

### David Simpson .com Solutions Inc.

- Developer of FmPro Migrator, SQLite Diff, FmPro Script Diff & other apps using LiveCode.
- LiveCode developer since 2001
- FileMaker developer for 25 years.



- MySQL, Sybase, SQL Server & Oracle dba
- Perl, PHP, .NET developer
- UNIX System Administrator (Solaris)

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Friday, July 13, 2012



Scalability Options [PHP & SQL Database Servers] Web Development is hard to do. Typical Use Cases Demo - Assets db - FM12 Demo - Core<sup>2</sup> CRM - FM12 Financial Savings Q & A

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### **Scalability**

- Why Use PHP & SQL Database Servers?
  - Corporate Mandate
    - All corporate data must be stored in Oracle, SQL Server etc.
  - Thousands of Users
    - Compared to 100 simultaneous users (IWP), or 200 (CWP FM12)
    - Example: A contracting management app having 5000 users who pay \$100 monthly for a hosted solution.
  - Performance
    - Example: FileMaker Inc. website searches are 100x faster using PHP/MySQL solution with FileMaker Server Advanced.
  - Customizability
    - Exert full control over every aspect of the web application.

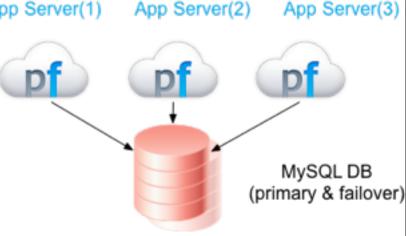


### **PHP Scalability**

phpfog

- PHP Scalability Options
  - PHP Accelerators
    - <u>APC</u>, <u>eAccelerator</u>, <u>XCache</u>, <u>Zend</u> <u>Server</u>
  - <u>PHPFog</u> Hosted on Amazon EC<sup>2</sup> phpfog App Server(1)
    - Multiple PHP App & Database Server Configuration
    - \$30 Per Month Per PHP App Server
  - CakePHP Caching
    - Caching Available for Views
    - Serves Cached Pages Directly -Skips Calculations & Reading Database if Cached Page Available

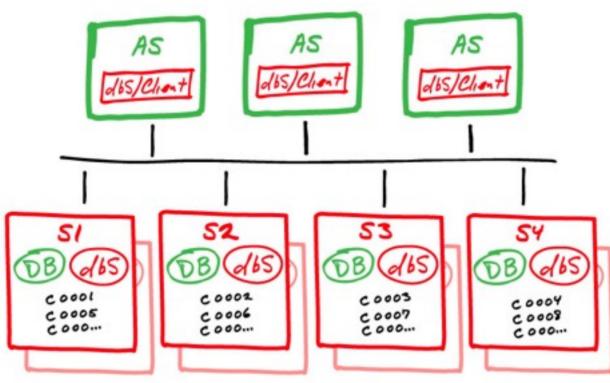
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phpfog

## FmPro Migrator - PHP Conversion Database Scalability - dbShards

- <u>dbShards</u>
  - Splits Data Across Multiple Servers (MySQL, PostgreSQL, DB2)
    - Includes Production & Failover Servers, Local Servers or Amazon EC<sup>2</sup>
    - Scales Linearly, No application changes required
    - Example: 100 Million User Family Builder Website, FaceBook

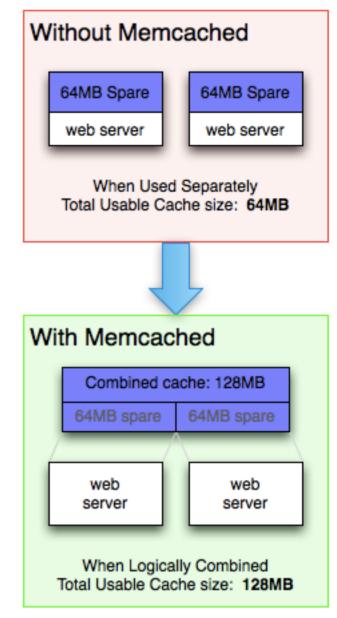


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### **Application Scalability - memchached**

