
Agile Toolkit Core

Release 0.1.0

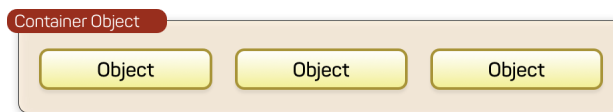
Jul 31, 2017

Contents

1	Object Containers	3
1.1	Containers	4
1.2	Initializer Trait	7
1.3	Factory Trait	8
1.4	AppScope Trait	9
1.5	Dependency Injection Containers	10
2	Hooks	13
2.1	Hook Trait	14
2.2	Hook-based dynamic Methods	17
3	Modelable Objects	19
3.1	Modelable Trait	20
4	Exceptions	21
4.1	Exception	22
4.2	Quick Exception Trait	23
5	Others	25
5.1	Debug Trait	25
5.2	Session Trait	26

Agile Core is a collection of PHP Traits for designing object-oriented frameworks. The main purpose for this project is to work as a foundation for [Agile UI](<https://github.com/atk4/ui>) and [Agile Data](<https://github.com/atk4/data>), but you are welcome to use some or all traits elsewhere.

Object Containers



Within your application / framework you can quite often have requirement for using containers:

- Form containing fields
- Table containing columns
- Component containing sub-components
- Model object containing Field objects
- Application containing controllers

Unlike PHP Array, containers offer number of advantages when one object need to contain other object(s):

- Execute some method when you add new element into container.
- Automatically assign unique names to elements.
- Associate element property with container `TrackableTrait::owner`.
- Allowing adding by omitting class name.

To assign container properties to any object in your framework, use *ContainerTrait*:

```
$child = $container->add(new ChildClass());  
  
// $child is the object of ChildClass  
  
$container->removeElement($child);
```

Although containers work with any objects, assigning additional traits to your `ChildClass` can extend the basic functionality.

- *InitializerTrait* will add automatic code execution when adding
- *AppScopeTrait* will pass value of \$app property from container to child.
- *TrackableTrait* will let you assign unique names to object
- *FactoryTrait* will let you specify object class by Seed
- *DIContainerTrait* will let you with dependency injection

Just to clarify what Seed is:

```
$field = $form->add('TextArea');
```

In this scenario, even though a new object is added, we don't do it ourselves. We simply specify some information on how to create and what properties to inject into the object:

```
$field = $form->add(['Password', 'icon'=>['lock', 'circular inverted'], 'width'=>4]);
```

The above code will determine the correct object to implement Password inside Form, instantiate it and then even add Icon object which is also defined through seed.

Containers

There are two relevant traits in the Container mechanics. Your “container” object should implement *ContainerTrait* and your child objects should implement *TrackableTrait* (if not, the \$owner/\$elements links will not be established)

If both parent and child implement *AppScopeTrait* then the property of `AppScopeTrait::app` will be copied from parent to the child also.

If your child implements *InitializerTrait* then the method *InitializerTrait::init* will also be invoked after linking is done.

You will be able to use *ContainerTrait::getElement()* to access elements inside container:

```
$object->add(new AnotherObject(), 'test');  
$another_object = $object->getElement('test');
```

If you additionally use *TrackableTrait* then your objects also receive unique “name”. From example above:

- `$object->name` == “app_object_4”
- `$another_object->name` == “app_object_4_test”

Name Trait

trait ObjectTrait

Name trait only adds the ‘name’ property. Normally you don't have to use it because *TrackableTrait* automatically inherits this trait. Due to issues with PHP5 if both *ContainerTrait* and *TrackableTrait* are using *NameTrait* and then both applied on the object, the clash results in “strict warning”. To avoid this, apply *NameTrait* on Containers only if you are NOT using *TrackableTrait*.

Properties

property ObjectTrait::\$name
Name of the object.

