Modular Application Architecture

Internation PHP Conference – Spring Edition 2011

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About us

- Degree in computer sience

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- More than 10 years of professional PHP

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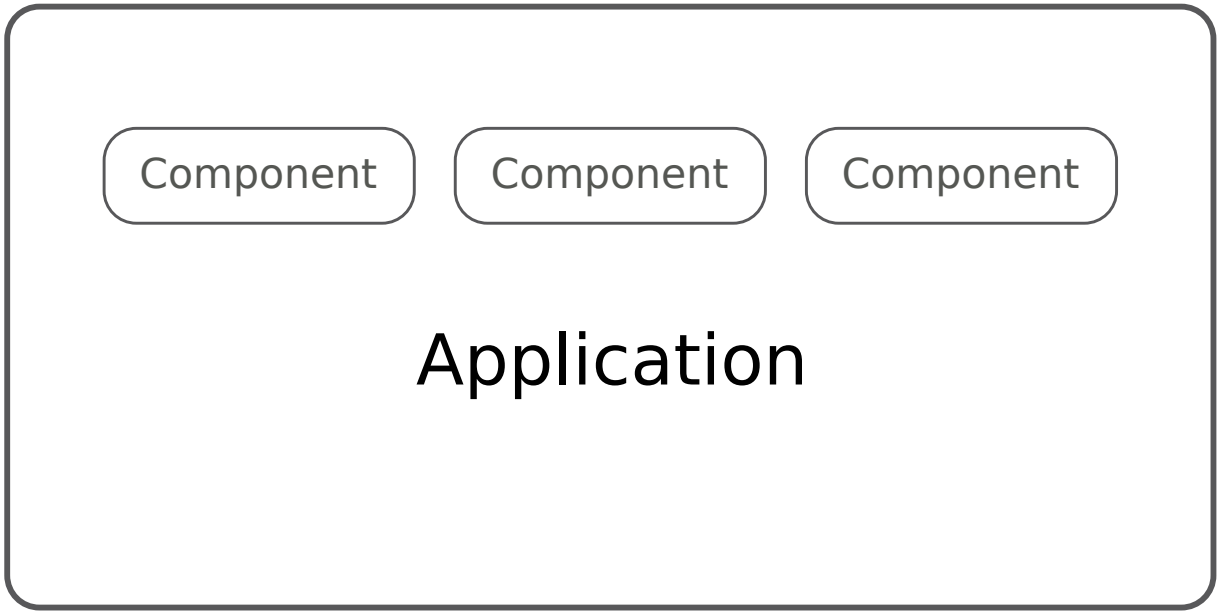
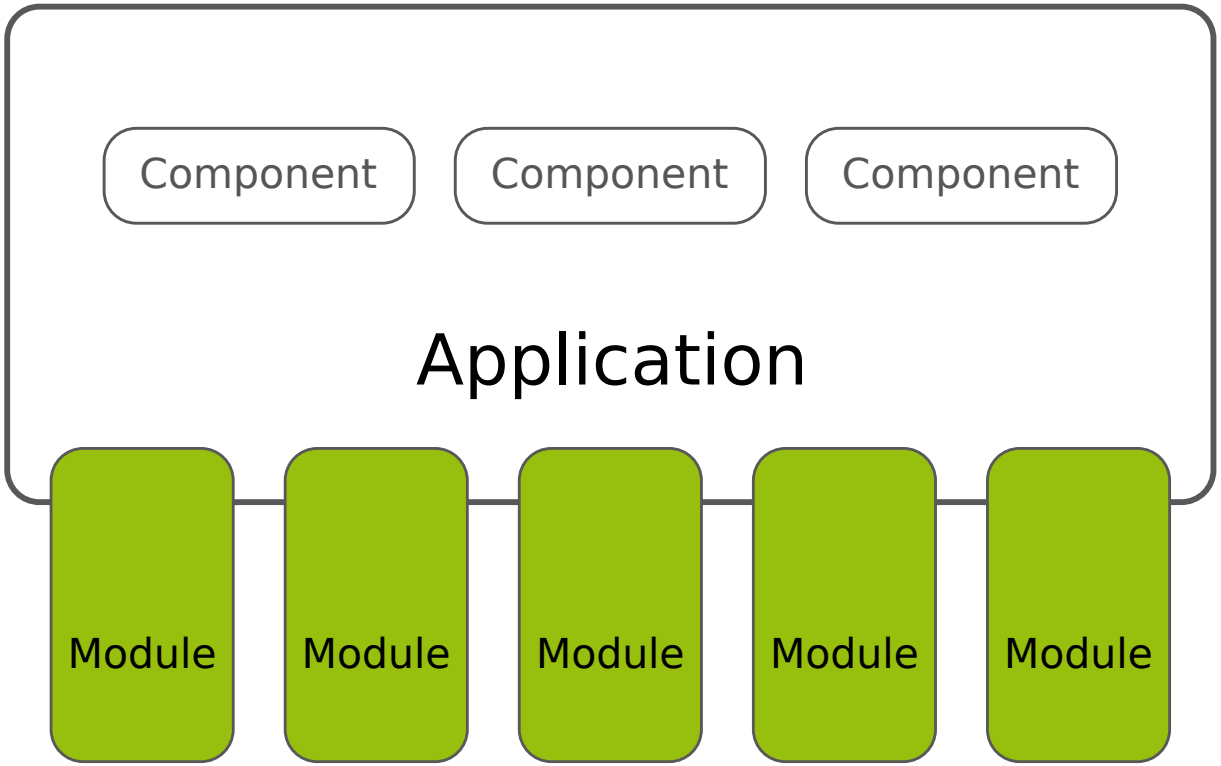
`http://qafoo.com`

