Environment". Each section has a list of specific items to be evaluated, such as "Session Content", "Session Delivery", "Session Materials", and "Session Environment". The form is designed for participants to provide feedback on their session experience.