

By: Adam Culp Twitter: @adamculp



- About me
- OSS Contributor

100 Total

- PHP Certified
- Zend Certification Advisory Board
- PHP-Fig voting member (IBM i Toolkit)
- Beachcasts and RunGeekRadio Host
- Consultant at Zend Technologies
- Organizer SoFloPHP (South Florida)
- Organizer SunshinePHP (Miami)
- Long distance (ultra) runner
- Photography Enthusiast
- Judo Black Belt Instructor



ERTIFICATION



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- Organizer Sunshine
- Long distance (ultr
- Judo Black Belt Ins



I am the Photography Enthu PHP Ninja!!!



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• Fan of iteration

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- Pretty much everything requires iteration to do well:
 - Long distance running
 - Judo
 - Development
 - Evading project managers
 - Code Quality!



- Metrics
 - Not productive



• Metrics

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- More accurate, quantifiable



• Why Measure?

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• Why Measure?

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- Highlight bugs

• Why Measure?

and the second second

- Highlight bugs
- Improve quality
 - Easier onboarding
 - Less reading, more writing
 - Testable

• Why Measure?

- Highlight bugs
- Improve quality
 - Easier onboarding
 - Less reading, more writing
 - Testable
- Satisfied customers
 - Faster development
 - Less broken



• Why Measure?

-

- Highlight bugs
- Improve quality
 - Easier onboarding
 - Less reading, more writing
 - Testable
- Satisfied customers
 - Faster development
 - Less broken
- Personal pride

• Why Measure?

-

- Highlight bugs
- Improve quality
 - Easier onboarding
 - Less reading, more writing
 - Testable
- Satisfied customers
 - Faster development
 - Less broken
- Personal pride
- Higher salary



• Bad Music

and the second

- Not a song writer



• Bad Music

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- Not a song writer
- "By ear" not reliable



• Code "smells"

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- What are "smells"?
 - Indications of spoiled code nearby
 - Not conclusive
 - The "smell" is not bad



• What To Measure?

• What To Measure?

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- Cyclomatic complexity
 - "The count of the number of linearly independent paths through the source code." wikipedia
 - Decision points
 - Less than 10 (personally less than 6)

and the second second

• Cyclomatic Complexity Example

```
function foo($bar)
{
    if ($bar == 1) {
        $bar = $bar;
    }
    if ($bar == 2) {
            $bar = $bar;
    }
    return $bar;
}
```



• What To Measure?

and the second second

- Cyclomatic complexity
- Duplicate code
 - Rule of 3

```
function foo($bar)
                                             function baz($bar)
    if ($bar == 1) {
                                                  if ($bar == 1) {
        $bar = $bar;
                                                      $bar = $bar;
    }
                                                  }
    if ($bar == 2) {
                                                  if ($bar == 2) {
        $bar = $bar;
                                                      $bar = $bar;
    }
                                                  }
    return $bar;
                                                  return $bar;
}
                                              }
```

• What To Measure?

-

- Cyclomatic complexity
- Duplicate code
- Long classes
 - Less than 1,000 lines
 - Classes solve a (1) problem



• What To Measure?

-

- Cyclomatic complexity
- Duplicate code
- Long classes
- Class Complexity
 - Less than 50

• What To Measure?

- Cyclomatic complexity
- Duplicate code
- Long classes
- Class complexity
- Long methods
 - Less than 100 (personally less than 20)
 - Method should do one thing



• What To Measure?

-

- Cyclomatic complexity
- Duplicate code
- Long classes
- Class complexity
- Long methods
- Unused variables



• What To Measure?

-

- Cyclomatic complexity
- Duplicate code
- Long classes
- Class complexity
- Long methods
- Unused variables
- Lack or overuse of comments
 - Clear, concise, not explain bad code

Comment Example

```
// check to see if the employee is eligible for full benefits
if (($employee['flags'] && HOURLY_FLAG) && ($employee['age'] > 65)) {
    /* Do something */
}
// Or this?
if ($this->Employee->isEligibleForFullBenefits($id)) {
    /* Do something*/
}
```

• What To Measure?

- Cyclomatic complexity
- Duplicate code
- Long classes
- Class complexity
- Long methods
- Unused variables
- Lack or overuse of comments
- Global usage

```
global $data;
```

\$user = \$ GLOBAL['user'];

\$user = \$_GET['user']; \$user = \$_POST['user']; \$user = \$_REQUEST['user'];

• What To Measure?