Outline

Application



Modules



Why modules?

- Need for customization
  - Custom setup for customers
  - 3rd party extensions

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  - External developers
  - Seperate release cycles

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  - Custom setup for customers
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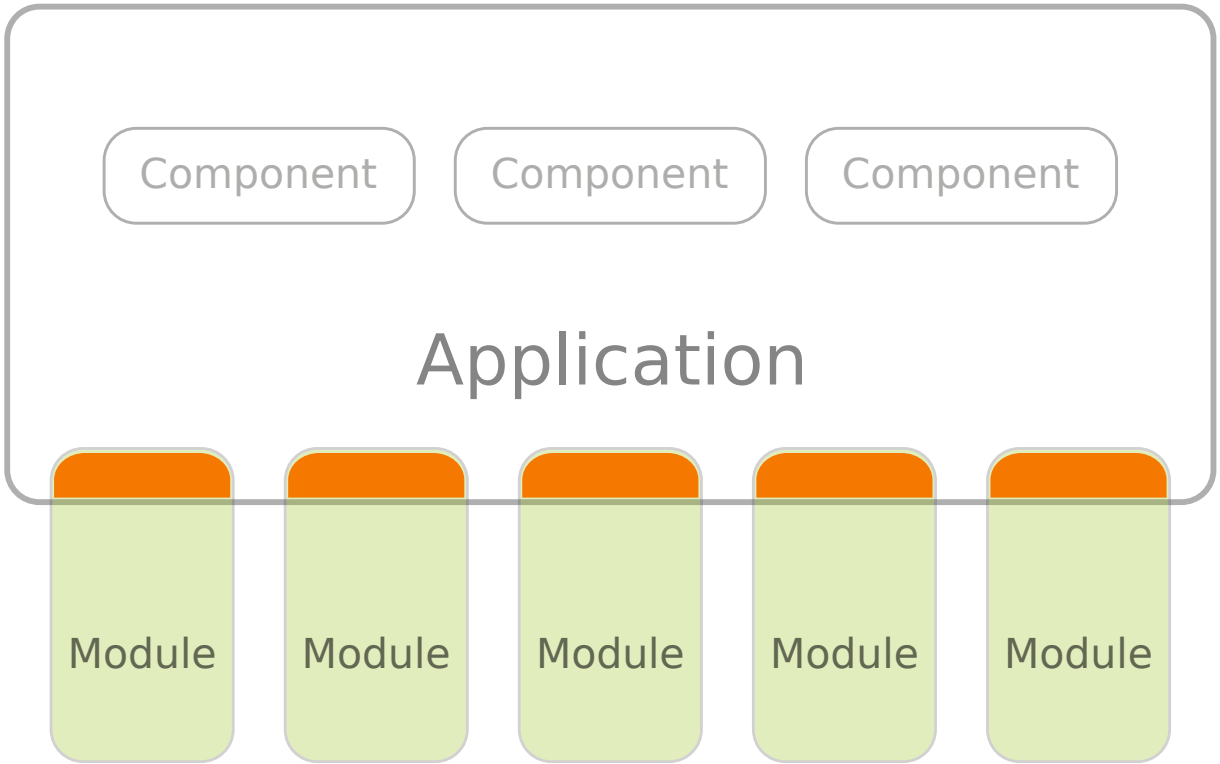
- Develop modules seperately from main application
  - External developers
  - Seperate release cycles
- Slag the main application
  - Raise maintainability

