
<?php
Best Practices of
PHP Development
Matthew Weier O'Phinney
PHP Developer
Zend Technologies
Mike Naberezny
Principal
Maintainable Software
Zend
The php Company

About Us

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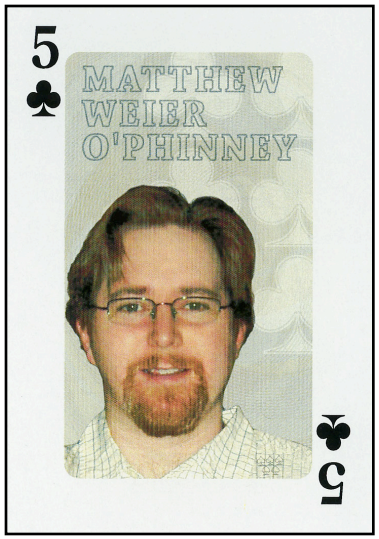
Matthew Weier O'Phinney

- **PHP Developer, Zend Technologies**
  - Production site maintenance and deployment
  - Internal web services
  - Zend Framework contributor
- **Open Source Contributor**
  - PEAR
  - Cgiapp
  - Solar



About Us

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Mike Naberezny

- Coauthored Zend PHP 5 Certification
- Professional software engineer for over ten years at some large companies
- Dynamic language advocate
  - Python Developer (6 years)
  - PHP Developer (about 4 years)
  - Ruby Developer (1.5 years)
- Open Source Contributor
- Principal, Maintainable Software LLC

About You

- Can you read your own code? Can others?
- Is your software documented?
- More importantly, is your software tested?
- Are you using source control?
- Does your team work efficiently?
- Do you push buggy software into production?

Agenda

- **Programming**
  - Coding Standards
  - Documentation
  - Testing
- **Tools and Processes**
  - Collaboration
  - Source Control
  - Deployment
- **Q&A**

Programming

- Coding Standards
- Documentation
- Testing

Coding Standards

Coding Standards

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- Focus on code, not formatting
- Consistency
- Readability
- Collaboration

Coding Standards

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- Don’t invent your own standard. You are not special and your PHP source code is not unique.
- Use an established standard
  - Be objective
  - Minimize politics when choosing
  - Use as requirement when hiring or outsourcing
  - Encourage reuse
  - Compatible with many PHP projects

Coding Standards

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PEAR Coding Standard

- Popular Library
- Issues have already been debated
- Well known and accepted (more than any other)
- Basis for many open source PHP projects
  - Horde*
  - Solar
  - Zend Framework

* The PEAR coding standard was largely adopted from Horde.
- Chuck Hagenbuch, Founder of the Horde project

Naming Conventions

- Class names are CamelCased, with an initial cap, using underscores to separate logical package and code boundaries:
  - Spreadsheet_Excel_Writer
  - Services_Google_AdWords

Naming Conventions

- Files
  - Class name used to name file
  - .php suffix
  - Class name underscores convert to directory separator:
    - Spreadsheet_Excel_Writer
    - Spreadsheet/Excel/Writer.php
  - One class per file, no loose PHP code

Naming Conventions

- Variable names are camelCased, with the initial character lowercased
- Constant names are ALL_CAPS with underscores for word separators
- Private methods and properties are prefixed with an _underscore

Coding Standards

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- One True Brace
  - Functions and Classes have the opening brace on the line following the declaration, at the same indent level
  - Control structures keep the opening brace on the same line as the declaration
- Indentation
  - Spaces only; no tabs
  - Four (4) spaces per level of indentation
  - Purpose is consistency of viewing

Coding Standards

```php
<?php

class Zend_Foo_Bar extends Zend_Foo
{
    const BAZ = 0;

    public $fooVar;

    private $_barVar;

    public function sayHello($name)
    {
        if ($name == 'Matthew') {
        }
    }
}
```

- All control structures use braces; no one liners
- Keep lines 75-85 characters in length, maximum
- No shell-style comments (#)

Design Patterns

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- Reusable ideas, not code
- Proven solutions to common design problems
- Better communication through shared vocabulary

Documentation

Documentation

- Source Documentation
  - phpDocumentor
- End User Documentation
  - DocBook

Source Documentation

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phpDocumentor

http://phpdoc.org

- phpDocumentor tags are the most used standard for generating documentation from PHP source code.
- Uses annotation tags in source comments very similar to those used by Javadoc.
- Other documentation generators, such as Doxygen, support these same tags. Don't invent your own tags.
- Supported by a number of different IDEs. Zend Studio is perhaps the most prevalent.

