
Benchmark
Performance Test
Results for Magento
Enterprise Edition
1.14.1

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Executive Summary

Benchmarking was conducted using various versions of Magento Enterprise Edition in combination with the Magento Performance Toolkit, a Magento-developed set of automated tools using PHP and Apache jMeter that provides a standardized way of performance testing Magento and the environment it is installed on. Test protocols and performance test results were developed and reported by Zynovo, a 3rd party Magento system integrator.

Test scenarios run on Magento Enterprise Edition 1.14.1 versus earlier versions of Enterprise Edition showed that Enterprise Edition 1.14.1 exhibited superior application server response times and CPU utilization rates. Also tested was the performance of various versions of PHP when run with Enterprise Edition 1.14.1. Those tests showed PHP 5.5 outperformed older versions of PHP when measuring application server response times and CPU utilization.

The 3rd party testing revealed:

- Enterprise Edition 1.14.1 provides superior application server response times versus earlier versions of Enterprise Edition:
 - 38% to 44% faster home page
 - 48% faster simple product pages
 - 27% to 47% faster checkout pages
- Enterprise Edition 1.14.1 provides superior application server CPU utilization:
 - 43% lower than Enterprise Edition 1.14.0
 - 37% lower than Enterprise Edition 1.13.1
 - 39% lower than Enterprise Edition 1.12.1
- PHP 5.5 is the best performing PHP version on Enterprise Edition 1.14.1:
 - PHP 5.5 with OPcache has 34%-53% faster application server response times than earlier versions of PHP without OPcache
 - PHP 5.5 with OPcache has at least 47% lower application server CPU utilization than all earlier versions of PHP

There are tangible benefits resulting from these performance improvements, the importance of which is supported by research:

- Faster application server response times lets merchants provide a faster shopping experience that improves conversion rates and sales.
 - An Aberdeen Group study found that a one-second improvement in page response time increases conversion by 7%¹
 - An Akamai/Forrester Consulting study showed that:
 - 47% of consumers expect an ecommerce page to load in two seconds or less
 - 40% of shoppers wait no more than three seconds before abandoning a retail site
 - 79% of online shoppers who experience a dissatisfying visit are less likely to buy from the same site again²
- Lower application server CPU utilization means merchants:
 - Save money by handling greater web traffic with their current hosting infrastructure
 - Have more options and flexibility when planning on-going site infrastructure needs
- Better PHP 5.5 performance on Enterprise Edition 1.14.1 means users:
 - Can improve conversion rates
 - Capture hosting infrastructure cost savings by upgrading from earlier PHP versions

The above benchmarking tests were conducted utilizing the [Magento Performance Toolkit](#), with recommended baseline settings described in the [Magento Performance Testing Guidelines](#). Together, the toolkit and testing guidelines reveal the real impact software, hardware, and network customizations have on performance so informed decisions can be made in optimizing Magento Enterprise Edition performance. Merchants and developers would be well served to incorporate the Magento Performance Toolkit into their development processes.

Research points to a strong link between web site performance and sales, and online shoppers have increasingly high expectations for superior web experiences. Taking advantage of the performance benefits of Enterprise Edition 1.14.1 and PHP 5.5 is one way merchants can continue to provide the types of shopping experiences that best serve their customers and deliver financial results.

¹ Simic, Bojan, "The Performance of Web Applications: Customers Are Won or Lost in One Second" November 2008, Aberdeen Group

² Forrester Consulting, "eCommerce Web Site Performance Today: An Updated Look At Consumer Reaction To A Poor Online Shopping Experience" A commissioned study conducted on behalf of Akamai Technologies, Inc., August 17, 2009

Testing Methodology

Files and scripts in the Magento Performance Toolkit were used to conduct the tests. These files can be downloaded from [GitHub](#). Siege was also used to test maximum throughput capacity without causing full page cache invalidation.

User sessions were distributed among scenarios according to the default values from the Magento Performance ToolKit (i.e. 62% for views product and add to cart, 30% for view catalog, 4% for guest checkout, and 4% for customer checkout).

The summary report from jMeter was used to measure response time. The Perfmon Metrics Collector was used to measure CPU, memory, disk I/O, and Network I/O utilization. The script was implemented to tag different page types and combine them into common page tags, and then to calculate the average response time for each common page tag. See the **Appendix** for a table showing how these different page types are tagged and combined. Also found in the **Appendix** are the network schema and the hardware and software configurations used for benchmark testing.

