



The PHP Company

Optimizing Drupal: Performance Tips by Acquia and Zend



acquia™



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Today's Speakers



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Agenda

- Acquia intro
- Zend Server intro
- Benchmarking Environment
- Drupal Normal Mode Cache .vs. Aggressive
- What is Bytecode Cache, Shared Memory Cache .vs. Full Page Cache
- Benchmark Results
- Finding Performance bottleneck Demo
- Summary
- Q&A

Drupal's Momentum

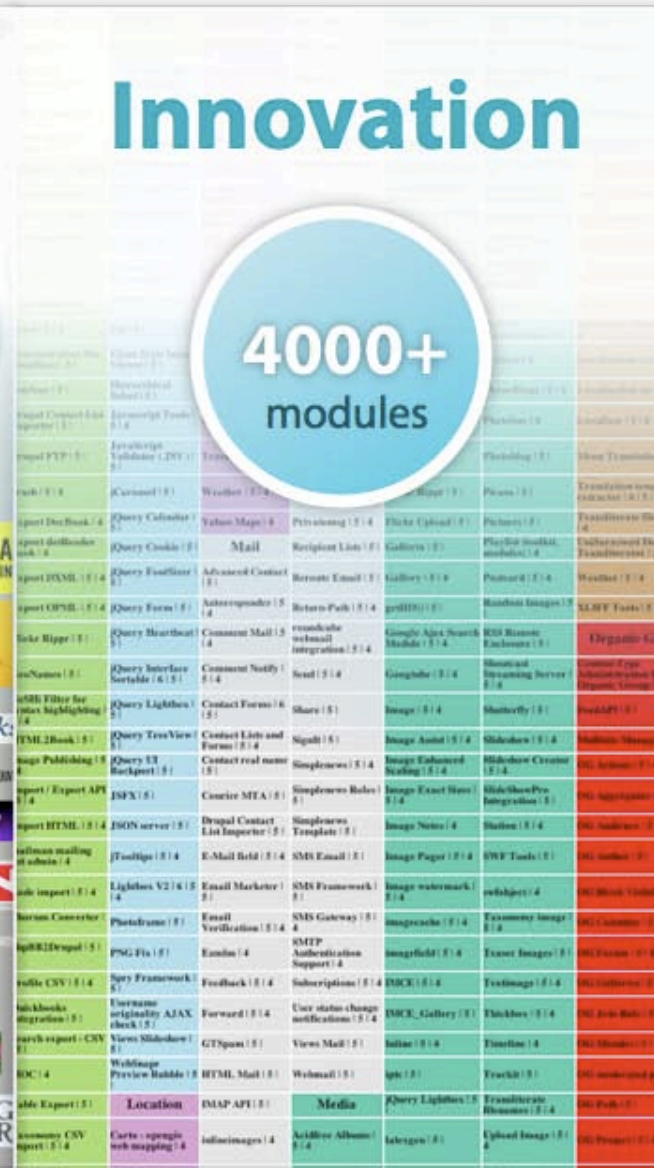
Market

400k sites



Innovation

4000+ modules



Community

600k members



Acquia Business Overview

Opened for business Q4 2008

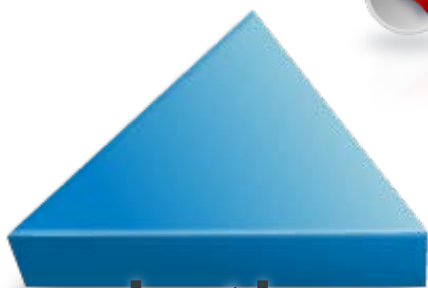
> 450 Customers

> 140 Partners



Acquia: Social Publishing for the Enterprise

Drupal Gardens



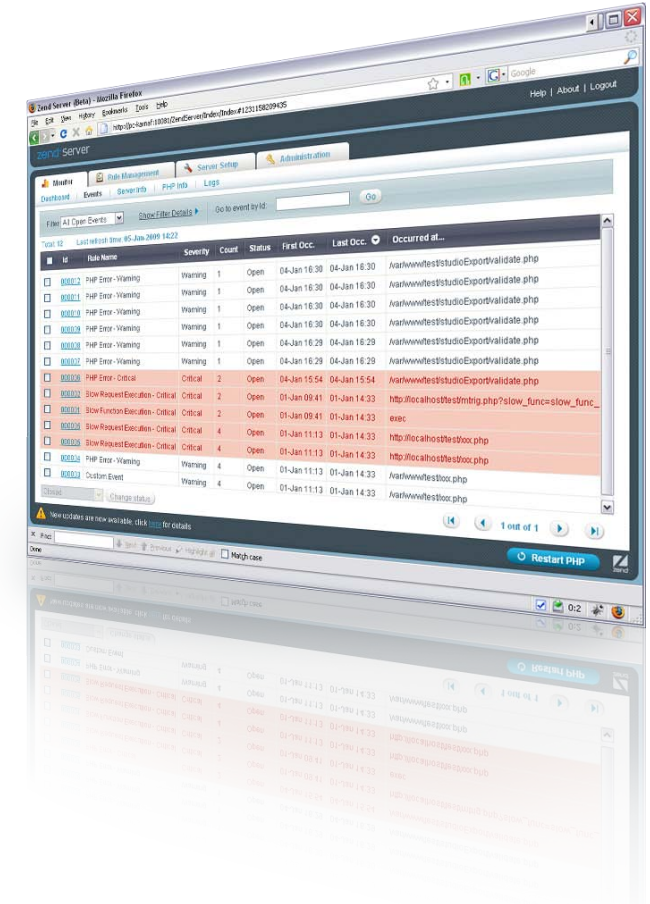
Subscription
S



Acquia Hosting

What Is Zend Server?