- <u>Memchached</u>
  - Key/Value Store
    - Similar to a Large Associative Array in Memory
    - NOT Suitable as a Drop in Replacement for MySQL, Oracle, etc. - Requires Application Redesign.
    - Commonly Used For SESSION Variables
       <u>Including for CakePHP</u>
    - Can be Used as a CakePHP Cache Engine
  - Examples: FaceBook, Twitter,
     Wikipedia, YouTube, WordPress,
     Amazon Elastic Cache



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### **The Hard Stuff**

- Web Development is Hard to Do
  - Build a GUI
    - How? (Dreamweaver, & other tools)
    - Write HTML Code
    - Write CSS Code
    - Write PHP, JavaScript Code
  - Test & Debug It
  - Iterate As Needed

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- Use Case #1
  - You are a FileMaker and PHP developer who wants to prototype a new PHP web application using FileMaker Pro Advanced.
    - Build a working web application which is more sophisticated in functionality than you might build manually because it is built automatically.
    - Utilize FileMaker layout tools to align, resize, distribute objects easier than using DreamWeaver.
    - Convert FileMaker charts into server or client-side charts.
    - Utilize FileMaker vector graphic objects for high quality graphic objects at any screen resolution without writing raphael.js code manually.



• Use Case #2

### - Convert part of an existing FileMaker solution.

- Render FileMaker charts as PNG images for performance.
- Data entry, record searching for high traffic web sites requiring more than 200 simultaneous users.
- Keep most of your business logic running on FileMaker Server Advanced, store some of your data in MySQL, Oracle, SQL Server etc.
- Replicate data: SyncDek, ESS, ODBC data import scripting.
- Decouple FileMaker database from website for maintenance.
- Example: FileMaker developer.filemaker.com/search Website

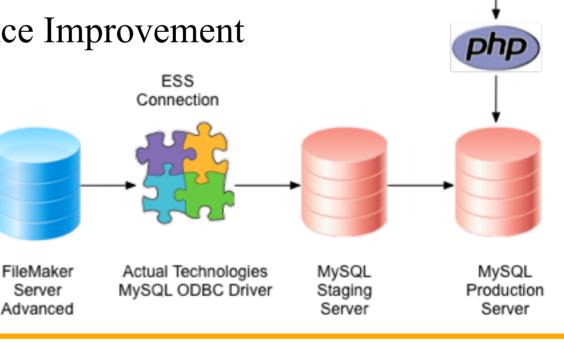
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Use Cases - developer.filemaker.com Website

- developer.filemaker.com/search & developer.filemaker.com/solutions
- FileMaker Server Advanced, PHP & MySQL
  - Public Web Search Uses PHP/MySQL Application
    - Data is Pushed into MySQL Using FileMaker ESS
  - Result: 100x Performance Improvement



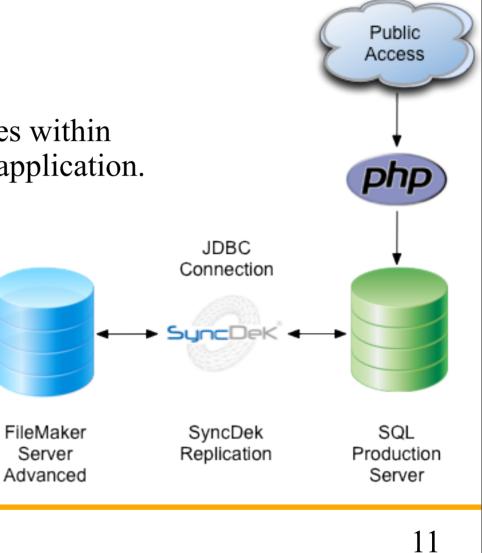
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Public

Access



- <u>SyncDek</u> Replication to FileMaker Server Advanced
  - Good Choice For:
    - 2 Way Replication
    - Data gets changed in many places within the FileMaker or SQL database application.



