

PHP MIGRATION CONCEPTS

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Migration

- Never touch a running system
- Always use the latest version
- Rewrite from scratch



Why migrate?

- Fewer bugs
- Increased security
- New features

- More code reuse



Migration Aspects

- Environment
 - § Platform
 - § Operating system
 - § Database
 - § Webserver
 - § PHP



Migration Aspects: PHP

- PHP Version
- PHP user and access rights
- PHP Extensions

- PHP Configuration



Migration Aspects

- Environment
 - § Platform
 - § Operating system
 - § Database
 - § Webserver
 - § PHP
 - § External programs
 - § Configuration
- PHP Code
 - § Your own code
 - § Third-party code



Aspects Deliberately Left Out

- Browser
- Performance
- Security



Which PHP Configuration?

- php.ini
- php-<sapi>.ini
- httpd.conf
- .htaccess
- ini_set()



How is PHP configured?

- Which configuration file?
 - § look at phpinfo() output
 - § `php -i | grep Configuration`
- Display configuration at runtime
 - § `var_dump(ini_get_all());`
- Remember:
 - § `get_cfg_var()` shows php.ini setting
 - § `ini_get()` shows current setting



Error Reporting

- E_* constants change between PHP versions
- Only PHP knows these constants
 - § Use numeric values in Apache configuration
- Always code for highest level of error reporting
 - § `error_reporting(E_ALL | E_STRICT)`
 - § even better: set this in `php.ini`



Useful Tools

- PHP
 - § Syntax Check ("Lint"): `php -l <filename>`
 - § Error Check: `php -d error_reporting=8191 test.php > NUL`
- PEAR
 - § `PHP_CodeSniffer`, `PHP_CompatInfo`, `PHP_Beautifier`



PHP_CodeSniffer

```
$ phpcs /path/to/code/myfile.php
```

```
FILE: /path/to/code/myfile.php
```

```
-----  
FOUND 5 ERROR(S) AND 1 WARNING(S) AFFECTING 5 LINE(S)
```

```
-----  
 2 | ERROR    | Missing file doc comment  
20 | ERROR    | PHP keywords must be lowercase; expected "false" but found  
   |          | "FALSE"  
47 | ERROR    | Line not indented correctly; expected 4 spaces but found 1  
47 | WARNING  | Equals sign not aligned with surrounding assignments  
51 | ERROR    | Missing function doc comment  
88 | ERROR    | Line not indented correctly; expected 9 spaces but found 6  
-----
```



PHP_CompatInfo

```
<?php
```

```
require_once 'PHP/CompatInfo/Cli.php';  
$info = new PHP_CompatInfo_Cli;  
$info->run();
```

```
?>
```



PHP_CompatInfo

- `php compat.php -d path/to/dir`

Path	Version	Extensions	Constants/Tokens
[...]*	3.0.12	mysql pcre	
[...]\script.php	3.0.6	mysql	

Useful Tools

- PHP
 - § Syntax Check ("Lint"): `php -l <filename>`
 - § Error Check: `php -d error_reporting=8191 <filename> > NUL`
- PEAR
 - § `PHP_CompatInfo`, `PHP_CodeSniffer`, `PHP_Beautifier`
- xdebug
- PHPUnit
- Selenium
- Virtual Machines

- Version Control (Subversion) + Merge/Diff Tools



Migration Process

- Analyze your environment
- Define target environment
- Partition your code
- Setup test systems
- Test
- Migrate
- Do Integration testing
- Migrate the production system



Analyze Your Environment

- PHP version
- PHP configuration
- PHP user and access rights
- PHP Extensions



Define Target Environment

- PHP version
- PHP configuration
- PHP user and access rights (How to install PHP?)
- PHP extensions
- Remove complexity
 - § Encoder
 - § Optimizer
 - § Cache
 - § Clustering
 - § Load-Balancing



Partition Your Code

- Identify modules / components



Setup Your Test Systems

- Set up two Test Systems
 - § Existing environment
 - § Target environment
- Run tests in both environments
 - § Results should be identical



Testing: Unit Tests

- Test a part (class, component) of the software
- Tests run at the command line
- Use PHPUnit or SimpleTest
- Compare calculated results with expected result



Testing: System Tests

- Test the whole product
- Tests run in the browser
- Selenium
 - § Selenium RC
 - § Selenium IDE