Source Documentation

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Completely Undocumented

```php
<?php

class Zend_Feed_EntryRss extends Zend_Feed_EntryAbstract
{
    protected $_rootElement = 'item';

}
```

(is your's like this?)

Source Documentation

```php
<?php

class Zend_Feed_EntryRss extends Zend_Feed_EntryAbstract
{
    /**
     * Root XML element for RSS items.
     *
     * @var string
     */
    protected $_rootElement = 'item';
}
```

Document All Source Elements

- Files, Classes, Methods, Variables, and more
- Comments, Type Hints, other useful metadata

Source Documentation

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```php
/**
 * Easy access to <link> tags keyed by "rel" attributes.
 *
 * If link() is called with no arguments, we will attempt to
 * return the value of the <link> tag(s) like all other
 * method-syntax attribute access. If an argument is passed to
 * link(), however, then we will return the "href" value of the
 * first <link> tag that has a "rel" attribute matching $rel:
 *
 * @param  string $rel    The "rel" attribute to look for.
 * @return mixed
 */
public function link($rel = null)
{


}
```

Write Meaningful Documentation

- Thoughtful Comments, Types, Throws, etc.
- Actually reflects source code (comments can lie)

Source Documentation

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```php
<?php

/**
 * Concrete class for working with Atom entries.
 *
 * @category   Zend
 * @package    Zend_Feed
 * @copyright  Copyright (c) 2006 Zend Technologies USA Inc.
 * @license    New BSD License
 */
class Zend_Feed_EntryAtom extends Zend_Feed_EntryAbstract
{
```

Organize Your Code

- Learn to utilize @category, @package, @subpackage
- PEAR style is the de facto standard
- Always Prefix Your Classes (Foo_)
- **http://paul-m-jones.com/organizing-php-projects.pdf**

Source Documentation

```php
<?php

class Zend_Bar
{
    public function sayHello()
    {}
}

class Zend_Foo
{
    /**
     * @return Zend_Bar
     */
    public static function getBar()
    {}
}

$bar = Zend_Foo::getBar();
$bar->
```

Some IDEs introspect doc tags to infer information about the source.

Properly documenting return types can greatly enhance the experience for many IDE users.