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#### **Use Cases**

- Use Case #3
  - Convert Entire FileMaker Solution
    - Consider Relationship Complexity
      - More Relationships, Can Severely Impact Performance
      - Consider Using Anchor/Buoy
      - May Need to Bind/Unbind Models Within View Controllers
    - Consider FileMaker Menus
      - Scripts Menu/Custom Menus Not Available
      - Add Scripted Buttons as Necessary
    - Consider Simplifying Scripting
      - Review whether the 16 commonly used script steps can replace some scripts. These will be automatically converted.



- Pre-Migration Preparation
  - Change Tables/Fields Using SQL Compliant Names
- CakePHP to ODBC Issues
  - Many Errors Upon Successful Connection (No Data)
  - Would Require Rewriting CakePHP ODBC Driver to Fix
  - Result: Not Ready for Production Usage.
- CakePHP <u>CakeMix Driver</u> from Beezwax
  - Uses FX.php & XML Connectivity
  - Reported Performance 500ms vs 50ms/Query for ODBC, vs 1-2 ms/Query for MySQL



- CakePHP Babel API to FileMaker PHP by Andrew Ballard
  - Better Performance, Used in Production
  - Can Call FileMaker Scripts Directly, Use FM Find Operators
  - Does Not Use CakePHP Model, Use from Views/Controllers
  - No Relationships, No Model Validation Available
  - Not a Drop In Usable Driver with FmPro Migrator Generated CakePHP Code
  - Can this API Be Improved? Integrated into CakePHP MVC?
  - Price? Availability?



Demo

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- Assets DB
  - Show MySQL config Main Window
  - Show Tables, Relationships, Layouts, Scripts Tabs of Migration Process window.
  - Show GUI PHP Window
    - Show PHP Prefs
      - pChart/FusionCharts menu
        - pChart library included at no cost.
      - Grid Type ExtJS/jqGrid [cost extra]
      - Authorization Type None/Basic Select Basic
      - Data Access All, Read Only, Edit Only
      - Navigation Toolbar [New]
    - Click Convert button [Discuss Preflight Process PK Required]



### Demo - app1

- Assets DB
  - Show Generated app
    - Show FM12 database side by side
    - localhost/app1 link directly to:
      - <u>http://localhost:8888/app1\_fm12/default</u>
      - Click on Log In Link Log in as Admin
      - Click on Admin List/Edit/Delete/Query Users
      - Show Editing ReadOnly User
      - Back to /default
      - Click on BaseTable Controllers Member
        - Base Tables Use scaffolding

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### • Assets DB

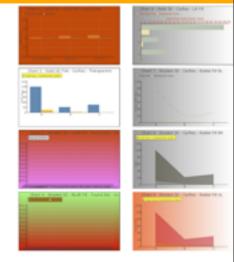
- Assets layout View mode
  - Compare to Original FileMaker layout
  - Show Assets Text Label, Fields, Menus
  - Show rectangle, circle, line, image objects
  - Show Radio Button, Checkbox
    - Show Radio Buttons/Checkboxes 2 Columns
  - Show ExtJS Grid
  - Show Tab Control 2 levels
  - Show Value Lists Static & Dynamic
  - Show Next Record data values change CSS Tooltips
    - Checkbox/Radio Buttons Updated With Record Change
  - Show 15 Script Steps/Buttons Right Side

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- Assets DB
  - Switch to Edit view
    - Change field value
      - Submit Edit Show Gritter Error message
      - Show Validation from Model
  - Switch to Query view
    - Click The Category Menu
      - Search: Office Furniture 0 Records
      - Search: Computers 2 Records Show Navigation Toolbar 1/2 (5)
    - Click Show All Records Button
    - Switch Between Forms \$\_SESSION['Model']['current\_record']
  - JavaScript Disabled Show Functionality CSS Tooltips

- Assets DB pChart
  - Show Bar Chart Gallery pChart
    - Show comparison -
      - pChart to FileMaker 12 Bar Charts
    - Show Colors
    - FM11 -> FM12 Converted Charts Only
  - Switch to Pie Chart Gallery pChart
    - Show comparison pChart to FileMaker 12
    - Show Colors Using Same Palette.
    - Mention That Stroke() => Render() Saves as PNG File
  - Fusion Charts Not Shown Here \$400 Extra
    - Interactive Flash/JavaScript Charts