Testing: System Tests

- Test the whole product
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 - § Selenium IDE

The screenshot shows the Selenium IDE application window. The title bar reads "Selenium IDE *". The menu bar includes "Datei (F)", "Bearbeiten", "Options", and "Hilfe". The "Base URL" field contains "http://www.google.de/". The control bar has radio buttons for "Run", "Walk", and "Step", along with play, pause, and refresh icons. The main area is a table with "Table" and "Source" tabs. The table contains the following test script:

Command	Target	Value
open	/	
assertTitle	Google	
clickAndWait	link=Bilder	
assertTitle	Google Bilder	
type	q	stefan priebisch
clickAndWait	btnG	
assertTitle	stefan priebisch - G...	

Below the table are input fields for "Command", "Target", and "Value", with a "Find" button. At the bottom, there is a "Log" section with "Reference" and "Info" tabs, and a "Clear" button.

Testing: System Tests

- Test the whole product
- Tests run in the browser
- Selenium
 - § Selenium RC
 - § Selenium IDE
- Tests assertions on DOM tree
- Selenium + PHPUnit to automate the tests



Migrate PHP Code

- Make the code compile
- Make it run without any E_* messages
- Work towards php.ini-recommended
- Fix problems with different behaviour



Name Conflicts

- PHP Keywords
 - § new, break, do, clone, final, try, import, namespace
- Built-in functions, classes, constants, variables



Name Conflicts

- Easy solution: Prefix everything
 - § Looks ugly for method names, though
- Show already used names:
 - § `var_dump(get_declared_classes());`
 - § `var_dump(get_defined_interfaces());`
 - § `var_dump(get_defined_constants());`
 - § `var_dump(get_defined_vars());`
 - § `var_dump(array_keys(get_defined_vars()));`



Case Problems

- Filenames on Windows vs. Unix
 - § case-insensitive vs. case-sensitive
 - § Backslash vs. Forward Slash
- `__FILE__` on Windows contains backslashes, not forward slashes
- `__FUNCTION__` / `__CLASS__` returned lower case names, now return "correct" names



References

- PHP 5 treats objects by reference, PHP 4 made copies unless you used &
- To copy objects in PHP 5, use clone

- Short version: you do not need & any more



Configuration Caveats

- zend.ze1_compatibility_mode
- allow_call_time_pass_reference
- register_globals
- magic quotes
- register_long_arrays
- allow_url_include
- error_reporting
- display_errors
- log_errors



register_globals

- import_request_variables()
- Global variables HTTP_*
- Superglobal variables
 - § \$_GET, \$_POST, \$_REQUEST, \$_FILES, \$_COOKIE, \$_GLOBALS



Processing Input Data

```
<?php

class Input
{
    protected $input = array();

    public function __construct($aInput)
    {
        $this->input = $aInput;
    }

    public function get($aName)
    {
        if (!array_key_exists($aName, $this->input)) return NULL;

        return $this->input[$aName];
    }
}

?>
```



magic_quotes

- Auto escape \ ' " in input data
- Application depends on the setting
- To avoid multiple backslashes, check setting, unescape if necessary
 - § `ini_get()`, `stripslashes()`



Integration Test

- Unit Tests are not enough
- System tests are not enough
- When it works on the test system, it may not work on the production system



After The Migration

- Take your time
- Slowly add complexity, step by step
 - § Optimizers, Encoders, Caches, Clusters, Load Balancing
- Optimize

- Prepare for the next migration



Lessons Learned

- Establish Coding Guidelines
- Stick to them
- Do not use undocumented features
- Do not use ugly hacks
- Write human-readable code
- Defensive coding
- Always code with highest level of error reporting
- Code should not emit E_* messages



Agile Migration

- Always develop with latest PHP version
- Switch development systems once in a while
- Continuously migrate in small steps
- Refactor your code



THANK YOU FOR LISTENING



PHP MIGRATION CONCEPTS

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URLs

- Email: stefan.pribsch@e-novative.de
- www.pribsch.de (de)
- inside.e-novative.de (en)

- xdebug: www.xdebug.org
- PHPUnit: www.phpunit.de
- Selenium: www.openqa.org

- PHP Migration:
www.php.net/manual/en/appendices.php