- Complete, well-tested PHP stack - Easy installation, >70 Extensions, DB connectivity, debugging extension, and more.
- Two versions, a FREE Community Edition and a Profession Edition with a superset of features:
 - Zend Support with updates/security hot fixes
 - Application monitoring and diagnostics (w ZendStudio) cuts troubleshooting times in half
 - Multi-level performance enhancement for your PHP applications from 2x to 100x faster.
- And more
 - JobQueue, Java Bridge, Download Server



What's new in Zend Server 5.0?

- Support for the new PHP 5.3 (and 5.2)
- Faster problem resolution with Code Tracing
- Memory and Performance analysis within a Code Trace
- Better application performance through Job Queueing
- New monitoring and troubleshooting of Jobs in Queues

MultiLevel Performance and Caching in Zend Server

- **Optimizer+: Opcode Cache**
 - ▶ Eliminates the need to recompile PHP scripts on each request
- **Zend Data Cache**
 - ▶ A set of functions for data and output caching
 - ▶ Two storage backends: Shared Memory and Disk
- **Zend Page Cache**
 - ▶ Cache entire HTTP responses based on the URL
 - ▶ Rules can be based on request and session parameters
- **Additional Caching Extensions**
 - ▶ memcached
 - ▶ APC cache compatibility

DRUPAL BENCHMARK DETAILS

Benchmarking Environment



1 Gb NET



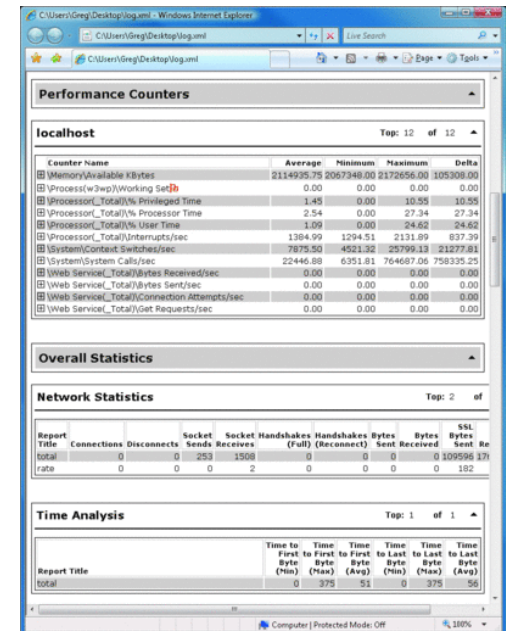
- **SERVER: 2GHz AMD x2 (3988.97 bogomips) with 2GB MB memory**
 - Windows Server 2008 R2 running MS IIS7
 - Linux, Fedora Linux 11 running Apache version 2.2.11
 - Drupal.org 6.15 project as baseline, PHP 5.2.10 on both ZendServer and PHP.net

STRESS TESTING CLIENTS:

- WCAT (Web Capacity Analysis Tool) running 50 parallel connections total, 3-minute warm-up (no data collection), a 3-minute duration (data is collected) and a 1-minute cool down.

Drupal Test Scripts

- /drupal/ (home page)
- /drupal/?q=content/hello-blog-entry (blog entry with 2 comments)
- /drupal/?q=node/1 (top node)
- /drupal/?q=node/2 (child node)
- /drupal/?q=archive/200803 (archive containing links to above 3 nodes)
- /drupal/?q=comments/recent (showing 4 comments)
- /drupal/?q=forum/1
- /drupal/?q=content/forum-topic-1
- /drupal/?q=content/forum-topic-2
- All of the nodes/comments and Forum had about 1-1.5Kb of text content.



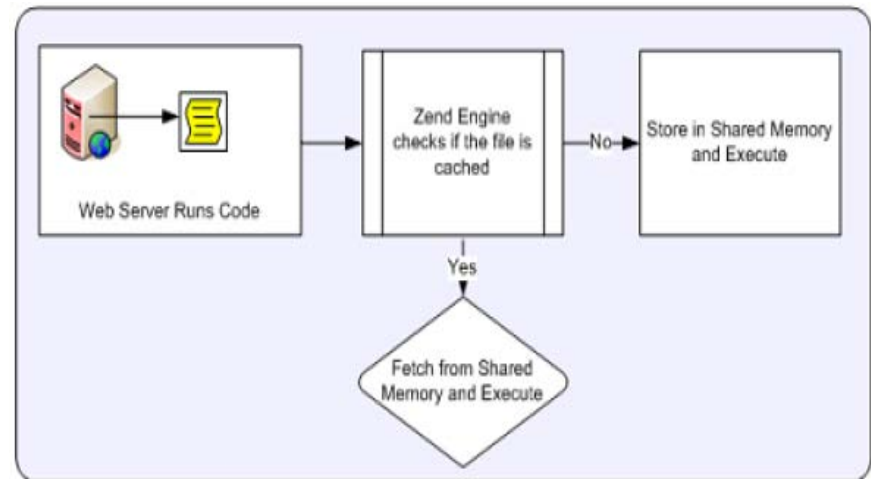


Optimizing Drupal Performance Through Caching

- Efficient Drupal sites use both external and internal caching techniques
- External caching
 - ▶ PHP bytecode caching
 - ▶ DB caching (e.g., memcached)
 - ▶ Page caching (e.g., reverse proxy caches, Zend page caching)
- Drupal-specific caching
 - ▶ Built-in page cache (caches pages in DB)
 - ▶ Block cache (caches page elements in DB)
 - ▶ Boost module (caches pages in file system)
 - ▶ Others: AuthCache, PathCache
- More info: <http://drupal.org/node/326504>