### **Demo - Core2CRM**

- Core<sup>2</sup> CRM by Productive Computing
  - Show Relationship Graph
  - Show Layout in FM12
  - Show Contacts Unmodified
    - Discuss Glbl button Error
      - No Relationship to Glbl TO Error
      - Replace with Static Images -
      - For PHP Web Applications Better Design
      - Note: The Text Label & The Image Should Get Links or the Button Click Won't Be Seen Due to the Text Label Object Sitting Over the Button.
    - Grid Errors PHP & JavaScript Needs Manually Modifications

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Slides

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- Automated Migration with FmPro Migrator:
  - Use a FileMaker Pro database as your software specification
    - Save time, immediately start developing your project
  - Generate forms, relationships, scripts, value lists
  - Estimated cost of \$1000 \$5000 per layout for manual conversion
  - Quickly build web apps having sophisticated and difficult to develop features: charts, grids, tab controls, vector graphics
- Off-shoring to your desktop using FmPro Migrator Platinum Edition (\$600)



### Q & A

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#### Demo - app1

- iPad2 Demo
  - Show Assets Form
    - Record Advance
  - Switch Layouts
    - Maint\_Record
    - Bar Chart Gallery
    - Pie Chart Gallery



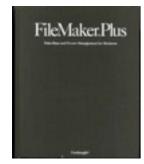
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- MySQL, Sybase, SQL Server & Oracle dba
- Perl, PHP, .NET developer
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Hello, my name is David Simpson.

During this session I will be showing how to use FmPro Migrator Platinum Edition to perform automated FileMaker Pro to PHP Web Application Conversions.

FmPro Migrator was originally developed only to perform FileMaker database data migration projects. Over the last 9 years it has been enhanced to convert Microsoft Access and Visual FoxPro applications into FileMaker Pro database files.

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As well as adding the new PHP Conversion feature.

How many people attended this session last year?



Scalability Options [PHP & SQL Database Servers] Web Development is hard to do. Typical Use Cases Demo - Assets db - FM12 Demo - Core<sup>2</sup> CRM - FM12 Financial Savings Q & A

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#### Friday, July 13, 2012

I am going to start off this presentation with a few introductory slides, then a demo showing the PHP Conversion process using FmPro Migrator. And then there will be time for Q & A.

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- Why Use PHP & SQL Database Servers?
  - Corporate Mandate
    - All corporate data must be stored in Oracle, SQL Server etc.
  - Thousands of Users
    - Compared to 100 simultaneous users (IWP), or 200 (CWP FM12)
    - Example: A contracting management app having 5000 users who pay \$100 monthly for a hosted solution.
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MySQL DB (primary & failover)

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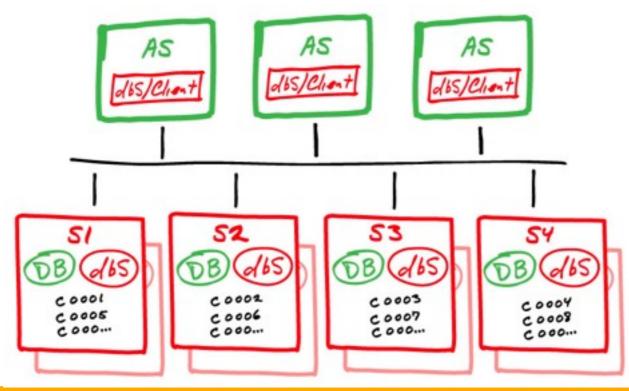
- PHP Scalability Options •
  - PHP Accelerators
    - APC, eAccelerator, XCache, Zend Server
  - <u>PHPFog</u> Hosted on Amazon EC<sup>2</sup> phpfog App Server(1) phpfog App Server(2) App Server(3)
    - Multiple PHP App & Database Server Configuration
    - \$30 Per Month Per PHP App Server
  - CakePHP Caching
    - Caching Available for Views
    - Serves Cached Pages Directly -Skips Calculations & Reading Database if Cached Page Available