Essential



Challenges

- Module structure
- Registration / configuration
- Handling ressources
- Interaction with core

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Dealing with resources

- Typical module resources
  - Templates
  - Translations
  - Images
  - CSS

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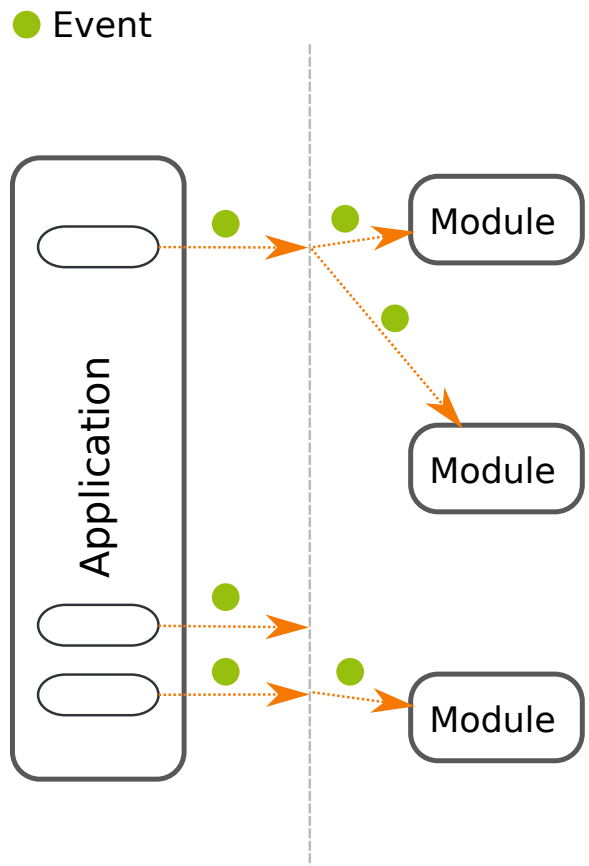
- Typical module resources
  - Templates
  - Translations
  - Images
  - CSS
- Resources handled by code are “easy”
  - Register “overrides“
- Static file resources are not
  - Put modules in a web accessible path?
  - Copy / link static files to `htdocs/` ?
  - Pipe static files through PHP?
  - Webserver configuration?