Zend Server Bytecode Caching

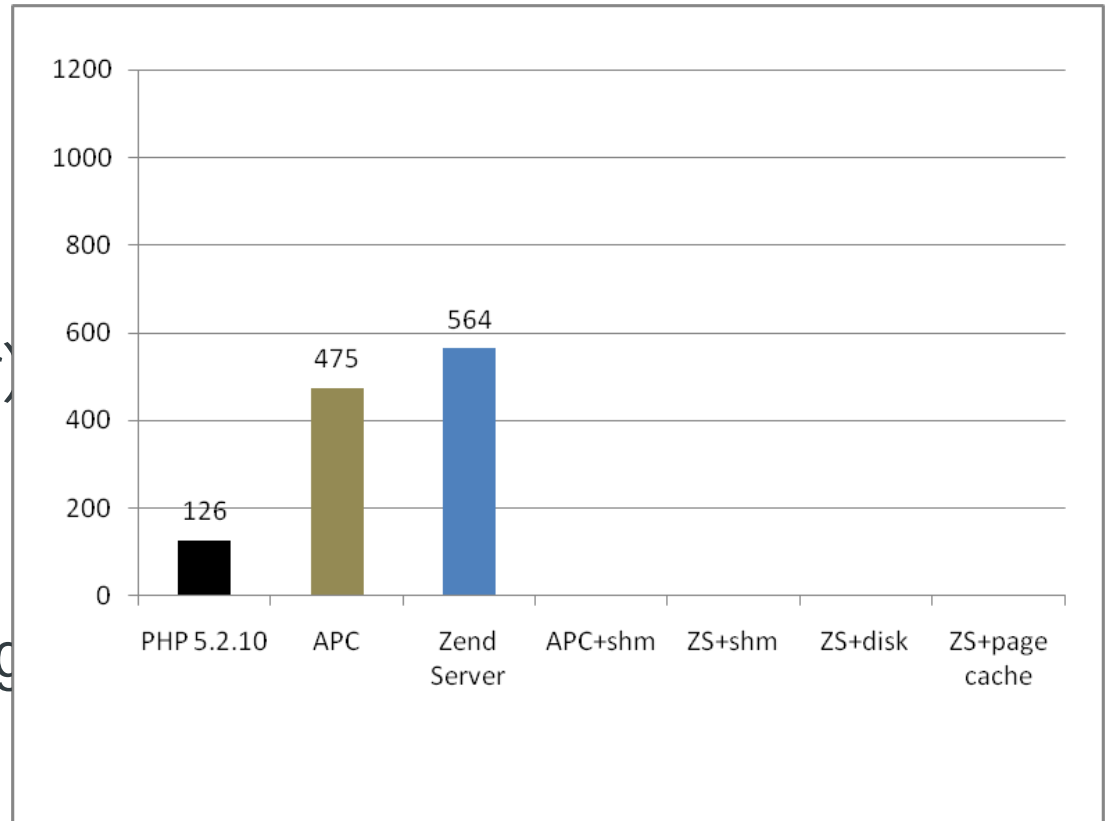
- Both Zend Server versions automatically accelerating PHP 2 to 3 times faster (called Optimizer+)
 - ▶ Code optimizer
 - Optimizes certain code fragments to improve execution speed
 - ▶ Opcode cache
 - Caches the optimized, compiled bytecode in RAM
 - Reduces or eliminates compile time
 - Reduces or eliminates disk access
 - Fastest Opcode technology (.vs. APC, WinCache)



Drupal (ByteCode Caching Benchmark)

PHP 5.2.10 and Drupal using Normal Caching enabled testing bytecode caching only

- Zend Server 4.0 is almost 3 times faster (283% faster) than PHP.net alone
- Zend Server Optimizer+ .vs. APC byte code caching (19% faster)
- Zend Server (24% faster) than WinCache



What is Shared Memory Data Caching?

- **Zend Data Cache API**

- ▶ A set of functions for data and output caching
- ▶ Two storage backends: Shared Memory and Disk

Provides a set of API functions for caching data items

- ▶ DB query results, web service calls, complex or hard-to-get data
- ▶ Output elements
- ▶ Allows skipping slow PHP code chunks and even Database Queries
- ▶ Data could be grouped using namespaces
- ▶ APC user cache compatibility layer
- ▶ Zend Framework `Zend_Cache_Backend` adapters



Planning

Zend Framew...