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Friday, July 13, 2012 Within app/config/core.php - enable Cache Configure::write('Cache.check', true); Within the view controller app/controllers/assets\_controller.php var \$helpers = array('Html', 'Form', 'Paginator', 'Js', 'Cache'); var \$cacheAction = "1 day"; Problem: Avoid caching grid objects. Even disabling caching seems to fail for ExtJS grid objects. <cake:nocache> </cake:nocache>



- <u>dbShards</u>
  - Splits Data Across Multiple Servers (MySQL, PostgreSQL, DB2)
    - Includes Production & Failover Servers, Local Servers or Amazon EC<sup>2</sup>
    - Scales Linearly, No application changes required
    - Example: 100 Million User Family Builder Website, FaceBook



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This diagram shows multiple application servers (PHP or any app server), connecting to 4 production servers, with 4 additional failover servers. There are editions from FREE to about \$5K per server annual licensing.

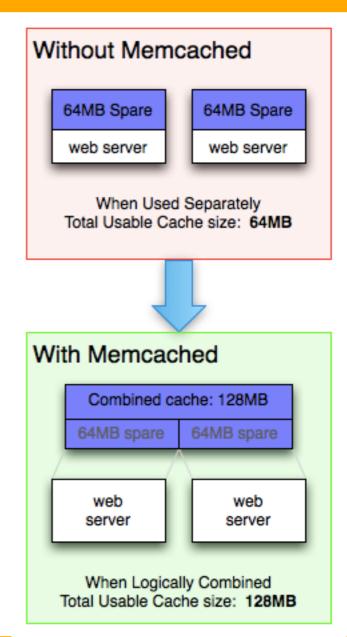
FaceBook uses this technology, having thousands of dbshards along with memchached.

dbshards driver handles the connection.



### **FmPro Migrator - PHP Conversion** Application Scalability - memchached

- <u>Memchached</u>
  - Key/Value Store
    - Similar to a Large Associative Array in Memory
    - NOT Suitable as a Drop in Replacement for MySQL, Oracle, etc. - Requires Application Redesign.
    - Commonly Used For SESSION Variables
       <u>Including for CakePHP</u>
    - Can be Used as a <u>CakePHP Cache Engine</u>
  - Examples: FaceBook, Twitter, Wikipedia, YouTube, WordPress, Amazon Elastic Cache



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Memchached is like a large associative array in memory, not a SQL database server replacement. Because Key/Value stores are not intended for doing table joins, unless you write the code manually to accomplish this task.

FmPro Migrator generates PHP code which uses SESSION variables for storing foundsets(), \$current\_record info - to simulate the same functionality used in FileMaker.

Another source of info:

http://www.mysql.com/news-and-events/events/innovation-day/



- Web Development is Hard to Do
  - Build a GUI
    - How? (Dreamweaver, & other tools)
    - Write HTML Code
    - Write CSS Code
    - Write PHP, JavaScript Code
  - Test & Debug It
  - Iterate As Needed

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There are many challenges with developing web applications. What we take for granted in FileMaker (sophisticated portals, interactive dialogs) requires more work in a web environment. This is because you have some code running on the server (PHP, database stored procedures) and other code running on the client (CSS, JavaScript). Within FileMaker, everything is cleanly integrated together automatically.



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- Use Case #1
  - You are a FileMaker and PHP developer who wants to prototype a new PHP web application using FileMaker Pro Advanced.
    - Build a working web application which is more sophisticated in functionality than you might build manually because it is built automatically.
    - Utilize FileMaker layout tools to align, resize, distribute objects easier than using DreamWeaver.
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Because you are designing the application from scratch for conversion, you will want to reduce the number of TOs, Relationships to simplify the structure of the application for improved performance.