Outline

Outline

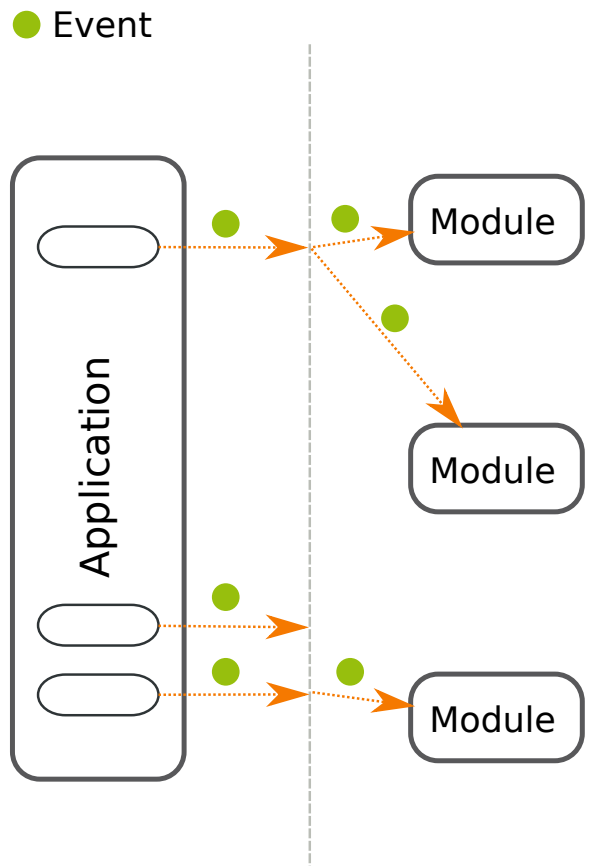
Event handling

- Interaction



Event handling

- Interaction
- Modules register for event types



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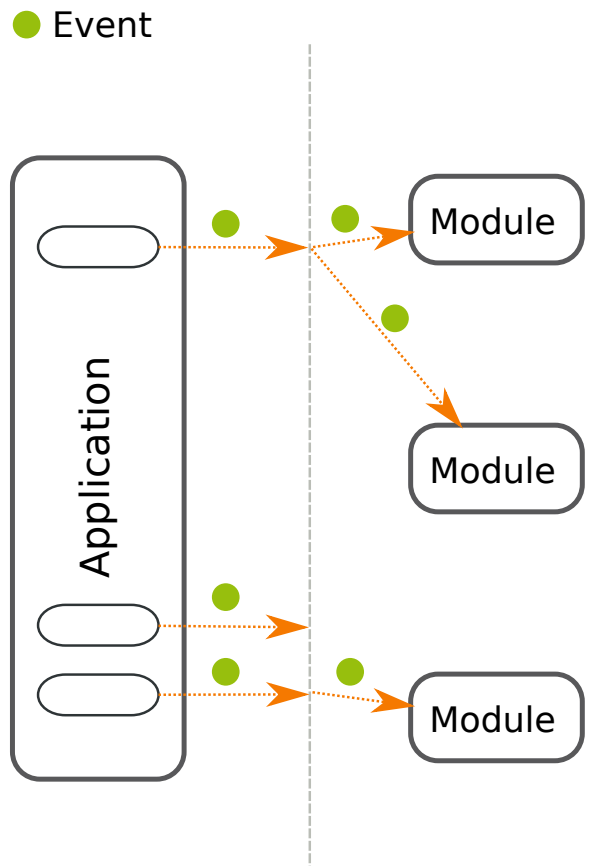

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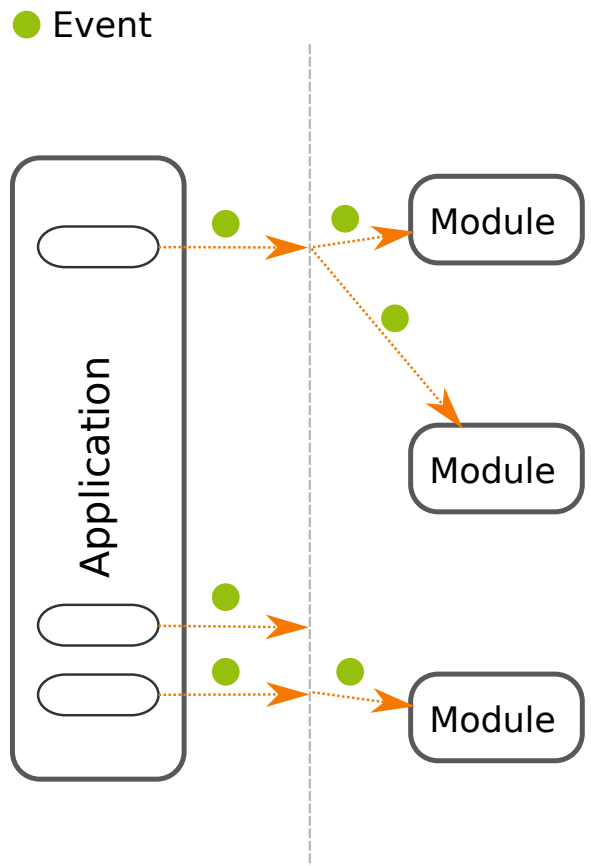
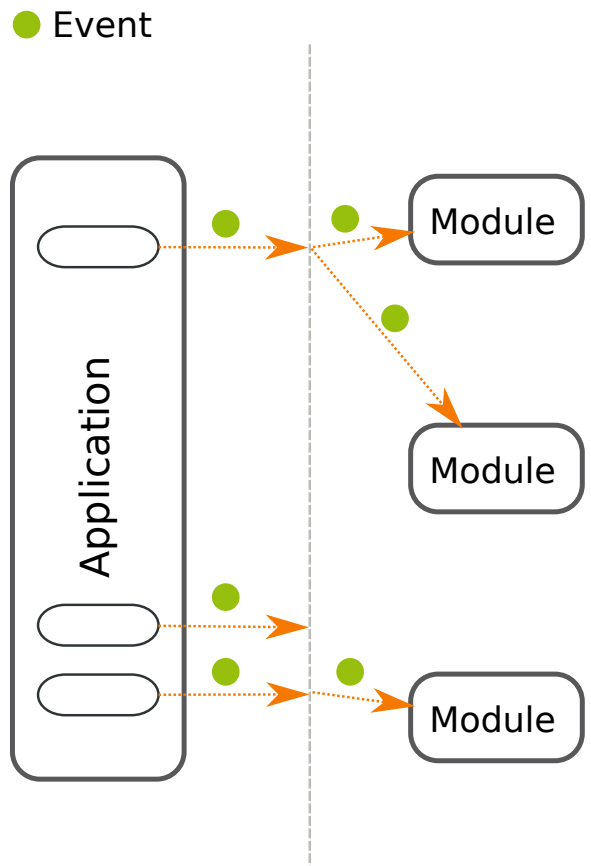


