



by M  YFLOWER

IBM DB2 with PHP 5.2 and AJAX

Zend Conference 2007



Introduction



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- Thorsten Rinne
- Born in 1977
- Graduated in computer sciences
- Project manager at Mayflower GmbH, Munich, Germany
 - Rating and reporting applications
 - Business critical bank applications
- 1999: started PHP programming
- 2001: started the development with the open source FAQ management software **phpMyFAQ** (www.phpmyfaq.de)
- 2002: first contact with IBM DB2
- 2005: porting phpMyFAQ to IBM DB2

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Summary



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- Introduction
- Why IBM DB2 ?
- Differences between IBM DB2 and MySQL
- PHP and PDO_IBM
- AJAX
- Application architecture
- Why PHP 5.2, IBM DB2 and AJAX ?
- Application example
- Q & A

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Why IBM DB2?



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- IBM DB2 is the database for enterprise applications
- Available for z/OS, iSeries, Linux, UNIX, and Windows
- Highly scalable
 - Starts with IBM DB2 Express-C for 2 CPUs
 - Available for systems with more than 64 processors
 - Clustered systems up to 1024 nodes
- Performance leader on Linux (TPC-H)
- Current version: IBM DB2 V.9.1 „Viper“
 - for relational and XML data
 - pureXML™ technology
 - SQL queries und Xquery support

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■ XML objects

- Currently only supported with Unicode databases

- Record type: XML

- INSERTs:

```
CONNECT TO ZENDCONF;  
INSERT INTO presenters VALUES (42,  
    '<presenter>Thorsten Rinne</presenter>');
```

- SELECTs:

```
SELECT name FROM clients  
WHERE  
    XMLEXISTS('$c/Client/Address[zip="12345"]'  
PASSING clients.contactinfo AS "c");
```

Differences IBM DB2 vs. MySQL



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| SQL:

LIMIT

| PHP:

`mysql_insert_id()`

| PHP:

`mysql_num_rows()`

| SQL:

auto_increment

| SQL:

FETCH FIRST n ROWS

| SQL:

SELECT

IDENTITY_VAL_LOCAL()

FROM SYSIBM.SYSDUMMY1;

PHP: since PECL PDO_IBM 1.2.1:

`PDO::lastInsertId()`

| PHP:

`db2_num_rows()` (works for
SELECT statements only when
using scrollable cursors!)

| SQL:

GENERATED BY DEFAULT AS
IDENTITY

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IBM DB2 and PHP



- | PHP offers four extensions
 - | ODBC with **ext/odbc**
 - | native extension for IBM DB2 and Cloudscape with **ext/ibm_db2**
 - | **PDO_ODBC**
 - | **PDO_IBM**
- | Open Source
- | Download:
 - | <http://pecl.php.net>
 - | <http://pecl4win.php.net>
- | Installation:
 - | <http://de.php.net/install.pecl>

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PHP and PDO_IBM: Summary



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- Fast, easy and C based standard interface for PHP
- PDO plugins for various database systems
 - IBM DB2, MySQL, PostgreSQL, SQLite, Oracle, ODBC
- PDO_IBM will be compiled against the generic IBM DB2 libraries
- Object orientated
- support for iterators
- PDO...
 - ... included since PHP 5.1
 - ... Windows DLLs available

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PHP and PDO_IBM: Features



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- Support for prepared statements
- Return of SQL error codes
- Features for database portability
- support for transactions
- Scrollable Cursors
- Support for PHP error handling and exceptions
- Planned: Support for LOBs (large binary objects)

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PHP and PDO_IBM: Example



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```
<?php
    try {
        $db = new PDO('ibm:DRIVER={IBM DB2 ODBC DRIVER};HOST
NAME=localhost;PORT=50000;DATABASE=FAQ;PROTOCOL=TCPIP;UI
D=db2admin;PWD=db2admin');