- Use Case #2
  - Convert part of an existing FileMaker solution.
    - Render FileMaker charts as PNG images for performance.
    - Data entry, record searching for high traffic web sites requiring more than 200 simultaneous users.
    - Keep most of your business logic running on FileMaker Server Advanced, store some of your data in MySQL, Oracle, SQL Server etc.
    - Replicate data: SyncDek, ESS, ODBC data import scripting.
    - Decouple FileMaker database from website for maintenance.
  - Example: FileMaker developer.filemaker.com/search Website

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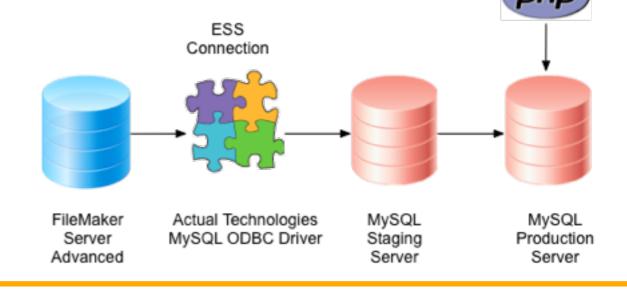
Coverting part of a solution can be a good way to web enable only the part of your application which needs to be web facing. Your back office functionality can still use FileMaker Server Advanced. This is the best way to keep your costs under control.

ODBC Drivers from Actual Technologies.

Example Educational Solution Conversion: 300 layouts 750 TOs 750 Relationships 511,000 lines of code generated 4 minutes Only 5 layouts didn't work - due to relationship complexity, 61 table join limit for MySQL.



- developer.filemaker.com/search & developer.filemaker.com/solutions
- FileMaker Server Advanced, PHP & MySQL
  - Public Web Search Uses PHP/MySQL Application
    - Data is Pushed into MySQL Using FileMaker ESS
  - Result: 100x Performance Improvement



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Public Access

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Designed by Jeff Benjamin, in FileMaker's IT department. I can't take credit for this design, because it was developed before the FmPro Migrator PHP Conversion feature was released.

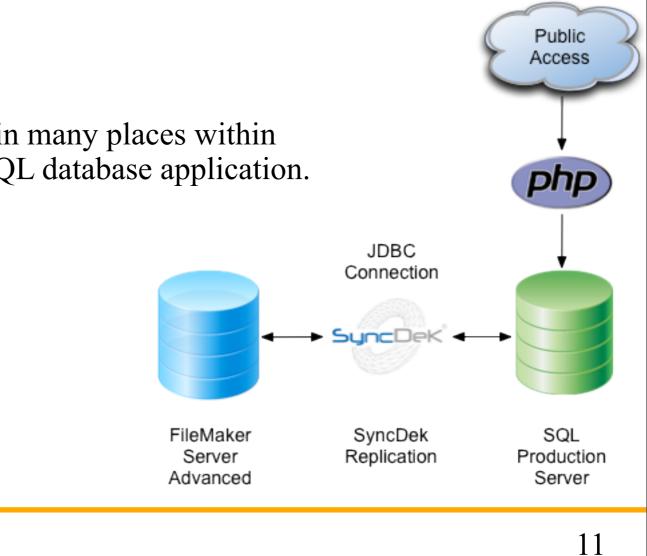
FileMaker's website now uses PHP/MySQL for product/consultant searches. 100x faster.

Data is pushed into MySQL thru ESS when Developer Relations approves changes, it goes to a staging Server via ESS, then from the staging server to production using MySQL replication.

Economical solution if you only have a 1 way data transfer, and can easily localize changes via scripting.



- SyncDek Replication to FileMaker Server Advanced
  - Good Choice For:
    - 2 Way Replication
    - Data gets changed in many places within the FileMaker or SQL database application.



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You don't want to write your own replication software to perform this task. Jason Erickson has been doing this for years, and has it all figured out.



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- Use Case #3
  - Convert Entire FileMaker Solution
    - Consider Relationship Complexity
      - More Relationships, Can Severely Impact Performance
      - Consider Using Anchor/Buoy
      - May Need to Bind/Unbind Models Within View Controllers
    - Consider FileMaker Menus
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    - Consider Simplifying Scripting
      - Review whether the 16 commonly used script steps can replace some scripts. These will be automatically converted.