Event handling

- Interaction
- Modules register for event types
- Events “thrown” (by core or module)
- Registered modules informed about event (maybe including data)
- Optionally transparent



Subject-Observer

```php
<?php

class Subject
{
    public function doSomething()
    {
        $this->notify( 'doSomethingStart' );
        // ...
        $this->notify( 'doSomethingEnd' );
    }
}
```

Subject-Observer

```php
<?php

class Subject
{
    protected $observers = array();

    public function addObserver( Observer $observer )
    {
        $this->observers[] = $observer;
    }

    public function notify( $event, $data = null )
    {
        foreach ( $this->observers as $observer )
        {
            $observer->$event( $data );
        }
    }

    public function doSomething()
    {
        $this->notify( 'doSomethingStart' );
        // ...
        $this->notify( 'doSomethingEnd' );
    }
}
```

Subject-Observer

```php
<?php


class Observer
{
    public function doSomethingStart()
    {
        // ...
    }

    public function doSomethingEnd()
    {
        // ...
    }
}
```

Pro & Contra

- Benefits:
- Drawbacks:

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  - Limited to defined extension points
  - **Requires implementation in each subject**

Signal slot

```php
<?php

$handler = new arbitSignalSlot();

$handler->register( 'signalA', array( new myModule(), 'handleSignalA' ) );
$handler->register( 'signalA', array( new yourModule(), 'handleSignalA' ) );

// In module c
$handler->emit( 'signalA', new signalADataStruct( /* ... */ ) );

// Now all modules registerd for this signal are called with the provided data
class myModule
{
    public function handleSignalA( $name, signalADataStruct $data )
    {
        // ...
    }
}
```

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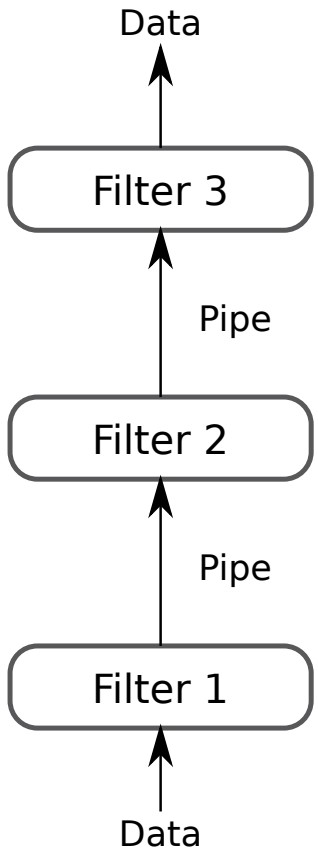
Outline