        $stmt = $db->prepare('SELECT * FROM user');
        $stmt->setFetchMode(PDO::FETCH_NAMED);
        $stmt->execute();

        while ($row = $stmt->fetch()) {
            var_dump($row);
        }

        $db = null;
    } catch (PDOException $e) {
        print "Error: " . $e->getMessage() . "<br />";
        die();
    }
}
```

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AJAX: Introduction



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- Acronym for *Asynchronous JavaScript and XML*
- Various web technologies:
 - (X)HTML and CSS
 - DOM (Document Object Model)
 - JavaScript
 - XMLHttpRequest object
- Types of transfer
 - SOAP
 - REST
 - JSON



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AJAX: Example with Prototype



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```
<script>
function getHTML() {
var url = 'http://yourserver/app/getSomeHTML';
var pars = 'someParameter=ABC';
var myAjax = new Ajax.Updater('placeholder', url, {
    method: 'get',
    parameters: pars});
}
</script>

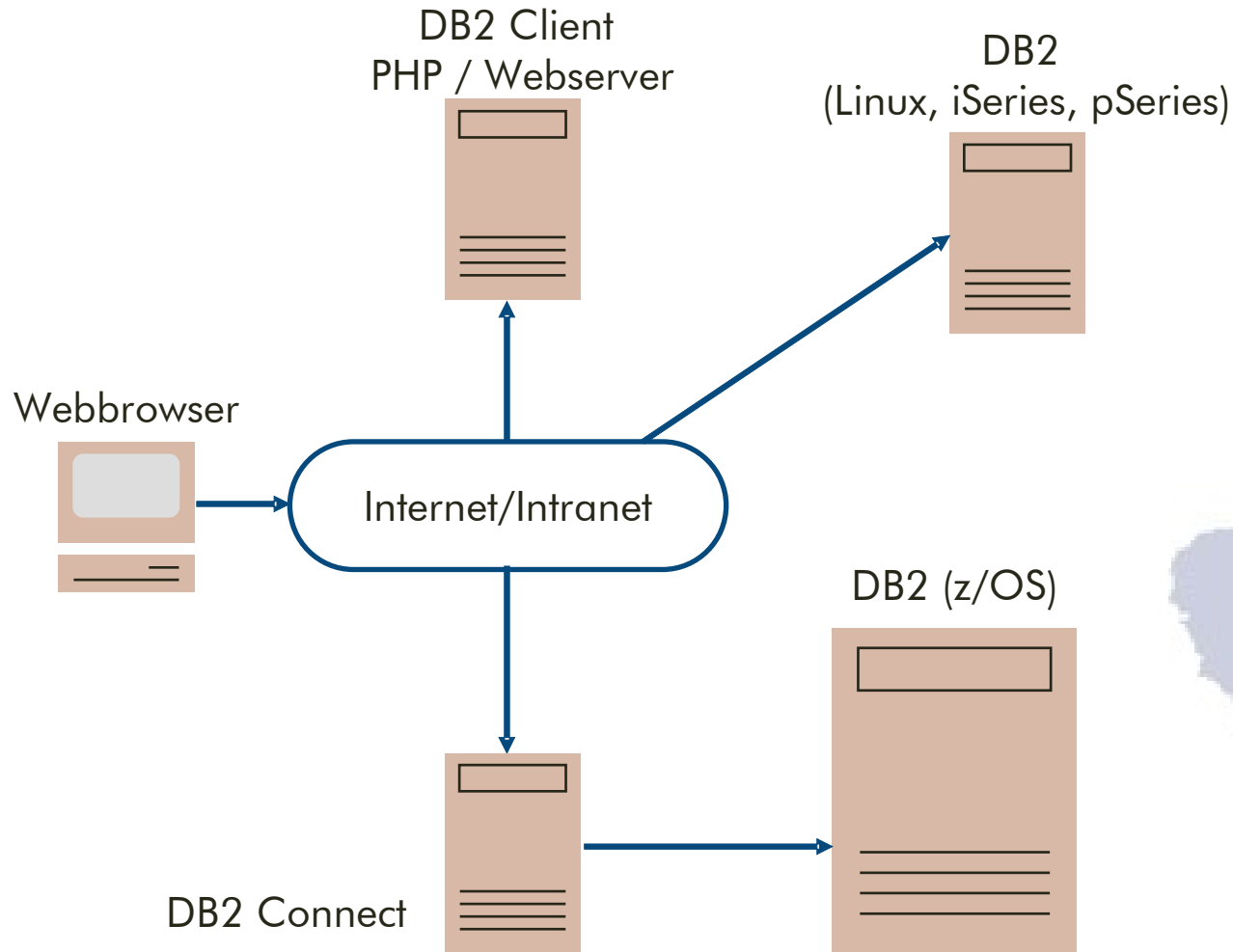
<input type="button" value="GetHtml" onclick="getHTML()" />
<div id="placeholder"></div>
```