Methods

None

Container Trait

trait ContainerTrait

If you want your framework to keep track of relationships between objects by implementing containers, you can use *ContainerTrait*. Example:

```
class MyContainer extends OtherClass {
    use atk4\core\ContainerTrait;

    function add($obj, $args = []) {
        return $this->_add_Container($obj, $args);
    }
}

class MyItem {
    use atk4\core\TrackableTrait;
}
```

Now the instances of MyItem can be added to instances of MyContainer **and** can keep_
 ↪track::

```
$parent = new MyContainer();
$parent->name = 'foo';
$parent->add(new MyItem(), 'child1');
$parent->add(new MyItem());

echo $parent->getElement('child1')->name;
// foo_child1

if ($parent->hasElement('child1')) {
    $parent->removeElement('child1');
}

$parent->each(function($child) {
    $child->doSomething();
});
```

Child object names will be derived from the parent name.

Properties

property ContainerTrait::\$elements

Contains a list of objects that have been “added” into the current container. The key is a “shot_name” of the child. The actual link to the element will be only present if child uses trait “TrackableTrait”, otherwise the value of array key will be “true”.

Methods

ContainerTrait::add(\$obj, \$args = [])

If you are using ContainerTrait only, then you can safely use this add() method. If you are also using factory, or

initializer then redefine `add()` and call `_add_Container`, `_add_Factory`..

`ContainerTrait::_addContainer($element, $args)`

Add element into container. Normally you should create a method `add()` inside your class that will execute this method. Because multiple traits will want to contribute to your `add()` method, you should see sample implementation in `Object::add`.

Your minimum code should be:

```
function add($obj, $args = [])
{
    return $this->_add_Container($obj, $args);
}
```

`$args` be in few forms:

```
$args = ['child_name'];
$args = 'child_name';
$args = ['child_name', 'db'=>$mydb];
$args = ['name'=>'child_name']; // obsolete, backward-compatible
```

Method will return the object. Will throw exception if child with same name already exist.

`ContainerTrait::removeElement($short_name)`

Will remove element from `$elements`. You can pass either `short_name` or the object itself. This will be called if `TrackableTrait::destroy` is called.

`ContainerTrait::_shorten($desired)`

Given the desired `$name`, this method will attempt to shorten the length of your children. The reason for shortening a name is to impose reasonable limits on overly long names. Name can be used as key in the GET argument or form field, so for a longer names they will be shortened.

This method will only be used if current object has `AppScope`, since the application is responsible for keeping shortenings.

`ContainerTrait::getElement($short_name)`

Given a short-name of the element, will return the object. Throws exception if object with such `short_name` does not exist.

`ContainerTrait::hasElement($short_name)`

Given a short-name of the element, will return the object. If object with such `short_name` does not exist, will return false instead.

`ContainerTrait::_unique_element()`

Internal method to create unique name for an element.

Trackable Trait

trait TrackableTrait

Trackable trait implements a few fields for the object that will maintain it's relationship with the owner (parent).

When name is set for container, then all children will derive their names of the parent.

- Parent: foo
- Child: foo_child1

The name will be unique within this container.

Properties

property TrackableTrait::\$owner

Will point to object which has add()ed this object. If multiple objects have added this object, then this will point to the most recent one.

property TrackableTrait::\$short_name

When you add item into the owner, the “short_name” will contain short name of this item.

Methods

TrackableTrait::getDesiredName()

Normally object will try to be named after it’s class, if the name is omitted. You can override this method to implement a different mechanics.

If you pass ‘desired_name’=>’heh’ to a constructor, then it will affect the preferred name returned by this method. Unlike ‘name’=>’heh’ it won’t fail if another element with this name exists, but will add ‘_2’ postfix.

TrackableTrait::destroy()

If object owner is set, then this will remove object from it’s owner elements reducing number of links to the object. Normally PHP’s garbage collector should remove object as soon as number of links is zero.

Initializer Trait

trait InitializerTrait

Introduction

With our traits objects now become linked with the “owner” and the “app”. Initializer trait allows you to define a method that would be called after object is linked up into the environment.