Source Documentation

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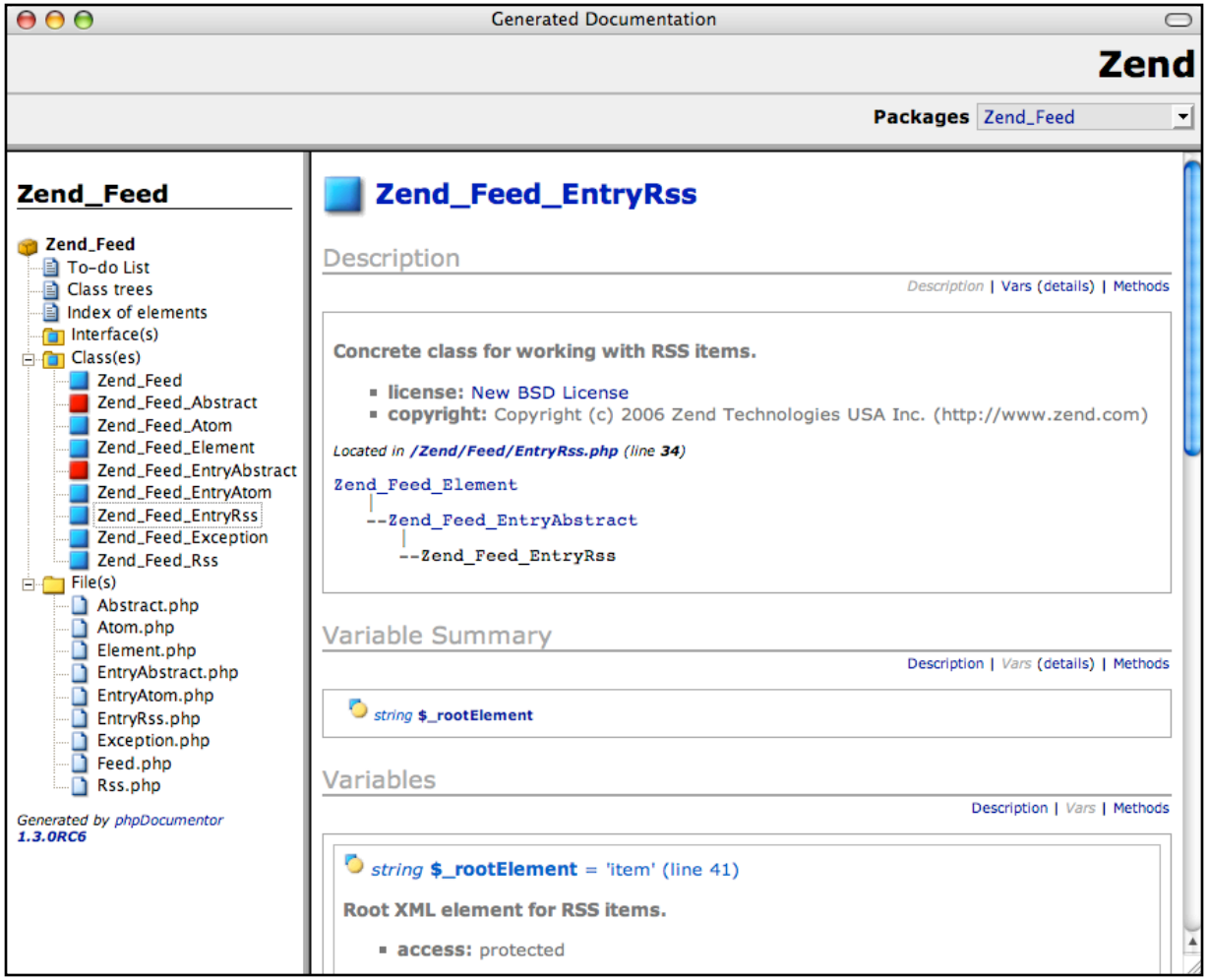

Automatically generate sophisticated documentation in many formats

End User Documentation

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DocBook

- Powers the php.net documentation and a large number of other open source projects
- Proven and used by publishers like O'Reilly
- XML-based
- Advanced editors available but not required
- Simple format is easy to learn and use
- Free toolchain runs on *nix or Cygwin

Testing

Testing

- Unit Testing
- Test Driven Development

Unit Testing

- If there is any single “best practice” that PHP developers should learn, testing is it.*

* Along with learning to write object oriented code that has some hope of being maintained.

Unit Testing

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- Unfortunately, huge amounts of PHP code is procedural spaghetti, not object oriented, let alone tested.
- Code without tests is fragile and will regress.
- No time to write tests? Start writing tests instead of reloading your browser and doing senseless debugging. Increase your productivity and product quality.
- print() and var_dump() are not testing tools.

Unit Testing

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Class representing a person

Until named otherwise, the person has a default name.

The name can be changed.

The new name cannot be empty.

```php
<?php

class Person
{
    private $_name = 'John Doe';

    public function setName($name)
    {
        if (empty($name)) {
            throw new IllegalArgumentException();
        }
        $this->_name = $name;
    }

    public function getName()
    {
        return $this->_name;
    }
}
```

Unit Testing

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```php
<?php

class PersonTest extends PHPUnit_Framework_TestCase
{
    public function testNameIsInitiallyAnonymous()
    {
        $p = new Person();
        $this->assertEquals('John Doe', $p->getName());
    }

    public function testNameCanBeChanged()
    {
        $p = new Person();
        $newName = "Matthew Weier O'Phinney";
        $this->assertNotEquals($newName, $p->getName());
        $p->setName($newName);
        $this->assertEquals($newName, $p->getName());
    }

    public function testNameCannotBeEmpty()
    {
        $p = new Person();
        try {
            $p->setName('');
        } catch (IllegalArgumentException $e) {
            return;
        }
        $this->fail();
    }
}
```

Testing the Person object

Each test examines a discrete behavior or “unit” of functionality of the Person object.

Each test asserts that the behavior of the object meets our expectations.

If a code change breaks the behavior, the tests will fail and show the regression.

Unit Testing

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What else could go wrong here?