Testing Scenarios & Results

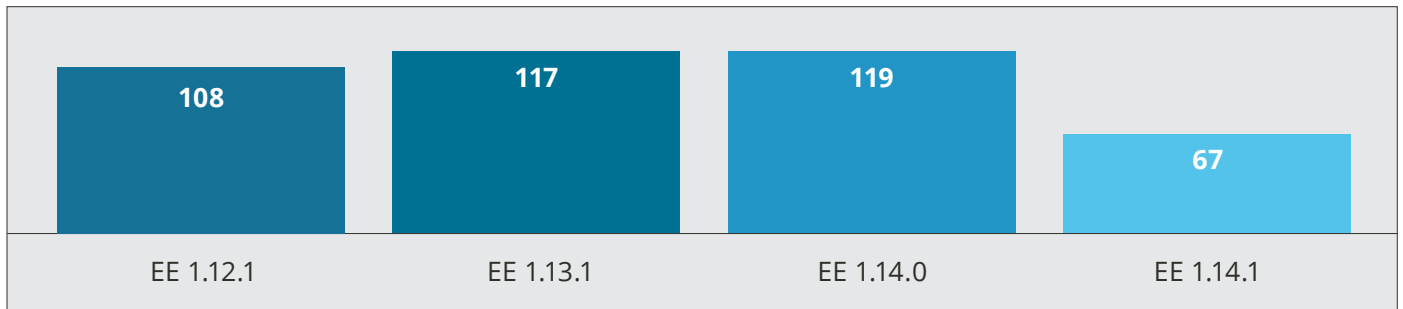
Compare different Enterprise Edition versions

Comparing the performance of different Enterprise Edition versions under the same server environment:

Software configuration for Enterprise Edition testing			
<i>PHP Version</i>	<i>MySQL Version</i>	<i>Caching Used</i>	<i>Theme Used</i>
PHP 5.5	MySQL 5.5	Native FPC with Redis	Enterprise/ default

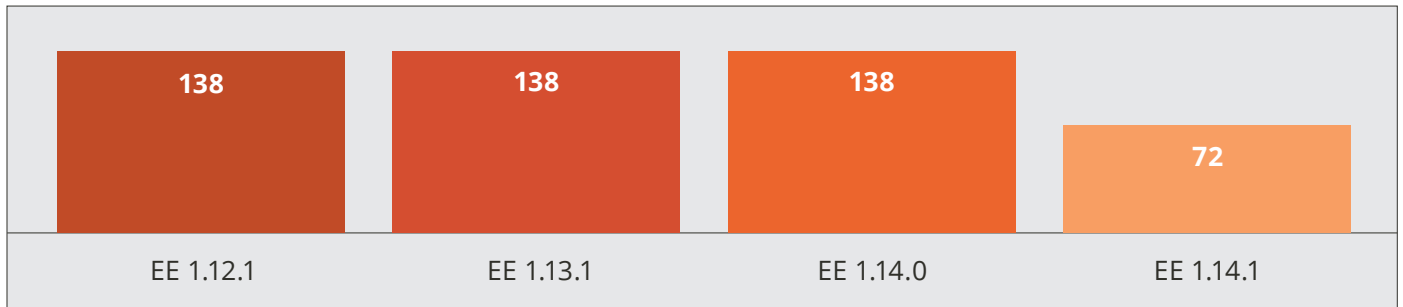
Testing revealed that Enterprise Edition 1.14.1 has faster average application server response times versus all other versions across all page types tested (home, simple product, and checkout).