- Approaches
  - Event handling
  - Data handling

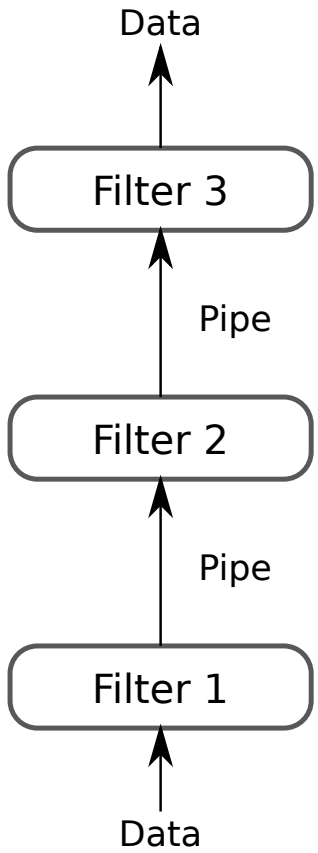
Data handling

- Data processing



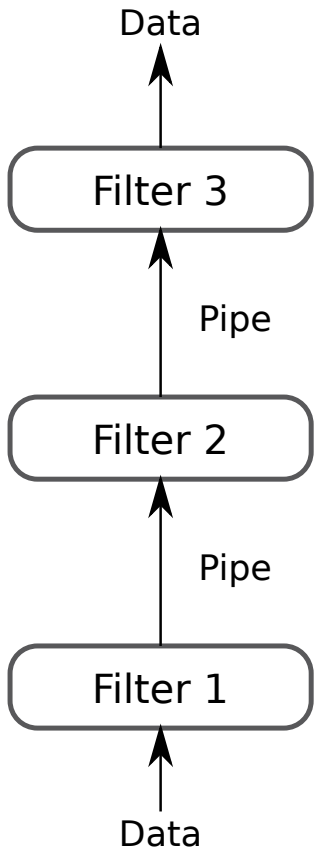
Data handling

- Data processing
- Pipes
  - Transport data



Data handling

- Data processing
- Pipes
  - Transport data
- Filters
  - Manipulate data



Popoon

```
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2
3  <map:sitemap xmlns:map="http://apache.org/cocoon/sitemap/1.0">
4  <map:pipelines>
5    <map:pipeline>
6      <map:match type="uri" pattern="examples.tgz">
7        <map:read type="tgz" src="." name="examples.tgz"/>
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  - Filters might break data easily
  - Somewhat forces linear code flow

Outline

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- Real world
  - Hooks
  - Patching
  - Inheritance

Serendipity hook announcement

```php
<?php

// ... in CSS code ...

// $out is CSS string
serendipity_plugin_api::hook_event($css_hook, $out);

echo $out;

// ... in entry display code ...

// $entry is blog entry
// $addData is meta data
serendipity_plugin_api::hook_event('frontend_display', $entry, $addData);
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Serendipity hook reaction

```
18      function event_hook($event, &$bag, &$eventData) {
19          global $serendipity;
20
21          $hooks = &$bag->get('event_hooks');
22
23          if (isset($hooks[$event])) {
24              switch($event) {
25                  case 'frontend_display':
26                      if ( $condition /* ... */) {
27                          $element = $temp['element'];
28                          $eventData[$element] = $this->bbcode(
29                              $eventData[$element]
30                          );
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39                      }
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- Benefits:
  - High flexibility
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  - “Liskov substitution principle” limits what you are allowed to do

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  - Inheritance

Patching the source

- The naive approach

Patching the source

- The naive approach
  - Works suprisingly well for some of the largest module ecosystems: phpBB

phpBB MODx format

```
1   <?xml version="1.0" encoding="utf-8" standalone="yes" ?>
2   <?xml-stylesheet type="text/xsl" href="1.2.0/modx.prosilver.en.xsl"?>
3   <mod xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.
        phpbb.com/mods/xml/modx-1.2.0.xsd">
4       <header>
42      </header>
43          <open src="index.php">
44              <edit>
45                  <comment lang="en">Here is a comment</comment>
46                  <comment lang="nl">Hier is een stukje commentaar</comment>
47                  <find>text to find</find>
48                  <action type="replace-with">text to be replaced with</action>
49              </edit>
50              <edit>
51                  <find>text to find</find>
52                  <action type="after-add">text to be added on the line after</
                        action>
53              </edit>
54              <edit>
55                  <find>text to find</find>
56                  <action type="before-add">text to be added on the line before</
                        action>
57              </edit>
```

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- Benefits:
  - Trivial to get started with (high “hackability”)
  - You can change anything
- Drawbacks:
  - Will definitely break
  - Can lead to unparsable code
  - Complex modules require deep knowledge

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- Oxid eSales (OS shop software) has an interesting extension model build entirely on inheritance
  - Any number of modules can inherit from “any” class . . .
  - . . . and each inheriting class will be used anywhere the original object would be used.
  - *How can that be possible?*

Modular inheritance

- Objects are instantiated with a special function instead of the `new` operator.
- Inheritance graph is created on-the-fly by generating intemediate classes

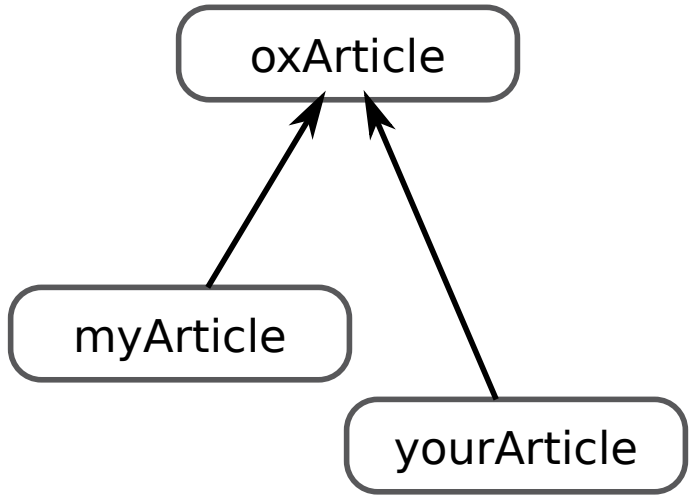
Example