PHP Debug

PHP

ErrorController.php IndexController.php Mage.php *DataCacheAPI.php X

```
1 <?php
2 function getRecentPosts($count = 5) {
3     // Try to fetch from the cache first
4     $recentPosts = zend_shm_cache_fetch ( 'recentposts' );
5
6     if ($recentPosts === null) {
7         // Get the PDO adapter for the DB
8         $dbAdapter = myBlogDb::getPdoAdapter ();
9
10        // Build the query
11        $query = "SELECT title, author, pubdate FROM posts" . " ORDER BY pubdate DESC LIMIT ?";
12        $dbStatement = $dbAdapter->prepare ( $query );
13
14        // Execute the query
15        $recentPosts = array ();
16        if ($dbStatement->execute ( array ($count) )) {
17            while ( $post = $dbStatement->fetch ( PDO::FETCH_ASSOC ) ) {
18                $recentPosts [] = $post;
19            }
20
21            // Store the results in cache
22            zend_shm_cache_store ( 'recentposts', $recentPosts, 24 * 3600 );
23        }
24    }
25
26    return $recentPosts;
27 }
```

<> PHP

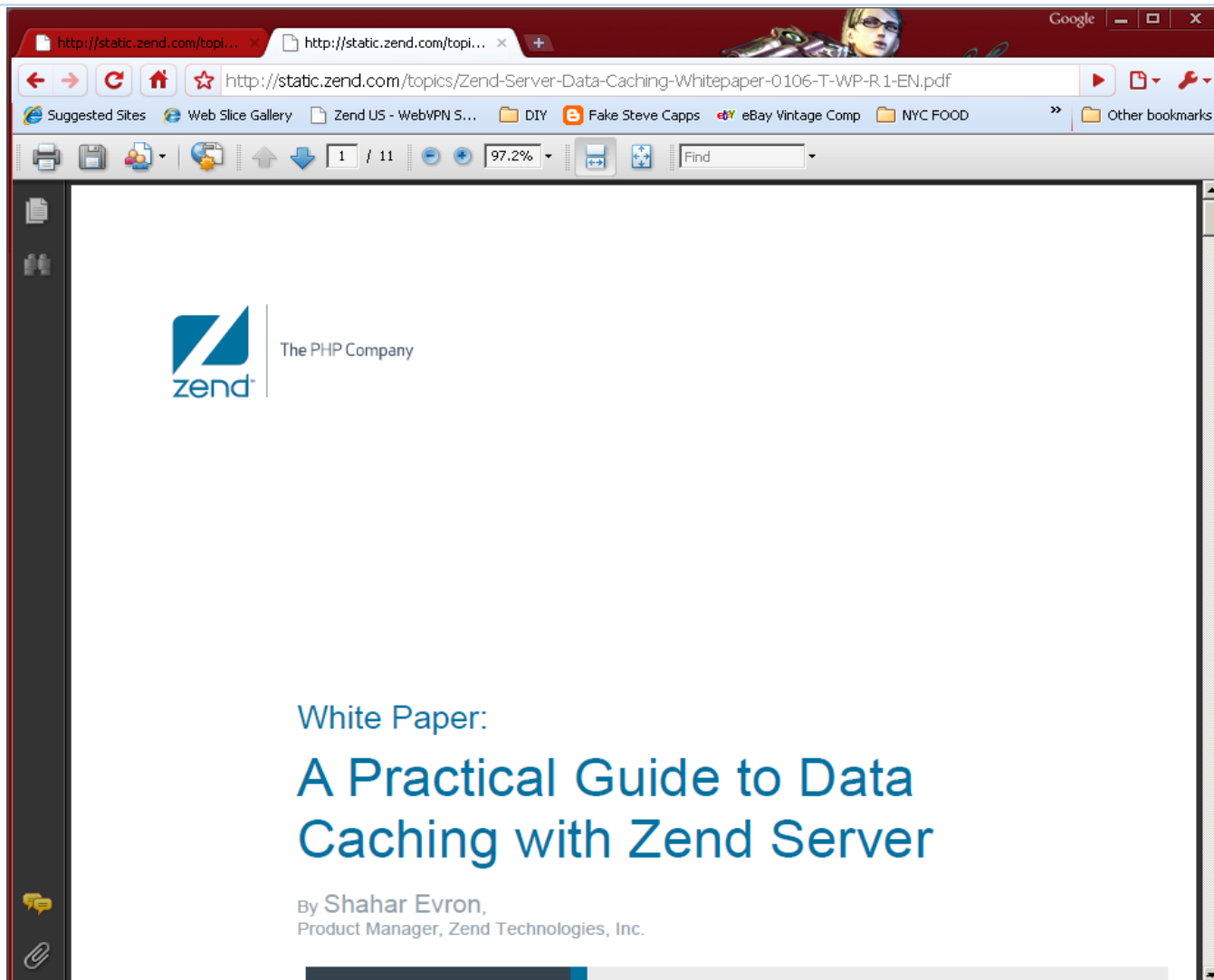
Writable

Smart Insert

Mar 12: Clear

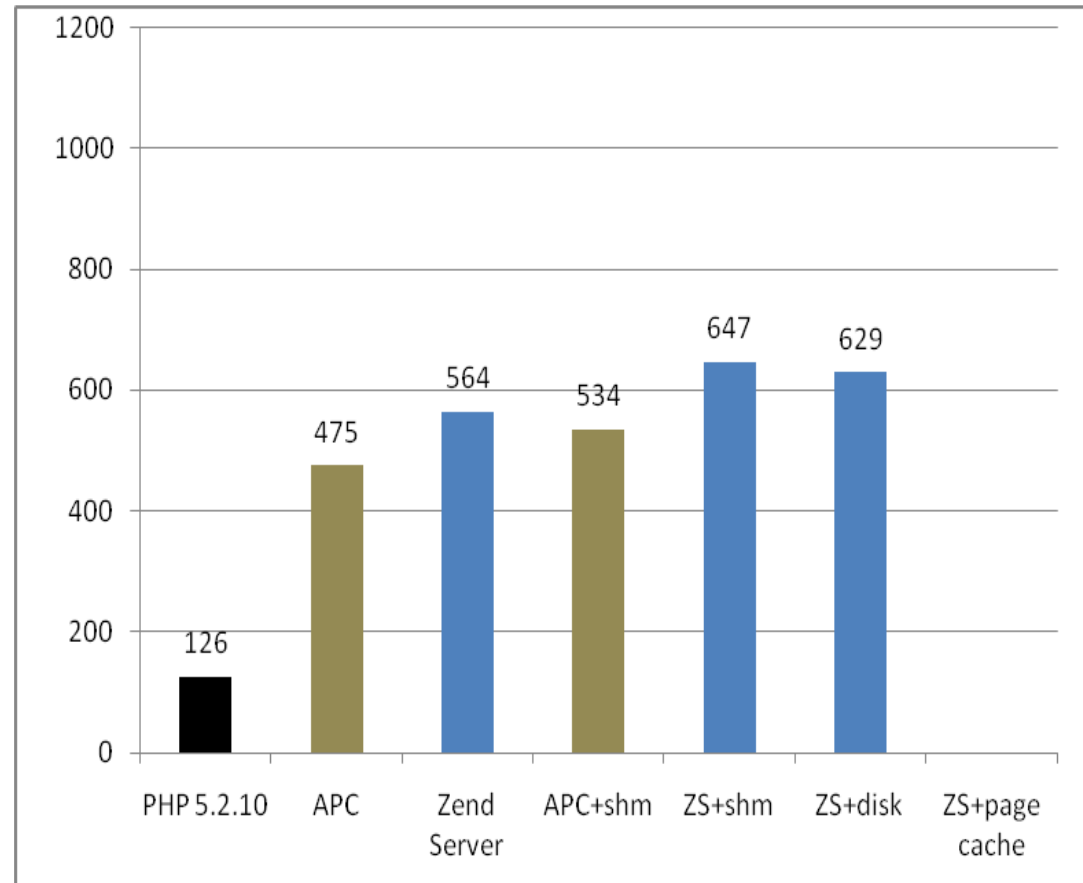
00:00

Data Caching Whitepaper on Zend.com



Drupal (Shared Memory Data Caching Benchmark)

- Zend Server is (21% faster) than APC shm
- Zend Server is (413% faster) than PHP
- Zend Server shm is (12% faster) than using just bytecode alone.



What is Page Caching?

Don't execute a single line of PHP if you don't have to