- 19 A

- Cyclomatic complexity
- Duplicate code
- Long classes
- Class complexity
- Long methods
- Unused variables
- Lack or overuse of comments
- Global usage
- Npath complexity
 - Possible paths through code
 - Less than 200 paths

```
$bar = array('one', 'two', 'three');
function foo($bar)
{
   foreach ($bar as $item) {
     $baz = $item;
   }
   return $baz;
}
```

• What To Measure?

-

- Cyclomatic complexity
- Duplicate code
- Long classes
- Class complexity
- Long methods
- Unused variables
- Lack or overuse of comments
- Global usage
- Npath complexity
- Much, much, more
 - Code smells

• Tools

ALC: NOT

- <u>https://github.com/exakat/php-static-analysis-tools</u>

This repository	Search	Pull requests	s Issues	Marketplace	Gist							
© exakat / php-sta	tic-analysis-tools	Projects	D III V	/iki Insiahts	Owned Watch → 67	★ Star						
A reviewed list of use static-analysis php	eful PHP static analysis to	pols ysis phplint	php-format	tter								
🕝 56 commi	ts 🖇	1 branch		ି ୦ rele	ases	11						
Branch: master - New	w pull request			Create no	ew file Upload files	Find file						
dseguy Adding PHP	Magic Number Detector					Latest co						
	Ini	Initial commit										
LICENSE.md	Ini	Initial commit										
README.md	Ad	Adding PHP Magic Number Detector										
README.md												

- Containerized Tools
 - PHPLoc
 - PHPDepend
 - PHPMessDetector
 - PHPCopyPasteDetector
 - PHPMetrics
 - PHP_Codesniffer
 - PHPCompatibility



https://hub.docker.com/u/adamculp/ https://github.com/adamculp/php-code-quality

• Docker Hub

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Q Search	Explore Help Sign up Sign In
PUBLIC AUTOMATED BUILD adamculp/php-code-quality ☆ Last pushed: 11 days ago	
Repo Info Tags Dockerfile Build Details	
Short Description	Docker Pull Command
Image with PHP code quality, PHP static analysis, PHPUnit, PHP compatibility, and PHP QA tools.	docker pull adamculp/php-code-quality
Full Description	Owner
php-code-quality	adamculp
The objective is to include multiple PHP code quality tools (phpqatools and more) in an easy to use Docker image. The tools include php-ga-tools, PHP static analysis, lines of PHP code report mess detector code smell	
highlighting, copy/paste detection, and the applications compatibility against versions of PHP.	adamculp/php-code-quality
More specifically this includes:	

https://hub.docker.com/u/adamculp/

• Tools

- <u>https://github.com/exakat/php-static-analysis-tools</u>
 - PHPLoc

\$ php phploc.phar -v --names "*.php" \
--exclude 'vendor' \
/path/to/project/ > /path/to/result.txt

• PHPLoc Results

Directories Files	77 408	
Size Lines of Code (LOC) Comment Lines of Code (CLOC) Non-Comment Lines of Code (NCLOC) Logical Lines of Code (LLOC) Classes Average Class Length Average Method Length Functions Average Function Length Not in classes or functions	139013 39849 99164 33765 31432 82 5 0 0 0 2333	(28.67%) (71.33%) (24.29%) (93.09%) (0.00%) (6.91%)
Complexity Cyclomatic Complexity / LLOC Cyclomatic Complexity / Number of Methods	0.17 2.10	
Dependencies Global Accesses Global Constants Global Variables Super-Global Variables Attribute Accesses Non-Static Static Method Calls Non-Static Static	140 0 140 7972 7972 0 23650 23299 351	(0.00%) (0.00%) (100.00%) (100.00%) (0.00%) (98.52%) (1.48%)
Structure Namespaces Interfaces Traits Classes Abstract Classes Concrete Classes Methods	60 0 379 0 379 5307	(0.00%) (100.00%)

- Tools
 - https://github.com/exakat/php-static-analysis-tools
 - PHPLoc
 - PHP_Depend https://pdepend.org/

\$ php pdepend.phar --ignore 'vendor' \
--summary-xml='/path/to/result.xml' \
--jdepend-chart='/path/to/chart.png' \
--overview-pyramid='/path/to/pyramid.svg' \
/path/to/project/