Declare a object class in your framework:

```
class FormField {
    use AppScopeTrait;
    use TrackableTrait;
    use InitializerTrait;
}

class FormField_Input extends FormField {

    public $value = null;

    function init() {
        parent::init();

        if($_POST[$this->name] ) {
            $this->value = $_POST[$this->name];
        }
    }

    function render() {
        return '<input name="'. $this->name. '" value="'. $value. '" />';
    }
}
```

```
}  
}
```

Properties

property `InitializerTrait::$_initialized`

Internal property to make sure you have called `parent::init()` properly.

Methods

`InitializerTrait::init()`

A blank `init` method that should be called. This will detect the problems when `init()` methods of some of your base classes has not been executed and prevents from some serious mistakes.

If you wish to use traits class and extend it, you can use this in your base class:

```
class FormField {  
    use AppScopeTrait;  
    use TrackableTrait;  
    use InitializerTrait {  
        init as _init  
    }  
  
    public $value = null;  
  
    function init() {  
        $this->_init(); // call init of InitializerTrait  
  
        if($_POST[$this->name] {  
            $this->value = $_POST[$this->name];  
        }  
    }  
}
```

Factory Trait

trait `FactoryTrait`

Introduction

This trait can be used to dynamically create new objects by their class names. It also contains method for class name normalization.

Properties

None

Methods

`FactoryTrait::factory($object, $defaults = [])`

Creates and returns new object. If object is passed as `$object` parameter, then same object is returned.

`FactoryTrait::normalizeClassName($name, $prefix = null)`

First normalize class name, then add specified prefix to class name if it's passed and not already added. Class name can contain namespace.

If object is passed as `$name` parameter, then same object is returned.

Example:: `normalizeClassName('User','Model') == 'Model_User'`;

If object also has an “AppScopeTrait” and if your application object contains a method ‘normalizeClassName’ then we will execute that. A typical use would be if your application defines various routes how to route strings into class names permitting this syntax:

```
$obj = $this->add('MyClass');
```

Application’s `normalizeClassName` can prepend namespace which will then be passed into `factory()` method for instantiation.

AppScope Trait

`trait AppScopeTrait`

Introduction

Typical software design will create the application scope. Most frameworks relies on “static” properties, methods and classes. This does puts some limitations on your implementation (you can’t have multiple applications).

App Scope will pass the ‘app’ property into all the object that you’re adding, so that you know for sure which application you work with.

Properties

property `AppScopeTrait::$app`

Always points to current Application object

property `AppScopeTrait::$max_name_length`

When using mechanism for `ContainerTrait`, they inherit name of the parent to generate unique name for a child. In a framework it makes sense if you have a unique identifiers for all the objects because this enables you to use them as session keys, get arguments, etc.

Unfortunately if those keys become too long it may be a problem, so `ContainerTrait` contains a mechanism for auto-shortening the name based around `max_name_length`. The mechanism does only work if `AppScopeTrait` is used, `$app` property is set and has a `max_name_length` defined. Minimum value is 20.

property `AppScopeTrait::$unique_hashes`

As more names are shortened, the substituted part is being placed into this hash and the value contains the new key. This helps to avoid creating many sequential prefixes for the same character sequence.

Methods

None

Dependency Injection Containers

Agile Core implements basic support for Dependency Injection Container.

What is Dependency Injection

As it turns out many PHP projects have built objects which hard-code dependencies on another object/class. For instance:

```
$book = new Book();  
$book->name = 'foo';  
$book->save(); // saves somewhere??
```

The above code uses some ORM notation and the book record is saved into the database. But how does Book object know about the database? Some frameworks thought it could be a good idea to use GLOBALS or STATIC. PHP Community is fighting against those patterns by using Dependency Injection which is a pretty hot topic in the community.

In Agile Toolkit this has never been a problem, because all of our objects are designed without hard dependencies, globals or statics in the first place.

“Dependency Injection” is just a fancy word for ability to specify other objects into class constructor / property:

```
$book = new Book($mydb);  
$book['name'] = 'foo';  
$book->save(); // saves to $mydb
```

What is Dependency Injection Container

By design your objects should depend on as little other objects as possible. This improves testability of objects, for instance. Typically constructor can be good for 1 or 2 arguments.