- ▶ Caches entire HTTP response
- ▶ Configured from UI, no code changes required
- ▶ Live / cached decision is based on request or session parameters
- ▶ Variants can be created based on request or session parameters

Enabled via HTTP Cache-Control header

Enabling Front-End Page Caching in Drupal

1. Enable Drupal's support for Cache-Control HTTP Header

- ▶ Comes built-in with Drupal 7
- ▶ In Drupal 5 and 6, use the Pressflow extensions
 - Pressflow includes many performance optimizations to Drupal core
 - More info: <http://pressflow.org>

2. Use Page Caching Front-End

- ▶ Options:
 - Zend Server Full Page Cache
 - Reverse-Proxy Caches (Varnish, Squid, pound, nginx)

Page Caching in Zend Server Admin GUI

The screenshot displays the Zend Server Admin GUI interface for configuring a caching rule. The top navigation bar includes 'Monitor', 'Rule Management', 'Server Setup', and 'Administration'. The 'Rule Management' section is active, showing a 'Caching' rule named 'Drupal'.

Step 1: Caching Conditions

Cache if URL: matches regex http :// .* / drupal.*

- _GET [q] regex_not_match user/.* [Remove](#)
- _GET [q] not_equals logout [Remove](#)
- _SESSION [uid] not_exists [Remove](#)

Match all of the above Match any of the above [Add Condition](#)

Step 2: Cache Output

Cache for: 30 seconds

Create compressed cache copies [?](#)

Create different versions of cache copies according to

- _SERVER [QUERY_STRING] [Remove](#)

[+ | Add](#)