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Application architecture: Network



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Why PHP 5.2, IBM DB2 and AJAX?



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- PHP is easy to learn and follows the KISS rule:
Keep It Simple & Stupid
- awesome integration of the native XML support
of IBM DB2 with PHP applications
- support for XML, JSON and Webservices by
default in PHP 5.2
- business logic and data stored directly in the IBM
DB2 database
 - tables with two columns
 - „id“ for PRIMARY KEY
 - „data“ for XML
 - built-in automatic XML validation

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Example: Data structure



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| XML file *talks.xml*:

```
<talks>
  <talk id="1">
    <presenter>Thorsten Rinne</presenter>
    <title>IBM DB2 with PHP 5.2 and AJAX</title>
    <date>2007-10-09</date>
  </talk>
</talks>
```

| SQL:

```
CONNECT TO PHPCONF;
CREATE TABLE TALKS (
  ID BIGINT NOT NULL PRIMARY KEY,
  TALKS XML ) ;
CONNECT RESET;
```

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Example: Insertion of the XML data



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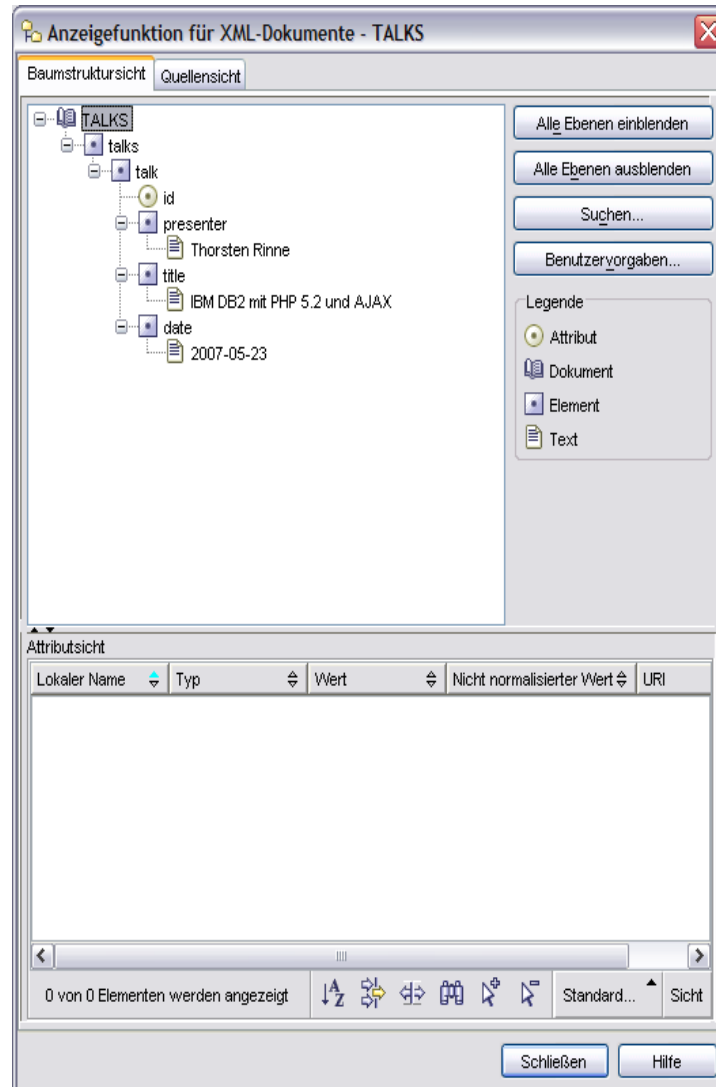
```
$talks = file_get_contents('talks.xml');  
$xml = simplexml_load_string($talks);  
$talkId = (int)$xml->talk['id'];  
$stmt = $db->prepare('INSERT INTO TALKS (ID,TALKS)  
VALUES (?, ?)');  
$stmt->bindValue(1, $talkId);  
$stmt->bindValue(2, utf8_encode($talks));  
$res = $stmt->execute();  
if (!$res) {  
    print_r($stmt->errorInfo());  
} else {  
    print 'XML Data successfully inserted.';  
}
```