```
public function setName($name)
{
    if (empty($name)) {
        throw new IllegalArgumentException();
    }
    $this->_name = $name;
}
```

Change the method to make it work properly by only accepting valid strings.

Write a test to assert that its new behavior meets your expectations.

Unit Testing

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- Learning to write good object oriented code that is testable takes practice and discipline.
- Using Classes != Object Oriented Design
- A great deal of PHP code is extremely difficult to test due to poor design. Learn how to design for testability.
- No longer fear changing code because your tests will fail if you break something.
- Stop reloading your browser.

Test Driven Development

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- Write the tests *first*.
- First make a test that fails because a new behavior does not yet exist. (go red)
- Write the code to make the test pass. (get to green)
- Refactor to keep your code clean and DRY.
- Repeat.
- Please learn more about testing. Start here:

  http://www.phpunit.de/pocket_guide/

Tools & Processes

- Collaboration
- Source Control
- Deployment

Collaboration

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Overview

Working with a geographically separated team is increasingly common and requires the same open communication channels as working in the same office.

- Messaging
- Web Collaboration
- Trac

Messaging

Collaboration: Messaging

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Technologies

- Email
- Instant Messaging
- VOIP
- Face-to-Face (old technologies are best)

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Email: When to use it

- Documenting and communicating decisions (be careful)
- Distribution lists
- Examples and use cases
- Review of code implementations
- Collaborating on specifications

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Email: When not to use it

- Time critical tasks: “I need this now!”
- Quick questions: “Can you…?” “Where is…?”
- Keep in mind spam filters; messages get lost

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IM: When to use it

- Quick questions: “Can you …?” “Where is…?”
- Time critical tasks (e.g., deploying code or servers)
- Quick code snippet review: “Will this work?”
- Multi-way conversations in real-time

IM: When not to use it

- Decision making (drive by decisions)
- Anything important that should be documented
- Long conversations

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VOIP: Why?

- Sometimes hearing something leaves a different impression than reading it
- Meetings
- Get to know people by spoken word (and possibly visual, if the VOIP solution has integrated video)

Collaboration: Messaging

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VOIP: When to use it

- Meetings
- Decision making
- Time critical tasks (e.g., deploying code or servers)

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VOIP: When not to use it

- Discussing code implementation details
  "Then take dollar-var and push it through fooAction; use the return value to append to dollar-underscore-bar."
- Quick questions

Collaboration: Messaging

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Face-to-Face

- Meet in person as often as time and budget allows
- Builds camaraderie
- Easier to understand written word when you can hear the voice behind it

Summary

- Communicate often
- Communicate in a variety of media
- Be polite
- Provide context
- Messaging can be distracting; build ‘offline’ time into each day

Web Collaboration

Collaboration: Web Collaboration

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Technologies

- Wikis
- Google Docs & Spreadsheets
- pastebin.com, paste2.org
- Thick-client technologies

Collaboration: Web Collaboration

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Wikis

- Central documentation source; best place to record decisions and processes
- Easy markup
- Plugins often provide extra functionality

Google Docs & Spreadsheets

- Writely and Spreadsheets
- Invite-only for viewing and editing; control who sees what, and who can edit it
- Real-time updates
- Who owns the data? How long will it be available?

Source Control

Source Control

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Problems Solved

- How do I know if somebody did something? How do they know I did something?
- How do I get updates from others? How do I push my updates out to them?
- Do we have the old version? What changed?

Source Control

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Distributed

- Methodology
  - Developers work directly on local repositories
  - Changesets are shared between repositories
- Examples
  - GNU Arch: Developed for Tracking Kernel Development
  - Darcs: “Theory of Patches”
  - Git: Linux Kernel Development

Source Control

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Non-Distributed

- Methodology
  - Developers work on local checkouts
  - Changesets checked in/out of a central repository
- Examples
  - CVS, Concurrent Versions System
  - Subversion: A compelling replacement for CVS

Workflow