Home page application server response times in milliseconds:



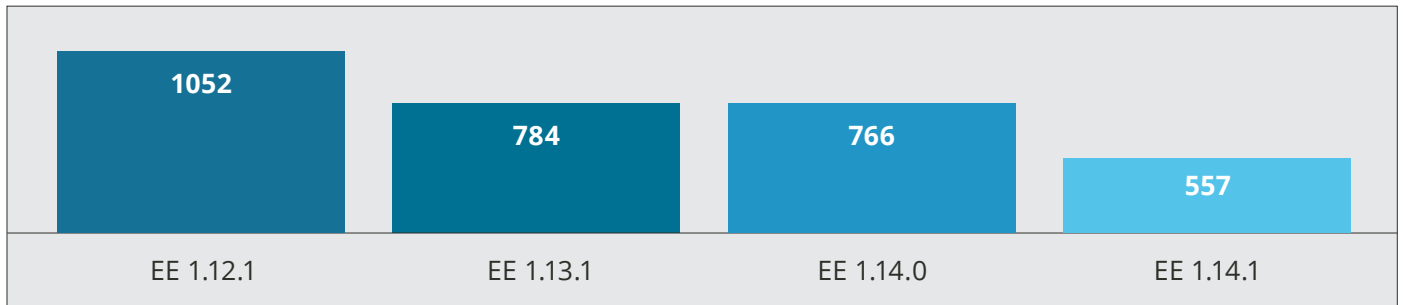
EE 1.14.1 is 38% faster for a home page than the next fastest version.

Simple product page application server response times in milliseconds:



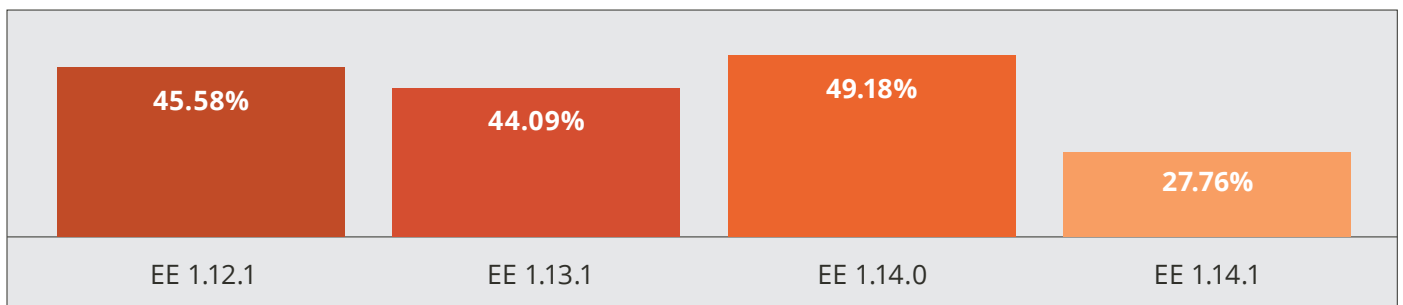
EE 1.14.1 is 48% faster for simple product pages than all other versions.

Checkout page application server response times in milliseconds:



EE 1.14.1 is 27% faster for checkout pages than the next fastest version.

Additionally, Enterprise Edition 1.14.1 shows significantly lower application server CPU utilization than the other versions. Application server CPU utilization percent:



For application server CPU utilization, EE 1.14.1 is 43% lower than EE 1.14.0, 37% lower than EE 1.13.1, and 39% lower than EE 1.12.1.

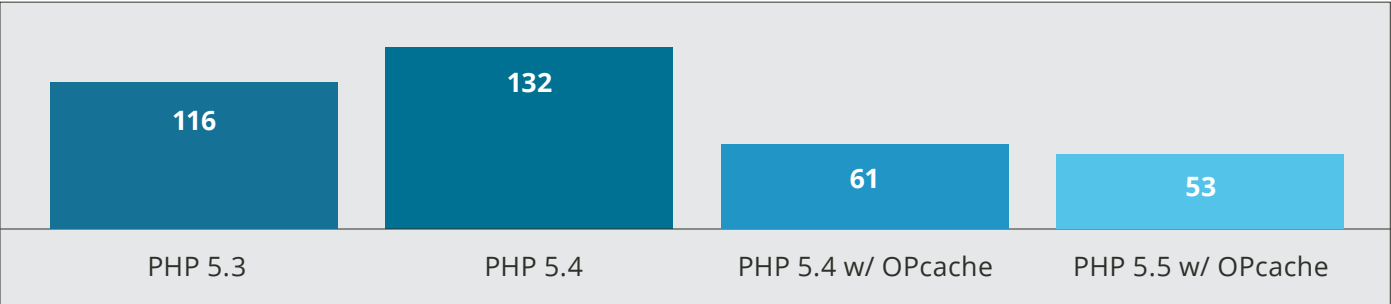
Compare different PHP versions running on Enterprise Edition 1.14.1