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Example: DB2 Control Center



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Example: Get the data with SQL/XMLQuery



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```
$stmt = $db->prepare('
    SELECT
        XMLSERIALIZE(
            XMLQUERY(\'$t/talks/talk/presenter\' PASSING
                t.TALKS AS "t") AS CLOB(32K))
    FROM TALKS t');
if ($stmt->execute()) {
    foreach ($stmt->fetch() as $data) {
        var_dump($data);
    }
} else {
    print_r($stmt->errorInfo());
}
```

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Example: The result of the query



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SQL/XQuery:

```
SELECT
    XMLSERIALIZE (
        XMLQUERY ('$t/talks/talk/presenter'
        PASSING t.TALKS AS "t")
        AS CLOB(32K))
FROM TALKS t
```

result:

```
<presenter>Thorsten Rinne</presenter>
```

Big advantage: use the XML with

- AJAX
- XSLT

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Example: AJAX with Prototype (I)



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```
<script type="text/javascript">/*  */<br/>/* HTTP Request object */<br/>var presenterList;<br/><br/>function getPresenterList() {<br/>    var url = 'index.php';<br/>    var pars = 'action=presenterlist';<br/>    var myAjax = new Ajax.Request( url, {method:<br/>    'get', parameters: pars, onComplete:<br/>    processPresenterList} );<br/>}<br/>getPresenterList();</pre></div><div><p>„IBM DB2 mit PHP 5.2<br/>und AJAX“</p></div><div><p>© Thorsten Rinne 2007 | 20</p></div>
```

Example: AJAX with Prototype (II)



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```
function processUserList(XmlRequest) {
    presenterList = XmlRequest;
    buildPresenterList();
}

function buildPresenterList()
{
    var presenters =
presenterList.responseXML.getElementsByTagName('presenter');

    ...
    // more
}

/* ]]> */</script>
```

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Example: Summary



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■ Advantages

- Business logic moved into the database
 - Stored Procedures
 - SQL/XQuery
- XML supports the easy way of
 - AJAX web apps
 - webservices with SOAP
 - transformations with XSLT

■ Disadvantages

- Higher complexity because of Xquery
- Logical changes are more complicated

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Questions & Answers



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???



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More informations ...



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- IBM DB2:
<http://www.ibm.com/db2>
- IBM DB2 pureXML™:
<http://www-306.ibm.com/software/data/db2/xml/>
- Prototype:
<http://www.prototypejs.org/>
- PHP and JSON:
<http://de.php.net/JSON>
- PHP and PDO:
<http://de.php.net/PDO>
- Download the slides:
<http://www.rinne.info/talks.html>

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Thank you very much!

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