FLORIDA DRUPAL CAMP

Tighten up your Drupal code using PHPStan

Finding bugs before your end users do!

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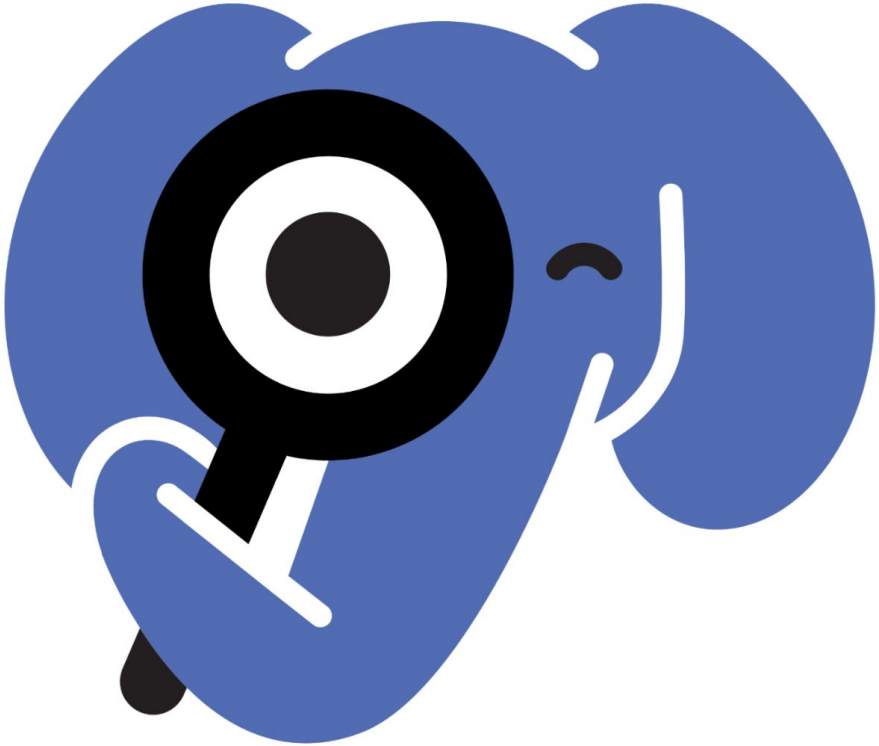
PHPStan

PHP static **an**alysis tool

PHPStan finds bugs in your code without writing tests.

https://phpstan.org/



phpstan-drupal

Extension for PHPStan to integrate with Drupal.

[mglaman/phpstan-drupal]

drupal-check

Wrapper around PHPStan and phpstan-drupal for generic config.

mglaman/drupal-check

But first, what about X?

Can your existing tools catch the typo in the method name?

Linting

- Using `php -l` you can lint your code for syntax errors
- Great first step in your continuous integration pipelines
- Doesn't catch typos or calls to invalid methods

```php
<?php

use Drupal\Core\Entity\EntityInterface;

/**
* Implements hook_ENTITY_TYPE_insert().
*/
function mymodule_node_insert(EntityInterface $node): void {
 if ($node->isPublihed()) {

 }
}
```

PHP CodeSniffer

- Uses **`token_get_all`** to tokenize a given source code
- Analyzes files individually and line by line
- Can detect calls to undesired functions, but not classes
- Great for coding standards and basic “code smell” checks
- Keeps code tidy, doesn’t find bugs.

```php
<?php

use Drupal\Core\Entity\EntityInterface;

/**
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*/
function mymodule_node_insert(EntityInterface $node): void {
 if ($node->isPublihed()) {

 }
}
```

Phan / Psalm

- Phan is another static analysis tool, which requires the `php-ast` extension (From Estsy)
- Psalm is another static analysis tool, with security analysis tools (From Vimeo)
- Drupal's autoloading is dynamic, unlike most PHP applications. **This makes it difficult to work with other tools**

```php
<?php

use Drupal\Core\Entity\EntityInterface;

/**
* Implements hook_ENTITY_TYPE_insert().
*/
function mymodule_node_insert(EntityInterface $node): void {
 if ($node->isPublihed()) {

 }
}
```

PHPStan

- Uses `nikic/php-parser` to create an abstract syntax tree of your code base.
- Verifies calls to classes and their methods (class exists, method visibility)
- Verifies types passed to functions and methods
- Has a system for defining dynamic returns types (and Drupal **is very dynamic!**)

```php
<?php

use Drupal\Core\Entity\EntityInterface;

/**
* Implements hook_ENTITY_TYPE_insert().
*/
function mymodule_node_insert(EntityInterface $node): void {
 if ($node->isPublihed()) {

 }
}
```

What PHPStan can do for *you*!