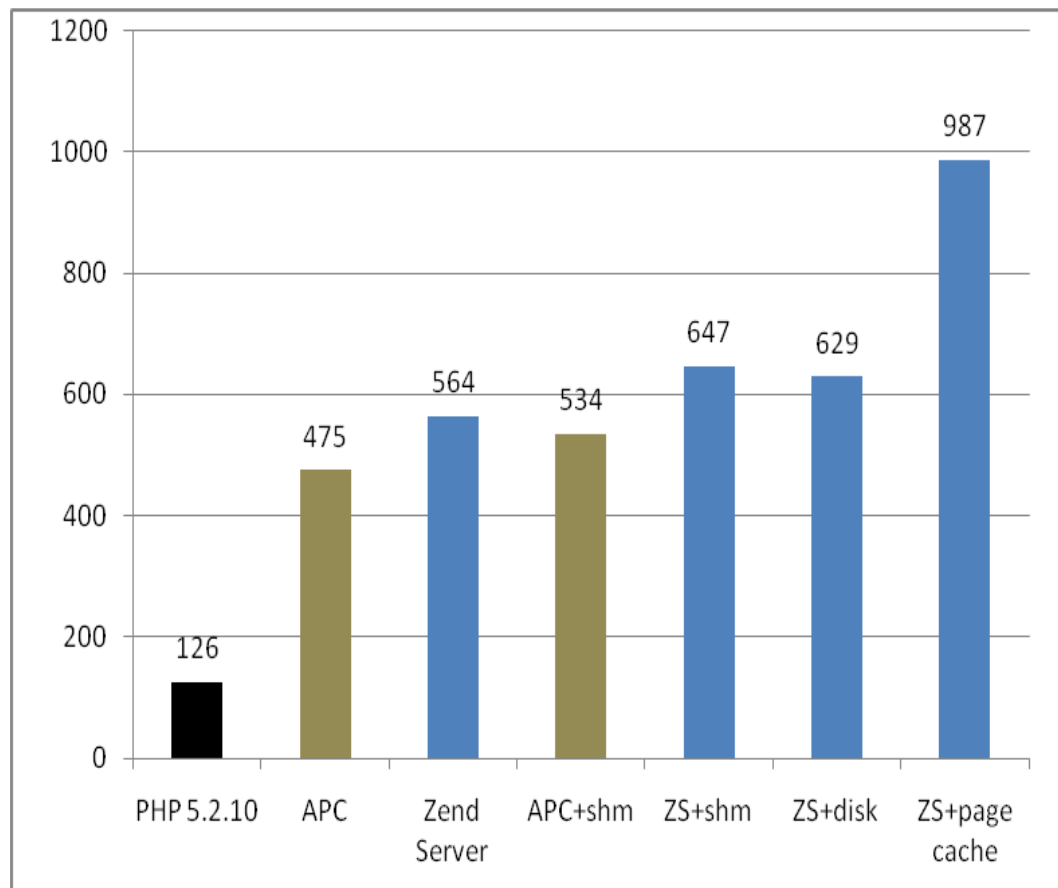
[Cancel](#) [Save](#)

! New updates are now available. Click [here](#) for details

[Restart PHP](#)

Zend Server Full Page Cache Benchmark

- ZS Full page caching is 683% faster than PHP.net
- 85% faster than APC shm
- 75% faster than using Bytecode caching alone



Slide on Pressflow Full Page Rules used

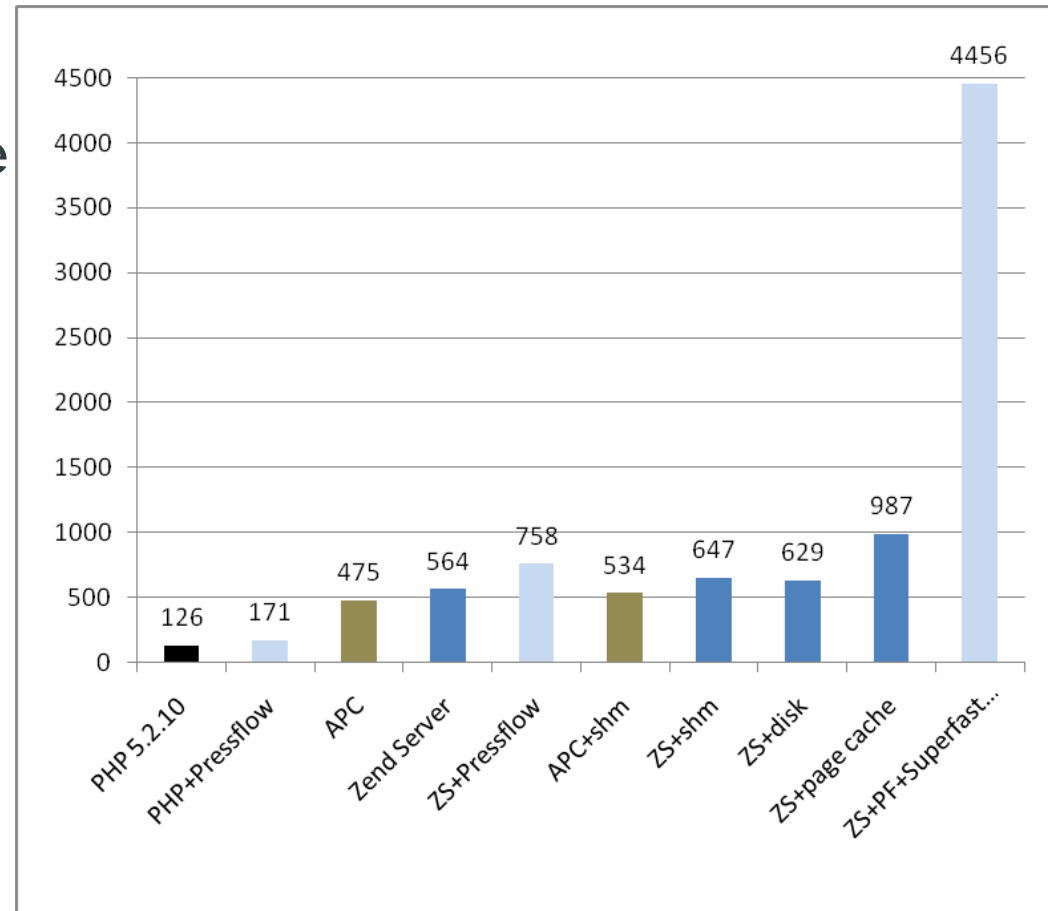
The screenshot shows the Zend Server administration interface for configuring a caching rule. The rule name is 'Pressflow'. The configuration is divided into two steps:

- Step 1: Caching Conditions**
 - Cache if URL: matches regex, http, ://, *, /pressflow.*
 - Cookie: _COOKIE, Cache: [NO_CACHE], Action: not_exists
 - Buttons: Remove, Add Condition
 - Options: Match all of the above (selected), Match any of the above
- Step 2: Cache Output**
 - Cache for: 300 seconds
 - Checked: Create compressed cache copies
 - Create different versions of cache copies according to: _SERVER, [QUERY_STRING]
 - Buttons: Remove, + | Add

At the bottom, there are 'Cancel' and 'Save' buttons. A footer message states: 'New updates are now available. Click [here](#) for details'. A 'Restart PHP' button is also present.

Acquia Pressflow + Zend Server Benchmark

- Pressflow mod makes Drupal 36% faster than the standard build
- Zend Server Page Caching using cookies improves it to 2605% .vs. PHP.net and 734% faster than fastest numbers from APC shm



Finding Performance issues in Customized Drupal/Pressflow websites

- Performance problem in Drupal identified by Zend Server
- Profile the Bottleneck
- CodeTrace the Bottleneck
- Fix the problem using Caching

Zend Server - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://localhost:10081/ZendServer/Index/Index#1268723251174

Zend Studio Debug Profile Extra Stuff Search for PHP information: on Zend.com

Do you want Firefox to remember this password on http://localhost:10081? Remember Never for This Site Not Now

zend server Help | About | Logout

Monitor Rule Management Server Setup Administration

Dashboard Events Jobs Queue Statistics Code Tracing Server Info PHP Info Logs

17 - Severe Slow Request Execution (Absolute) Page last refreshed: 16-Mar-2010 03:07

Occurred 32 times between 01-Mar-2010 11:59 and 12-Mar-2010 14:54 Status: **Open** Severity: **Critical**

URL: http://localhost/drupal/?q=node/4

Last Time	Count	Trace	Run-Time (ms)
12-Mar 14:54	1	Has Trace/s	3520
12-Mar 14:32	1	Has Trace/s	3557
12-Mar 11:44	1	Has Trace/s	5252
12-Mar 11:16	1	Has Trace/s	8172
11-Mar 14:32	1	Has Trace/s	3477
11-Mar 14:23	2	Has Trace/s	3616
10-Mar 13:36	1	Has Trace/s	4446
10-Mar 13:30	1	Has Trace/s	5317
08-Mar 14:45	1	Has Trace/s	3689

Request Server Show Code Tracing Export Trace File Export

```

GET
  array (
    'q' => 'node/4',
  )
POST (empty)
COOKIE
  array (
    'Drupal_admin_toolbar_collapsed' => '0',
    'SESScfc90a62c81b7bfc6f292320b1d0b8ca' => '3cc34eb97342f284',
    'Drupal.cookie' => 'null'
  )

```

Zend Studio Diagnostics: Debug Event Profile Event Settings

Change status to Closed Change

Your license will expire in 12 days. Click [here](#) to update your license Restart PHP

Done 0,000 s 0,000 s 0 bytes 0 req

Code Tracing - Data Capture

Zend Server - Mozilla Firefox

http://localhost:10081/ZendServer/Code-Tracing/Show-Dump/dumpId/0.3568.2/eventNum/1