This test compared different versions of PHP running on the same Enterprise Edition 1.14.1 configuration:

Software configuration for PHP testing on Enterprise Edition 1.14.1			
Magento Version	MySQL Version	Caching Used	Theme Used
EE 1.14.1	MySQL 5.5	Native FPC w/ FileSystem	Rwd/enterprise

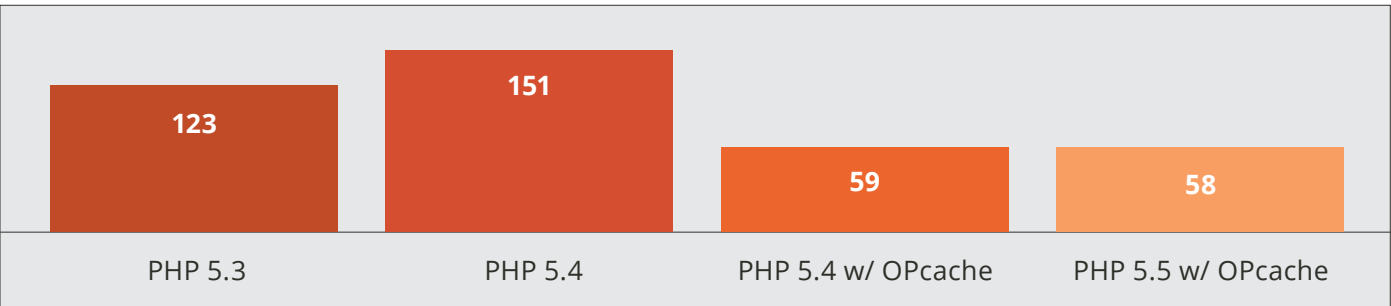
PHP 5.5 has faster application server response times versus all other versions across all page types (home, simple product, checkout order). PHP 5.4 with OPcache shows comparable performance to PHP 5.5 with OPcache with respect to application server response times.

Home page application server response time in milliseconds:



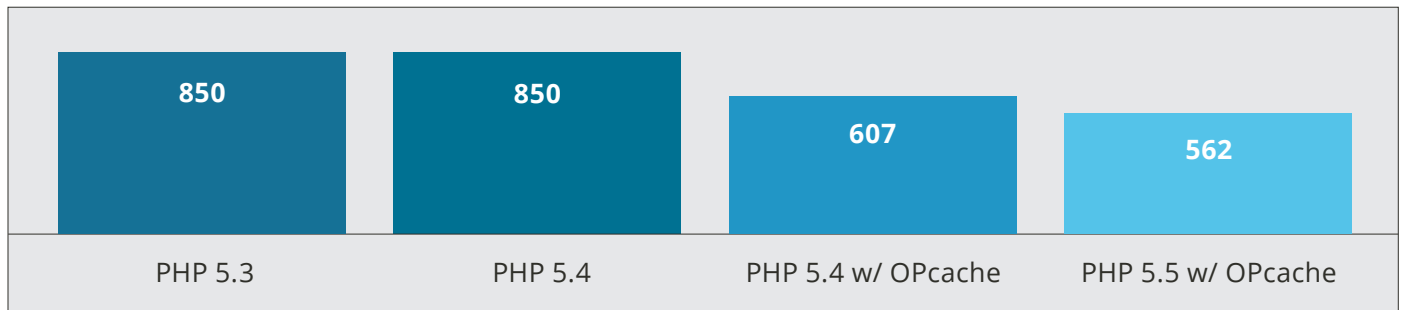
For a home page, PHP 5.5 with OPcache is 60% faster than PHP 5.4 without OPcache and 54% faster than PHP 5.3.

Simple product page application server response time in milliseconds:



For simple product pages, PHP 5.5 with OPcache is 62% faster than PHP 5.4 without OPcache and 53% faster than PHP 5.3.