However in Agile UI there are components that are designed specifically to encapsulate many various objects. CRUD for example is a fully-functioning editing solution, but suppose you want to use custom form object:

```
$crud = new CRUD([  
    'formEdit' => new MyForm(),  
    'formAdd'  => new MyForm()  
]);
```

In this scenario you can't pass all of the properties to the constructor, and it's easier to pass it through array of key/values. This pattern is called Dependency Injection Container. Theory states that developers who use IDEs extensively would prefer to pass “object” and not “array”, however we typically offer a better option:

```
$crud = new CRUD();  
$crud->formEdit = new MyForm();  
$crud->formAdd  = new MyForm();
```

How to use DIContainerTrait

Calling this method will set object's properties. If any specified property is undefined then it will be skipped. Here is how you should use trait:

```
class MyObj {
    use DIContainerTrait;

    function __construct($defaults = []) {
        $this->setDefaults($defaults, true);
    }
}
```

You can also extend and define what should be done if non-property is passed. For example Button component allows you to pass value of \$content and \$class like this:

```
$button = new Button(['My Button Label', 'red']);
```

This is done by overriding setMissingProperty method:

```
class MyObj {
    use DIContainerTrait {
        setMissingProperty as _setMissingProperty;
    }

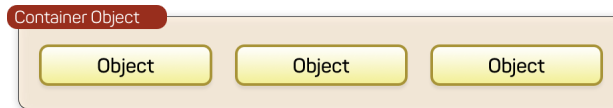
    function __construct($defaults = []) {
        $this->setDefaults($defaults, true);
    }

    function setMissingProperty($key, $value, $strict = false) {
        // do something with $key / $value

        // will either cause exception or will ignorance
        $this->_setMissingProperty($key, $value, $strict);
    }
}
```


When you look to make your framework / application extendable, the Hooks is a modern standard in PHP applications. This way a 3rd-party addon can execute code every time components are rendered or data is saved into database.

Our implementation of Hooks is based around storing callback references in array for your standard objects then executing them.



Yet HookTrait implements many much needed extensions to make hooks work great:

- define multiple hooking spot per object, e.g: 'beforeInit', 'beforeDelete' etc
- multiple call-back can be assigned to each spot
- callbacks are executed in order of numeric priority
- arguments can be passed to callbacks
- return values can be collected from callbacks
- callback may "Break Hook" preventing other callbacks from being executed

Once you assign *HookTrait* to *AnyClass*, you can start assigning and triggering callbacks:

```
$object = new AnyClass();

$object->addHook('test', function($o){ echo 'hello'; });
$object->addHook('test', function($o){ echo 'world'; });

$object->hook('test');
// outputs: helloworld
```

Hook Trait

trait HookTrait

Introduction

HookTrait adds some methods into your class to registering call-backs that would be executed by triggering a hook. All hooks are local to the object, so if you want to have application-wide hook then use *app* property.

Hook Spots

Hook is described by a string identifier which we call hook-spot, which would normally be expressing desired action with prefixes “before” or “after if necessary.

Some good examples for hook spots are:

- beforeSave
- afterDelete
- validation

The framework or application would typically execute hooks like this:

```
$obj->hook('spot');
```

You can register multiple call-backs to be executed for the requested *spot*:

```
$obj->addHook('spot', function($obj){ echo "Hook 'spot' is called!"; });
```

Adding callbacks

`HookTrait::addHook($spot, $callback, $args = null, $priority = 5)`

Register a call-back method. Calling several times will register multiple callbacks which will be execute in the order that they were added.

Short way to describe callback method

There is a consise syntax for using \$callback by specifying object only. In this case a metod with same name as \$spot will be used as callback:

```
function init() {
    parent::init();

    $this->addHook('beforeUpdate', $this);
}

function beforeUpdate($obj){
    // will be called from the hook
}
```

Callback execution order

\$priority will make hooks execute faster. Default priority is 5, but if you add hook with priority 1 it will always be executed before any hooks with priority 2, 3, 5 etc.