• PHP_Depend Result

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- Graphs and XML output



				ANDC	0.565				
				AHH	0.442				
			9.333	NOP	342				
		7.318	NOC		3192				
	16.945	NOM			23359		NOM	4.137	
0.169	LOC				395815	96646		CALLS	0.102
CYCLO)				66812	9891		FA	NOUT
• Low	v 🥚	Averag	e	High			Generate	d by PHP	Depend

• Tools

- The

- https://github.com/exakat/php-static-analysis-tools
 - PHPLoc
 - PHP_Depend
 - PHP Copy/Paste Detector

\$ php phpcpd.phar \
/path/to/project/ \
--exclude 'vendor' \
> /path/to/result.txt

• PHP Copy/Paste Detector Result

Found 427 exact clones with 51080 duplicated lines in 262 files:

- /path/to/project/my-project/module/Registration/src/Registratic /path/to/project/my-project/module/Registration/src/Registratic
- /path/to/project/my-project/module/Registration/src/Registratic /path/to/project/my-project/module/Registration/src/Registratic
- /path/to/project/my-project/module/Registration/src/Registratic /path/to/project/my-project/module/Registration/src/Registratic
- /path/to/project/my-project/module/Registration/src/Registratic /path/to/project/my-project/module/Registration/src/Registratic

/--- --/

36.74% duplicated lines out of 139013 total lines of code.

Time: 4.2 seconds, Memory: 98.00Mb

• Tools

And the owner of the owner own

- https://github.com/exakat/php-static-analysis-tools
 - PHPLoc
 - PHP_Depend
 - PHP Copy/Paste Detector
 - PHP Mess Detector
 - Codesize

\$ php phpmd.phar /path/to/project/my-project/module/ xml codesize --exclude 'vendor' --reportfile ' /path/to/project/phpqatoolresults/phpmd_codesize_output.xml'

• PHP Mess Detector Result (codesize)

-<violation beginline="28" endline="1057" rule="ExcessiveClassLength" ruleset="Code Size Rules" package="Other\Controller" externalInfoUrl="http://phpmd.org/rules/codesize.html#excessiveclasslength" class="DashboardController" priority="3">The class DashboardController has 1030 lines of code. Current threshold is 1000. Avoid really long classes.

</violation>

-<violation beginline="28" endline="1057" rule="TooManyMethods" ruleset="Code Size Rules" package="Other\Controller" externalInfoUrl="http://phpmd.org/rules/codesize.html#toomanymethods" class="DashboardController" priority="3">

The class DashboardController has 13 methods. Consider refactoring DashboardController to keep number of methods under 10.

-<violation beginline="28" endline="1057" rule="ExcessiveClassComplexity" ruleset="Code Size Rules" package="Other\Controller" externalInfoUrl="http://phpmd.org/rules/codesize.html#excessiveclasscomplexity" class="DashboardController" priority="3">

The class DashboardController has an overall complexity of 143 which is very high. The configured complexity threshold is 50. </violation>

-<violation beginline="78" endline="287" rule="CyclomaticComplexity" ruleset="Code Size Rules" package="Other\Controller" externalInfoUrl="http://phpmd.org/rules/codesize.html#cyclomaticcomplexity" class="DashboardController" method="dashboardAction" priority="3">

The method dashboardAction() has a Cyclomatic Complexity of 24. The configured cyclomatic complexity threshold is 10. </violation>

• Tools

-

- https://github.com/exakat/php-static-analysis-tools
 - PHPLoc
 - PHP_Depend
 - PHP Copy/Paste Detector
 - PHP Mess Detector
 - Codesize
 - Unused

\$ php phpmd.phar /path/to/project/my-project/module/ xml unusedcode --exclude
'vendor' --reportfile ' /path/to/project/phpqatool-results/phpmd_unused_output.xml'

• Tools

where the

- https://github.com/exakat/php-static-analysis-tools
 - PHPLoc
 - PHP_Depend
 - PHP Copy/Paste Detector
 - PHP Mess Detector
 - Codesize
 - Unused
 - PHP Dead Code Detector
 - Searches for code no longer used

- Tools
 - https://github.com/exakat/php-static-analysis-tools
 - **PHPMetrics**

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• http://phpmetrics.org

```
wget https://github.com/Halleck45/PhpMetrics/raw/master/build/phpmetrics.p
har
chmod +x phpmetrics.phar
```

```
mv phpmetrics.phar /usr/local/bin/phpmetrics
```