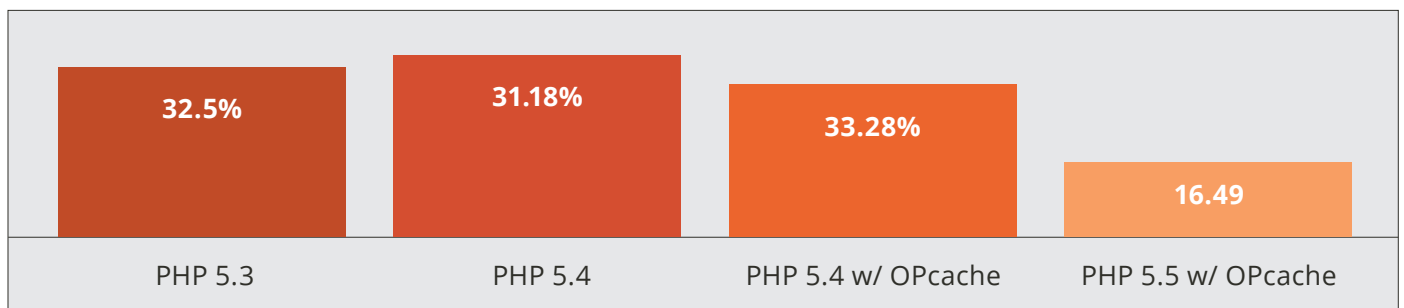
Checkout page application server response time in milliseconds:



For checkout pages, PHP 5.5 with OPcache is 34% faster than PHP 5.4 without OPcache or PHP 5.3.

When comparing application server CPU utilization, PHP 5.5 is significantly lower than all previous versions of PHP.

Application server CPU utilization percent:



For application server CPU utilization, PHP 5.5 with OPcache is 50% lower than PHP 5.4 with OPcache, 47% lower than PHP 5.4 without OPcache, and 49% lower than PHP 5.3.

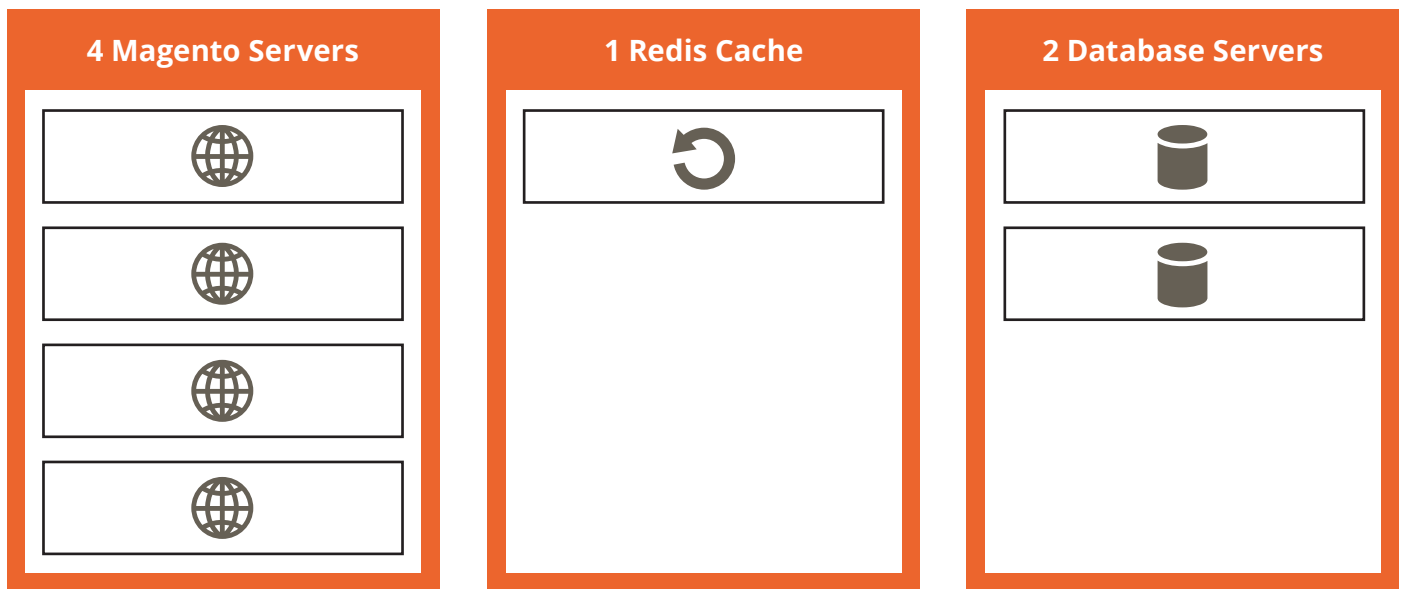
Appendix

Configuration settings for benchmark testing

Network Layout

A dedicated Apache jMeter server was located on the same network as the application and database servers. The jMeter GUI was used to control the remote jMeter server and to start and stop tests.