Normally hooks are executed in the same order as they are added, however if you use negative priority, then hooks will be executed in reverse order:

```
$obj->addHook('spot', third,    null, -1);

$obj->addHook('spot', second,   null, -5);
$obj->addHook('spot', first,    null, -5);

$obj->addHook('spot', fourth,   null, 0);
$obj->addHook('spot', fifth,    null, 0);

$obj->addHook('spot', ten,      null, 1000);

$obj->addHook('spot', sixth,    null, 2);
$obj->addHook('spot', seventh,  null, 5);
$obj->addHook('spot', eighth);
$obj->addHook('spot', nine,     null, 5);
```

HookTrait::hook(\$spot, \$args = null)

execute all hooks in order. Hooks can also return some values and those values will be placed in array and returned by hook():

```
$mul = function($obj, $a, $b) {
    return $a*$b;
};

$add = function($obj, $a, $b) {
    return $a+$b;
};

$obj->addHook('test', $mul);
$obj->addHook('test', $add);

$res1 = $obj->hook('test', [2, 2]);
// res1 = [4, 4]

$res2 = $obj->hook('test', [3, 3]);
// res2 = [9, 6]
```

Arguments

As you see in the code above, we were able to pass some arguments into those hooks. There are actually 3 sources that are considered for the arguments:

- first argument to callbacks is always the \$object
- arguments passed as 3rd argument to addHook() are included
- arguments passed as 2nd argument to hook() are included

You can also use key declarations if you wish to override arguments:

```
// continue from above example

$pow = function($obj, $a, $b, $power) {
    return pow($a, $power)+$pow($b, $power);
}

$obj->addHook('test', $pow, [2]);
$obj->addHook('test', $pow, [7]);

// execute all 3 hooks
$res3 = $obj->hook('test', [2, 2]);
// res3 = [4, 4, 8, 256]

$res4 = $obj->hook('test', [2, 3]);
// res3 = [6, 5, 13, 2315]
```

Breaking Hooks

HookTrait::breakHook()

When this method is called from a call-back then it will cause all other callbacks to be skipped.

If you pass \$return argument then instead of returning all callback return values in array the \$return will be returned by hook() method.

If you do not pass \$return value (or specify null) then list of the values collected so far will be returned

Remember that adding breaking hook with a lower priority can prevent other call-backs from being executed:

```
$obj->addHook('test', function($obj) {
    $obj->breakHook("break1");
});

$obj->addHook('test', function($obj) {
    $obj->breakHook("break2");
}, null, -5);

$res3 = $obj->hook('test', [4, 4]);
// res3 = "break2"
```

breakHook method is implemented by throwing a special exception that is then caught inside hook() method.

Using references in hooks

In some cases you want hook to change certain value. For example when model value is set it may call normalization hook (methods will change \$value):

```
function set($field, $value) {
    $this->hook('normalize', [&$value]);
    $this->data[$field] = $value;
}

$m->addHook('normalize', function(&$a) { $a = trim($a); });
```

Checking if hook has callbacks

`HookTrait::hookHasCallbacks()`

This method will return true if at least one callback has been set for the hook.

Hook-based dynamic Methods

DynamicMethodTrait adds ability to add methods into objects dynamically. That's like a "trait" feature of a PHP, but implemented in run-time:

```
$object->addMethod('test', function($o, $args){ echo 'hello, '.$args[0]; } );
$object->test('world');
// outputs: hello, world
```

There are also methods for removing and checking if methods exists, so:

```
method_exists($object, 'test');
// now should use
$object->hasMethod('test');

// and this way you can remove method
$object->removeMethod('test');
```

The implementation of dynamic methods relies on Hook trait, so to use it:

```
class AnyClass extends OtherClass {
    use HookTrait;
    use DynamicMethodTrait;

    // .. your code ..
}
```

Dynamic Method Trait

`trait DynamicMethodTrait`

Introduction

Adds ability to add methods into objects dynamically. That's like a "trait" feature of a PHP, but implemented in run-time:

```
$object->addMethod('test', function($o, $args){ echo 'hello, '.$args[0]; } );
$object->test('world');
```

Global Methods

If object has application scope *AppScopeTrait* and the application implements *HookTrait* then executing `$object->test()` will also look for globally-registered method inside the application:

```
$object->app->addGlobalMethod('test', function($app, $o, $args) {
    echo 'hello, '.$args[0];
});

$object->test('world');
```

Of course calling test() on the other object afterwards will trigger same global method.