Tracing ID: 0.3568.2 12-Mar-2010 14:54

Traced URL Request: http://localhost/drupal/?q=node/4 Trace Size: 1.02 MB

URL After Rewrites: http://localhost/drupal/index.php

Tracing Tree Statistics per Function

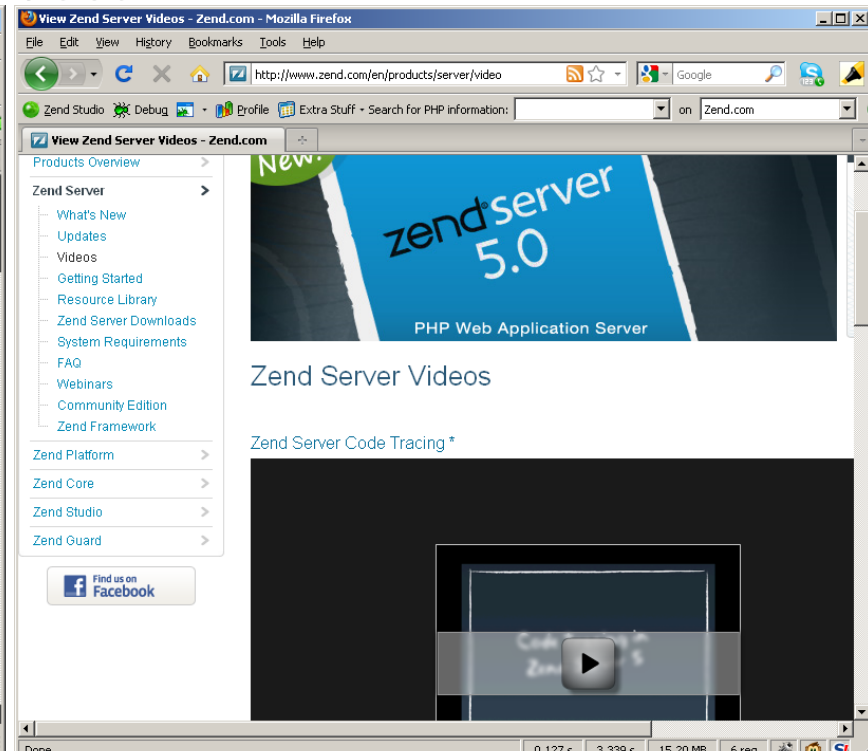
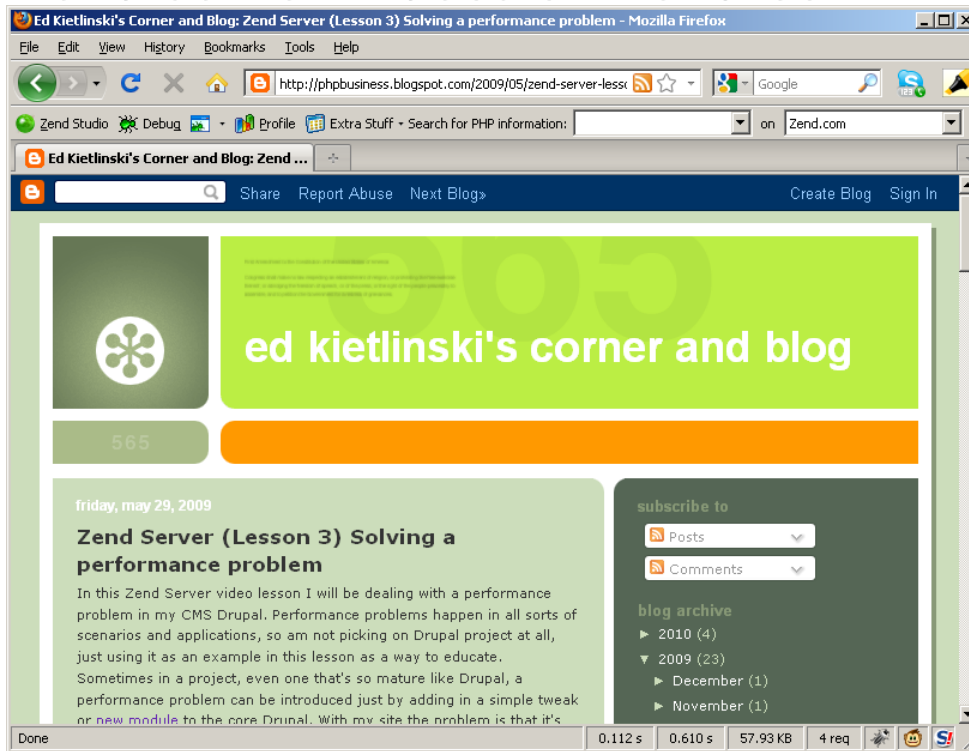
Show memory usage Highlight the most time-consuming path Next child in path

Traced Functions	Running Time	(% of tot..)	(ms)	Called from: (line)
▶ <code>field_info_field()</code>		<1.00%	0.026 ms	field.attach.inc (198)
▶ <code>field_multilingual_available_languages()</code>		<1.00%	0.121 ms	field.attach.inc (203)
▼ <code>text_field_sanitize()</code>		77.00%	1,742.394 m	field.attach.inc (212)
▶ Arguments: node,object(stdClass#26),array(translate... sle...cut, summary => , format => 4)),null,null				
▼ <code>check_markup()</code>		77.00%	1,741.898 m	text.module (239)
▶ Arguments: string(52) <?php echo date("r") . "<				
sle...cut,4,zxx,true				
▶ <code>filter_format_load()</code>		<1.00%	0.897 ms	filter.module (573)
▶ <code>filter_format_allowcache()</code>		<1.00%	0.346 ms	filter.module (576)
▶ <code>filter_list_format()</code>		<1.00%	2.504 ms	filter.module (590)
▶ <code>filter_get_filters()</code>		<1.00%	0.055 ms	filter.module (591)
▶ <code>php_eval()</code>		77.00%	1,738.008 m	filter.module (605)
▶ Returns: Fri, 12 Mar 2010 14:54:27 -0500 				
▶ <code>check_markup()</code>		<1.00%	0.448 ms	text.module (244)

Transferring data from localhost... 0.204 s 0.686 s 590.54 KB 31 req

Demos of Code Trace and Performance Troubleshooting

- May 2009 Zend Newsletter “Solving a Performance problem in Drupal”
- Zend Server Videos on Zend.com > Videos



Other Performance Opportunities for Drupal+ ZendServer

Performance Optimizations not tested yet

- Memcached
- Zend Server Clustered configuration
- BOOST
- Zend Download Server
- JobQueue and parallelizing tasks

Q & A

- URL to Optimizing Drupal Performance Whitepaper
<http://www.zend.com/topics/Optimizing-Drupal-Performance-Zend-Acquia-Whitepaper-Feb2010v2.pdf>

Contact Zend



ACQUIA

<http://acquia.com>

ZEND SERVER

<http://www.zend.com/en/products/server/>

PRESSFLOW

<https://launchpad.net/pressflow>

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THE END