Network schema used for testing:



Hardware

All test servers were hosted by Rackspace cloud and located in the same region (Northern Virginia, USA).

Hardware specifications for benchmark testing:

Webserver	CPU	RAM	System Disk	Network
jMeter Server	4 vCPUs	7.5 GB	50 GB	625 Mb/s
Web Server	8 vCPUs	15 GB	50 GB	1.3 Gb/s
Database Servers	8 vCPUs	15 GB	50 GB	1.3 Gb/s
Redis Server	2 vCPUs	3.75 GB	50 GB	312.5 Mb/s

Software

The operating software installed on all servers was Ubuntu 14.04.01 LTS. Each server type had different software versions installed based on its function and dependencies.

Webservers:

Webserver	PHP	Apache	JRE	jMeter Server Agent
Webserver #1	php5=5.3.10	Apache2=2.2.22	Openjdk-7-jre=7u71-2.5.3	ServerAgent=2.2.1
Webserver #2	php5=5.4.35	Apache2=2.2.22	Openjdk-7-jre=7u71-2.5.3	ServerAgent=2.2.1
Webserver #3	php5=5.5.9	Apache2=2.4.7	Openjdk-7-jre=7u71-2.5.3	ServerAgent=2.2.1
Webserver #4	php5=5.5.9	Apache2=2.4.7	Openjdk-7-jre=7u71-2.5.3	ServerAgent=2.2.1

DB Nodes

DB Server	MySQL	JRE	jMeter Server Agent
DB Server #1	Mysql-server=5.5.40	Openjdk-7-jre=7u71-2.5.3	ServerAgent=2.2.1
DB Server #2	Mysql-server=5.6.19	Openjdk-7-jre=7u71-2.5.3	ServerAgent=2.2.1

Redis & jMeter

Server	Redis	JRE	jMeter	jMeter Server Agent	jMeter-Plugins
Redis #1	Redis-server=2:2.8	Openjdk-7-jre=7u71-2.5.3	×	ServerAgent=2.2.1	×
jMeter #1	×	Openjdk-7-jre=7u71-2.5.3	Apache-jMeter=2.12	×	jMeter-Plugins-Standard=1.2.0

Page tag mapping for response time testing

The following table shows the different Apache jMeter page tags and how they are combined into aggregated page types for use in application server response testing.

Tag	Tag in Jmeter
Home page	Open Home page(CatProdBrowse). Open Home page(BrowsAddToCart). Open Home Page(GuestChkt). Open Home page(CustomerChkt)
Category page	Open Category(CatProdBrowse). Open Category(BrowsAddToCart). Open Category(GuestChkt). Open Category(CustomerChkt)
Simple product view	Simple product 1 View(CatProdBrowse). Simple product 1 View(BrowsAddToCart). Simple product 1 View(GuestChkt). Simple product 1 View(CustomerChkt) Simple product 2 View(CatProdBrowse). Simple product 2 View(BrowsAddToCart). Simple product 2 View(GuestChkt). Simple product 2 View(CustomerChkt)
Configurable product 1 View	Configurable product 1 View(CatProdBrowse). Configurable product 1 View(BrowsAddToCart). Configurable product 1 View(GuestChkt). Configurable product 1 View(CustomerChkt)
Simple product add to cart	Simple product 1 add to cart(BrowseAddToCart). Simple product 1 add to cart(GuestChkt). Simple product 1 add to cart(CustomerChkt) Simple product 2 add to cart(BrowseAddToCart). Simple product 2 add to cart(GuestChkt). Simple product 2 add to cart(CustomerChkt)
Configurable product 1 add to cart	Configurable product 1 add to cart(BrowseAddToCart). Configurable product 1 add to cart(GuestChkt). Configurable product 1 add to cart(CustomerChkt)
Checkout Start	Checkout start(GuestChkt). Checkout start(CustomerChkt)
Checkout Place Order	Checkout place order(GuestChkt). Checkout place order(CustomerChkt)