If you attempt to register same method multiple times you will receive an exception.

Dynamic Method Arguments

When calling dynamic method first argument which is passed to the method will be object itself. Dynamic method will also receive all arguments which are given when you call this dynamic method:

```
$m->addMethod('sum', function($m, $a, $b) { return $a+$b; });
echo $m->sum(3,5);
// 8
```

Properties

None

Methods

`DynamicMethodTrait::tryCall($method, $arguments)`

Tries to call dynamic method, but doesn't throw exception if it is not possible.

`DynamicMethodTrait::addMethod($name, $callable)`

Add new method for this object. See examples above.

`DynamicMethodTrait::hasMethod($name)`

Returns true if object has specified method (either native or dynamic). Returns true also if specified methods is defined globally.

`DynamicMethodTrait::removeMethod($name)`

Remove dynamically registered method.

`DynamicMethodTrait::addGlobalMethod($name, $callable)`

Registers a globally-recognized method for all objects.

`DynamicMethodTrait::hasGlobalMethod($name)`

Return true if such global method exists.

Modelable Objects

[Agile Data](<https://github.com/atk4/data>) features a modern implementation for object modeling. You may extend [Model](<http://agile-data.readthedocs.io/en/develop/model.html>) class to define a business object, such as - Shopping-Bag:

```
class ShoppingBag extends \atk4\data\Model {
    public $table = 'shopping_bag';

    function init() {
        parent::init();

        $this->hasOne('user_id', new User());
        $this->hasMany('Items', new Item())
            ->addField('total_price', ['aggregate'=>'sum', 'field'=>'price']);
    }
}
```

Such a model handles references to the user and items, is aware of storage details, but it is a non-visual object. Because Model does not know if you will need HTML or RestAPI to access it, it does not implement any vizualization.

[Agile UI](<https://github.com/atk4/ui>) implements UI Components that can be binded together with a model and will render HTML in a way that User can understand and interact with.

To associate UI Component with Data Model a *setModel()* is used. But it's not only the UI Components that can be associated with the model. In fact "Authentication" controller can be associated with User model and RestAPI endpoints can be associated with models. This is why *setModel()* is implemented by a PHP Trait.

ModelableTrait allows you to associate your object with a Model:

```
$form->setModel('Order');

// or

$grid->setModel($order->ref('Items'), ['name', 'qty', 'price']);
```

Modelable Trait

`trait ModelableTrait`

Introduction

not yet implemented

Properties

Methods

Exceptions in most programming languages are cryptic and confusing, about 5% of the trace-back code is useful and it's obscured in most unique ways.

We've got an excellent solution by implementing exceptions our way. Simply look at how beautiful and clean they look:

```
Orange-Dream:test rw$ php test4.php
--[ Agile Toolkit Exception ]-----
atk4\core\Exception: Test value is too high
test:6
Stack Trace:
/Users/rw/Sites/test/test4.php: 14 faulty
(6)
sc->addMethod($method, function($c, $a, $b){
/Users/rw/Sites/test/test4.php: 14 faulty()
/Users/rw/Sites/test/test4.php: 14 faulty()
/Users/rw/Sites/test/test4.php: 14 faulty()
/Users/rw/Sites/test/test4.php: 14 faulty()
/Users/rw/Sites/test/test4.php: 19 faulty()
```

The same can be said about web output:

Agile Core implements *Exception* class which offers many benefits compared to standard PHP exceptions:

- Pass additional information *new Exception(['Bad argument', 'arg'=>\$arg])*
- Vizualize in ASCII or HTML
- Better means of localization

On top of that, there is *QuickExceptionTrait* which will add a method for your class emitting new ready-to-throw exception:

```
throw $object->exception(['Incorrect foo value', 'foo'=>$bar]);
```

This takes care of choosing the right class for exception, adding useful context information and more.