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Scalability concerns and ESS limitations may require converting an entire solution.

Example: Current Oracle conversion project. Customer is ecstatic about continuing to use FileMaker for rapid application prototyping for the new PHP application.



- Pre-Migration Preparation
  - Change Tables/Fields Using SQL Compliant Names
- CakePHP to ODBC Issues
  - Many Errors Upon Successful Connection (No Data)
  - Would Require Rewriting CakePHP ODBC Driver to Fix
  - Result: Not Ready for Production Usage.
- CakePHP <u>CakeMix Driver</u> from Beezwax
  - Uses FX.php & XML Connectivity
  - Reported Performance 500ms vs 50ms/Query for ODBC, vs 1-2 ms/Query for MySQL

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Friday, July 13, 2012 Andrew Ballard's Notes: Here's a quick SWOT analysis of ODBC:

#### Strengths:

Native SQL queries Can select which data fields to return Can access any part of the database from any query Cake Models used, but mainly only for data validation Reasonably fast (50ms per request), but also requiring lots of queries to perform one 'task'. Easy to set up on Filemaker side. Can use native Cake pagination. Native Cake SQL Debug log

#### Weaknesses:

No limit/max records able to be specified

Cake Models are used, but only Belongs To relationships work - no Has Many nor HABTM 'instant' relationships - easily achieved with multiple queries though No related data in one query (apart from Belongs To) - easily achieved with multiple queries though Need to modify the standard Cake ODBC Driver: change single quotes to multiple, etc etc etc

Handling dates is not straightforward - ODBC has it's own date format expectations Max limit of 31 characters for \*combined\* table::field names. Makes for unexpected truncations in returned data. Can't call a Filemaker script.

David Simpson's Notes on CakePHP Performance:

Typically 1 - 2 ms each for about a dozen queries to build a typical page using MySQL.

CakePHP 1.3 - Officially benchmarks at 105 requests per second, and over 200 requests per second for CakePHP 2.0.



- CakePHP Babel API to FileMaker PHP by Andrew Ballard
  - Better Performance, Used in Production
  - Can Call FileMaker Scripts Directly, Use FM Find Operators
  - Does Not Use CakePHP Model, Use from Views/Controllers
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  - Not a Drop In Usable Driver with FmPro Migrator Generated CakePHP Code
  - Can this API Be Improved? Integrated into CakePHP MVC?
  - Price? Availability?

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Friday, July 13, 2012 Andrew Ballard's Notes on Babel API Strengths:

Cake-like find constructs. A few syntax changes due to Filemaker's requirements, but 100% knowledge-transferrable! Able to set limit/max records returned; perform multi-field sorts

By setting a Filemaker layout, can limit the fieldset returned, as well as access all related portals/data on that layout.

Can use all Filemaker search syntax: can do all search operators (<, >, \*, !, '...', etc), and can allow web users to do some pretty advanced searching/filtering if these are taught

Error reporting returned from Filemaker API - handy in initial setup/conversion phases

Can do a SaveAll, but only through smart Array preparations beforehand/looping a Save in Controller.

Can call Filemaker scripts

Pretty fast. Should say, more correctly, that it's pretty efficient: you can get a lot of good data from one query.

Of course, if unstored/reaching too far with portals, it may be slow - but with good discipline, it's fast enough for production (intelligent Cake element/page caching assists for heavy traffic).

#### Weaknesses:

Cake models not used whatsoever: in fact, no database is specified. So no pre-validation or relationship structure. Validation needs to be performed in-view or in database; related data is accessed via Filemaker layouts.

Native Cake Pagination is broken. We've coded in-controller replacement, but should be easily incorporated in future releases Filemaker Tomcat data server doesn't release any of the HTML page before entire query is complete. You lose your SQL debug log. Safari's Developer Network inspector is indispensable, so is Brian Dunning's "microtime" code snippet.