```php
<?php

class oxArticle
{
    public function calculatePrice()
    {
        // ...
    }
}

class myArticle
    extends oxArticle
{
    // ...
}

class yourArticle
    extends oxArticle
{
    // ...
}
```



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class oxArticle
{
    public function calculatePrice()
    {
        // ...
    }
}

class myArticle
    extends myArticle_parent
{
    // ...
}

class yourArticle
    extends yourArticle_parent
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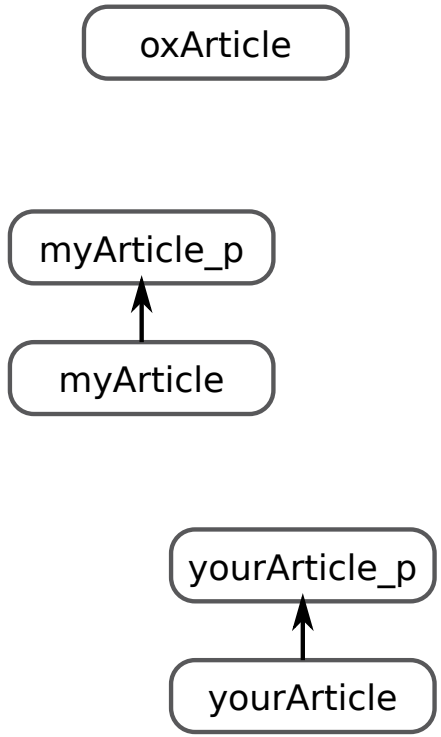
    // ...
}
```



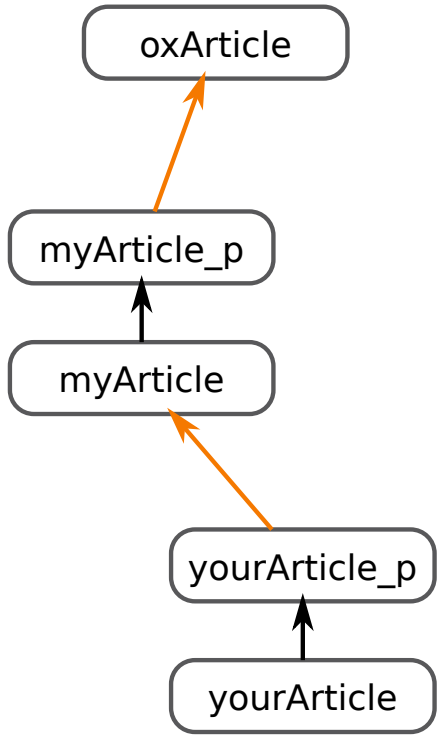
Example

```php
<?php

class oxArticle
{
    public function calculatePrice()
    {
        // ...
    }
}

class myArticle
    extends myArticle_parent
{
    // ...
}

class yourArticle
    extends yourArticle_parent
{
    // ...
}
```



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  - Non-enforcable constraints (`parent::method()`)
  - Liskov substitution principle limits what you are allowed to do

Outline

Summary

- Patching
- Hooks
- Pipes & Filters
- Inheritance
- Subject-Observer
- Signal-Slot

Thanks for listening

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