Fatal Error
 atk4\ui\Exception: Not sure what to do

Exception Parameters

- key: "foo"
- val: "bar"

Stack Trace

File	Object	Method
/www/ui/src/View.php: 265	atk4\ui\Exception	atk4\core\Exception::__construct ({"0": "Not sure what to do", "key": "foo", "val": "bar"})
endor/atk4/core/src/DIContainerTrait.php: 61	atk4\ui\View	atk4\ui\View::setMissingProperty()
/www/ui/src/View.php: 233	atk4\ui\View	atk4\ui\View::_setDefault()

Exception

class **Exception**

Introduction

Exception provides several improvements over vanilla PHP exception class. The most significant change is introduction of parameters.

property `Exception::$params`

Parameters will store supplementary information that can help identify and resolve the problem. There are two ways to supply params, either during the constructor or using `addMoreInfo()`

`Exception::__construct` (*error, code, previous*)

This uses same format as a regular PHP exception, but error parameter will now support array:

```
throw new Exception(['Value is too big', 'max'=>$max]);
```

The other option is to supply error is:

`Exception::addMoreInfo` (*param, value*)

Augments exception by providing extra information. This is a typical use format:

```
try {
    $field->validate();
} catch (Validation_Exception $e) {
    $e->addMoreInfo('field', $field);
    throw $e;
}
```

I must note that the reason for using parameters is so that the name of the actual exception could be localized easily.

The final step is to actually get all the information from your exception. Since the exception is backwards compatible, it will contain message, code and previous exception as any normal PHP exception would, but to get the parameters you would need to use:

`Exception::getParams()`
 Return array that lists all params collected by exception.

Some param values may be objects.

`Exception::setMessage($message)`
 Change message (subject) of a current exception. Primary use is for localization purposes.

Output Formatting

Exception (at least for now) contains some code to make the exception actually look good. This functionality may be removed in the later versions to to facilitate use of proper loggers. For now:

`Exception::getColorfulText()`

Will return nice ANSI-colored exception that you can output to the console for user to see. This will include the error, params and backtrace. The code will also make an attempt to locate and highlight the code that have caused the problem.

`Exception::getHtmlText()`

Will return nice HTML-formatted exception that will rely on a presence of Semantic UI. This will include the error, params and backtrace. The code will also make an attempt to locate and highlight the code that have caused the problem.

```
Orange-Dream:test rw$ php test4.php
--[ Agile Toolkit Exception ]-----
atk4\core\Exception: Test value is too high
test: 6
Stack Trace:
/Users/rw/Sites/test/test4.php: 14 faulty
(6)
/Users/rw/Sites/test/test4.php: 14 faulty()
/Users/rw/Sites/test/test4.php: 14 faulty()
/Users/rw/Sites/test/test4.php: 14 faulty()
/Users/rw/Sites/test/test4.php: 14 faulty()
/Users/rw/Sites/test/test4.php: 19 faulty()
-----
```

Quick Exception Trait

`trait QuickExceptionTrait`

Introduction

not yet implemented

Properties

property QuickExceptionTrait::\$default_exception
Default exception class name.

Methods

QuickExceptionTrait::**exception** (*\$message*)
Calls exception.

Debug Trait

trait DebugTrait

Introduction

DebugTrait adds a few essential methods to your object that can be very handy when trying to find a problem deep in the framework. DebugTrait has the following features

- ability to switch debug only for specific objects or system-wide
- can log basic error and separately additional info (objects)
- override debug reporting in the API

Additionally the following features are available:

debugTraceChange

This method can help you find situations when a certain code is called multiple times and when it shouldn't. When called first time it will remember "trace" which is used to arrive at this point. Second time it will compare with the previous and will tell you where trace has diverged.