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Demo

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- Assets DB
  - Show MySQL config Main Window
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    - Show PHP Prefs
      - pChart/FusionCharts menu
        - pChart library included at no cost.
      - Grid Type ExtJS/jqGrid [cost extra]
      - Authorization Type None/Basic Select Basic
      - Data Access All, Read Only, Edit Only
      - Navigation Toolbar [New]
    - Click Convert button [Discuss Preflight Process PK Required]

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PK Required for each table. No PK=ID naming requirements, no "s" ending for tablenames. TOs are renamed automatically during the conversion.



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    - Show FM12 database side by side
    - localhost/app1 link directly to:
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# **FmPro Migrator - PHP Conversion**

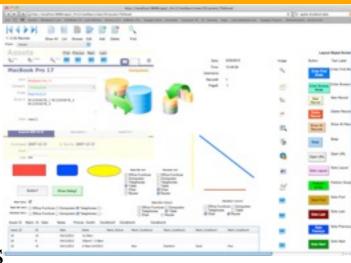
### Demo - app1

## • Assets DB

- Assets layout View mode
  - Compare to Original FileMaker layout
  - Show Assets Text Label, Fields, Menus
  - Show rectangle, circle, line, image objects
  - Show Radio Button, Checkbox
    - Show Radio Buttons/Checkboxes 2 Columns
  - Show ExtJS Grid
  - Show Tab Control 2 levels
  - Show Value Lists Static & Dynamic
  - Show Next Record data values change CSS Tooltips
    - Checkbox/Radio Buttons Updated With Record Change
  - Show 15 Script Steps/Buttons Right Side

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### • Assets DB

- Switch to Edit view
  - Change field value
    - Submit Edit Show Gritter Error message
    - Show Validation from Model
- Switch to Query view
  - Click The Category Menu
    - Search: Office Furniture 0 Records
    - Search: Computers 2 Records Show Navigation Toolbar 1/2 (5)
  - Click Show All Records Button
  - Switch Between Forms \$\_SESSION['Model']['current\_record']
- JavaScript Disabled Show Functionality CSS Tooltips

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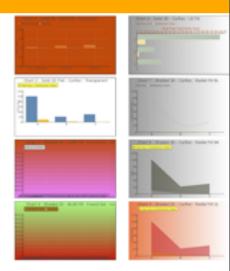
# **FmPro Migrator - PHP Conversion**

### Demo - app1

- Assets DB pChart
  - Show Bar Chart Gallery pChart
    - Show comparison -
      - pChart to FileMaker 12 Bar Charts
    - Show Colors
    - FM11 -> FM12 Converted Charts Only
  - Switch to Pie Chart Gallery pChart
    - Show comparison pChart to FileMaker 12
    - Show Colors Using Same Palette.
    - Mention That Stroke() => Render() Saves as PNG File
  - Fusion Charts Not Shown Here \$400 Extra
    - Interactive Flash/JavaScript Charts

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# • Core<sup>2</sup> CRM by Productive Computing

- Show Relationship Graph
- Show Layout in FM12
- Show Contacts Unmodified
  - Discuss Glbl button Error
    - No Relationship to Glbl TO Error
    - Replace with Static Images -
    - For PHP Web Applications Better Design
    - Note: The Text Label & The Image Should Get Links or the Button Click Won't Be Seen Due to the Text Label Object Sitting Over the Button.
  - Grid Errors PHP & JavaScript Needs Manually Modifications

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Slides

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- Automated Migration with FmPro Migrator:
  - Use a FileMaker Pro database as your software specification
    - Save time, immediately start developing your project
  - Generate forms, relationships, scripts, value lists
  - Estimated cost of \$1000 \$5000 per layout for manual conversion
  - Quickly build web apps having sophisticated and difficult to develop features: charts, grids, tab controls, vector graphics
- Off-shoring to your desktop using FmPro Migrator Platinum Edition (\$600)

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Production Application Cost - Estimated @\$50 - \$150 Per Layout After Automated Conversion - Including Manual Changes

Q & A

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### **FmPro Migrator - PHP Conversion**

Demo - app1

- iPad2 Demo
  - Show Assets Form
    - Record Advance
  - Switch Layouts
    - Maint\_Record
    - Bar Chart Gallery
    - Pie Chart Gallery



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