Usage:

phpmetrics --report-html=/path/of/report.html <folder or filename>

• PHPMetrics Results

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PhpMetrics report - Google Chrome													-		-		_	_					to the state	900	
Nouvel anglet 🛛 📄 PhpMetrics report																									
Source State Sta																						5	(c) 🔹	* =	Ŧ
🗋 Debug 🔛 Getting Started 📕 Am I Responsive? 📗	What are incide 🧱 En	deavour Fl	at 🧇	Scrum To	pols S	Scrumwi	e 🙀 R	ational	llyboos	. ef we	ebPerfDay	s (0100	rsera	NI col	or gradie	nt	65	+ Greatest F	r 🚺	Google Ne	2005			۰
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	Powered by PhoMetrics - C	oovright Je	an-Franco	is Lépine																					

• Tools

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- https://github.com/exakat/php-static-analysis-tools
- PHPMetrics
- PHP_Codesniffer
 - Create rules/sniffs to ensure standards are followed
 - From CLI, IDE, or via SCM hooks



- PHP Upgrading Get to 7+
 - PHPCompatibility
 - Uses PHPCodesniffer
 - Outputs detailed results

13 \$ php /usr/local/lib/php-code-quality/vendor/bin/phpcs -sv -config-set installed_paths /usr/local/lib/php-code-quality/ vendor/phpcompatibility/php-compatibility && \ 14 php /usr/local/lib/php-code-quality/vendor/bin/phpcs -sv -standard='PHPCompatibility' --extensions=php -ignore=vendor . |--report-file=./php_code_quality/ phpcompatibility_results.txt .

15

• PHP Upgrading

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- PHPCompatibility
 - Sample result

FILE:	/app/libr	raries/classes/Config/Validator.php
FOUND	2 ERRORS	AFFECTING 2 LINES
208 mysqli	ERROR instead	Extension 'mysql_' is deprecated since PHP 5.5 and removed since PHP 7.0; Use
212		(PHPCompatibility.Extensions.RemovedExtensions.mysql_DeprecatedRemoved)
mysqli	instead	Extension mysql_ is deprecated since Php 5.5 and removed since Php 7.0; use
	I	(PHPCompatibility.Extensions.RemovedExtensions.mysql_DeprecatedRemoved)

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- Commercial Tools
 - Scrutinizer

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- Commercial Tools
 - Scrutinizer

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- Zend Server and Z-Ray
 - Debugging, Code tracing, Error reporting

1 7	Slow Request Execution	Today, 21:23:23
8	High Memory Usage	Today, 21:23:23
1 1 4	Slow Function Execution	Today, 21:23:20
1	PHP Error	Today, 21:23:18
2	Function Error	Today, 21:23:18
1 1 3	Database Error	Today, 21:23:18

10 C

• Apache Bench Result

Server Softwar	e:		Apache	/2.2.22									
Server Hostnam	ne:		zend.c	om									
Server Port:			80										
Document Path:			/										
Document Lengt	:h:		278 by	278 bytes									
Concurrency Le	vel:		1										
Time taken for	tes '	ts:	10.005	second	s								
Complete reque	sts:		96										
Failed request	s:		0										
Non-2xx respon	ises:		96										
Total transfer	red:		51072 bytes										
HTML transferr	ed:		26688 bytes										
Requests per s	econ	d:	9.60 [#/sec] (mean)										
Time per reque	st:		104.21	6 [ms]	(mean)								
Time per reque	st:		104.21	6 [ms]	(mean.	across	all	concurrent	requests)				
Transfer rate:			4.99 [Kbytes/	sec] re	eceived			, , , , , ,				
Connection Tim	nes (ms)											
	min	mean	[+/-sd]	median	max								
Connect:	47	51	2.7	50	60								
Processing:	49	53	5.9	52	99								
Waiting:	49	52	3.5	51	68								
Total:	98	104	6.3	102	148								

• Automate!

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Conclusion

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- Measure all the things!
- Don't fear results, share them
- Reduce complexity
- Leave code cleaner than you got it
- Learn to "smell" problems
- Use refactoring to fix shortcomings
- Love iteration!

• Thank you!

and the second second

- https://github.com/exakat/php-static-analysis-tools
- http://phpmetrics.org
- https://github.com/adamculp/php-code-quality
- http://zend.com
- Please rate

Adam Culp http://www.geekyboy.com http://RunGeekRadio.com http://Beachcasts.com Twitter @adamculp