This method is pretty valuable when you try to find why certain areas of the code have executed multiple times.

Properties

Methods

Session Trait

`trait SessionTrait`

Warning: SESSIONS WILL BE REMOVED FROM Agile core IN THE FUTURE.

Introduction

not yet implemented

Properties

property `SessionTrait::$session_key`

Internal property to make sure that all session data will be stored in one “container” (array key).

Methods

`SessionTrait::startSession ($options = [])`

Create new session.

`SessionTrait::destroySession ()`

Destroy existing session.

`SessionTrait::memorize ($key, $value)`

Remember data in object-relevant session data.

`SessionTrait::learn ($key, $default = null)`

Similar to memorize, but if value for key exist, will return it.

`SessionTrait::recall ($key, $default = null)`

Returns session data for this object. If not previously set, then \$default is returned.

`SessionTrait::forget ($key = null)`

Forget session data for arg \$key. If \$key is omitted will forget all associated session data.

Symbols

`__construct()` (Exception method), **22**
`_addContainer()` (ContainerTrait method), **6**
`_initialized` (InitializerTrait property), **8**
`_shorten()` (ContainerTrait method), **6**
`_unique_element()` (ContainerTrait method), **6**

A

`add()` (ContainerTrait method), **5**
`addGlobalMethod()` (DynamicMethodTrait method), **18**
`addHook()` (HookTrait method), **14**
`addMethod()` (DynamicMethodTrait method), **18**
`addMoreInfo()` (Exception method), **22**
`app` (AppScopeTrait property), **9**
`AppScopeTrait` (trait), **9**

B

`breakHook()` (HookTrait method), **16**

C

`ContainerTrait` (trait), **5**

D

`DebugTrait` (trait), **25**
`default_exception` (QuickExceptionTrait property), **24**
`destroy()` (TrackableTrait method), **7**
`destroySession()` (SessionTrait method), **26**
`DynamicMethodTrait` (trait), **17**

E

`elements` (ContainerTrait property), **5**
`Exception` (class), **22**
`exception()` (QuickExceptionTrait method), **24**

F

`factory()` (FactoryTrait method), **9**
`FactoryTrait` (trait), **8**
`forget()` (SessionTrait method), **26**

G

`getColorfulText()` (Exception method), **23**
`getDesiredName()` (TrackableTrait method), **7**
`getElement()` (ContainerTrait method), **6**
`getParams()` (Exception method), **23**

H

`hasElement()` (ContainerTrait method), **6**
`hasGlobalMethod()` (DynamicMethodTrait method), **18**
`hasMethod()` (DynamicMethodTrait method), **18**
`hook()` (HookTrait method), **15**
`hookHasCallbacks()` (HookTrait method), **17**
`HookTrait` (trait), **14**

I

`init()` (InitializerTrait method), **8**
`InitializerTrait` (trait), **7**

L

`learn()` (SessionTrait method), **26**

M

`max_name_length` (AppScopeTrait property), **9**
`memorize()` (SessionTrait method), **26**
`ModelableTrait` (trait), **20**

N

`name` (ObjectTrait property), **4**
`normalizeClassName()` (FactoryTrait method), **9**

O

`ObjectTrait` (trait), **4**
`owner` (TrackableTrait property), **7**

P

`params` (Exception property), **22**

Q

`QuickExceptionTrait` (trait), **23**

R

recall() (SessionTrait method), [26](#)
removeElement() (ContainerTrait method), [6](#)
removeMethod() (DynamicMethodTrait method), [18](#)

S

session_key (SessionTrait property), [26](#)
SessionTrait (trait), [26](#)
setMessage() (Exception method), [23](#)
short_name (TrackableTrait property), [7](#)
startSession() (SessionTrait method), [26](#)

T

TrackableTrait (trait), [6](#)
tryCall() (DynamicMethodTrait method), [18](#)

U

unique_hashes (AppScopeTrait property), [9](#)