- Create repository
- Perform local checkout
- Write code
- Record changes
- Check changes in to repository
- Check for repository updates
- Lather, rinse, repeat

Source Control

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Advantages

- Central repository makes administration and control easier
- Central repository lends itself to automated processes (e.g., commit notifications, documentation builds, etc.)

Disadvantages

- Harder to move between servers reliably
- Author verification left to OS; no signed revisions
  - Note: Subversion's pre-commit hooks allow greater flexibility in this regard

Source Control: Subversion

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Subversion

- A compelling replacement for CVS
- Functions like a superset of CVS
- Migrate existing CVS repositories to SVN
- Popular with many open source projects
- Easily move files between directories while preserving histories
- Simplified process of tagging and branching
- Transactions for when things go wrong
- Extensible and supported by excellent tools

Source Control: Trac

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Trac

http://trac.edgewall.com/

Source Control: Trac

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- Simple Installation
- Repository Browser
- Wiki
- Issue Tracker
- Roadmap / Milestones
- Plugins
- Great Collaboration Tool

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Link Changesets and Tickets

Changeset linking to ticket

Changeset 3342

Timestamp: 10/25/06 15:31:37
Author: daniel.b

Message:

- Add mapping for Studio Beta

Related to ticket:144

Ticket comment linking to changeset

10/27/06 00:34:27: Modified by luke

- **status** changed from *new* to *closed*.
- **resolution** set to *fixed*.

Implemented in [3363] and merged into production with [3364].

Source Control: Trac: Tips

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Timeline

09/30/06:

- 13:02 Changeset [3116] by matthew
  All related to #62: * Added response fault codes ...

09/29/06:

- 23:44 Changeset [3115] by lucas
  * New utility that decorates the document with calls to a controller ...
- 23:42 Changeset [3114] by lucas
  * Test template
- 23:39 Changeset [3113] by lucas
  * Basic structure for ModuleController? style module
- 20:08 Changeset [3112] by matthew
  Related to #62: ...
- 02:42 Changeset [3111] by matthew
  xmlrpc/server changes related to #62: ...
- 02:27 Changeset [3110] by matthew
  All changes related to #62: * Modified Zend_Server_Interface ...

09/28/06:

- 21:29 Changeset [3109] by lucas
  --
- 20:08 Changeset [3108] by lucas
  Branching myzend development
- 19:41 Ticket #69 (defect) closed by luke

Reports

Available Reports

This is a list of reports available.

Report	Title
{1}	Active Tickets
{2}	Active Tickets by Version
{3}	All Tickets by Milestone
{4}	Assigned, Active Tickets by Owner
{5}	Assigned, Active Tickets by Owner (Full Description)
{6}	All Tickets By Milestone (Including closed)
{7}	My Tickets
{8}	Active Tickets, Mine first
{9}	Current Week Report
{10}	Last Week Report

Create new report

Source Control: Trac: Tips

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Roadmap / Milestones

- /trac/roadmap
- Create “projects” or goals
- Assign deadlines
- Attach tickets by milestone
- View progress as tickets are opened and closed against the milestone

Email2Trac

- http://trac-hacks.org/wiki/EmailToTracScript
- Integrates with local MTA and Trac install
- Send email to ticket address to create new tickets
- Reply to Trac-generated issue emails, and comments to the issue will be created
- Email attachments are attached to the issue

Source Control: Trac: Tips

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Tags

- http://muness.textdriven.com/trac/wiki/tags
- Tag wiki entries, issues, changesets for easy searching and categorization
- Create tag clouds
- List items by tag

Deployment

Deployment

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- Never edit files on a production server!
- Deploy from repository tags.
- Don’t go from Development to Production. Use a Staging server to mimic the Production environment.
- Establish a Deployment Release Procedure (DRP).

Deployment

- Instead of overwriting files on the web server, use a symlink. After the new deployment is installed, switch the symlink to point to it. If anything goes wrong, just switch it back.
- Don't manually interact with the Production server in any way. Write scripts to build and deploy the application without any human intervention after starting.

Deployment

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- Write acceptance and integration tests for your application that run on deployment.
- Investigate open source deployment tools like Capistrano to help further automate the process.
- Use server management tools like Supervisord to continuously monitor your deployment.
- Continue to run your tests periodically on a scheduler to detect failures.

Wrap Up

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Questions?

Wrap Up

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Thanks!

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