PHPStan Rule Levels

- **0:** unknown classes/functions/methods (**$this**), argument count, undefined variables
- **1:** possibly undefined variables, unknown magic methods or properties
- **2:** checks for unknown methods to all objects, validating PHPDocs
- **3:** return types, types assigned to properties
- **4:** dead code checking, redundant code
- **5:** type checks of arguments passed to functions/methods
- **6:** report missing typehints
- **7:** report wrong method calls on union types (**EntityInterface|NodeInterface**),
- **8:** report calling methods and accessing properties on nullable types
- **9:** strict on **mixed** type usage

10.0.x

Drupal 10 *is now running* PHPStan at level 0

Let’s analyze the example code with PHPStan

(This is running PHPStan at level 2)

```php
<?php

use Drupal\Core\Entity\EntityInterface;

/**
* Implements hook_ENTITY_TYPE_insert().
*/
function mymodule_node_insert(EntityInterface $node): void {
 if ($node->isPublihed()) {

 }
}
```

Call to an undefined method Drupal\Core\Entity\EntityInterface::isPublihed().

```php
<?php

use Drupal\Core\Entity\EntityInterface;

/**
* Implements hook_ENTITY_TYPE_insert().
*/
function mymodule_node_insert(EntityInterface $node): void {
  if ($node->isPublihed()) {

 }
}
```

?#!?!

Call to an undefined method Drupal\Core\Entity\EntityInterface::isPublihed().

```php
<?php

use Drupal\node\NodeInterface;

/**
* Implements hook_ENTITY_TYPE_insert().
*/
function mymodule_node_insert(NodeInterface $node): void {
 if ($node->isPublished()) {

 }
}
```

isPublished comes from EntityPublishedInterface, which NodeInterface extends!

PHPStan & Extensions

PHPStan & Extensions overview

PHPStan

- Checks that a class exists (can be autoloaded)
- Detects incorrect namespacing
- Functions exists, methods on classes exist and are visible
- Can resolve variable values and verify their types (!!!)

phpstan-drupal

- Container services return the correct types
- Entity storage and query return types
- Class resolver service return types
- Checking if using @internal classes
- Support for checking deprecated global constants

PHPStan & Extensions overview

phpstan/phpstan-deprecation-rules

- PHPStan rules for detecting usage of deprecated classes, methods, properties, constants and traits.
- The special sauce used by the Drupal community in **drupal-check** and the **Upgrade Status** module.

phpstan/phpstan-phpunit

- PHPUnit extensions and rules for PHPStan
- Uses assertions to understand types, support for mocks, and more.

jangregor/phpstan-prophecy

- Provides a phpstan/phpstan extension for phpspec/prophecy
- Makes PHPStan understand prophesied mocks

Because you are all developers and want to play...

Adding PHPStan to your Drupal codebase

(What I run when setting up PHPStan for a Drupal code base)

phpstan/extension-installer

- Automatically configures PHPStan to use installed extensions
- Simplifies setting up PHPStan by not needing to include extension configurations
- Pssst: this is a problem **drupal-check** tried to solve for Drupal users, before the extension installer existed.

```
composer require  --dev phpstan/phpstan \
    phpstan/extension-installer \
    mglaman/phpstan-drupal \
    phpstan/phpstan-deprecation-rules
```

Use Composer to add PHPStan to require-dev

```
php vendor/bin/phpstan analyze \
    --level 2 \
    web/modules/custom
```

Run PHPStan against custom modules

FLORIDA DRUPAL CAMP

Adding PHPStan to your Drupal codebase **(how I do it)**

```
composer require  --dev phpstan/phpstan \
    phpstan/extension-installer \
    mglaman/phpstan-drupal \
    phpstan/phpstan-deprecation-rules \
    phpstan/phpstan-phpunit \
    jangregor/phpstan-prophecy
```

Use Composer to add PHPStan to require-dev

```
parameters:
    level: 5
    paths:
        - web/modules/custom
        - web/themes/custom
```

A basic phpstan.neon

```
php vendor/bin/phpstan
```

Run PHPStan against custom modules (no arguments requires with `paths` defined)

phpstan-drupal

Bringing PHPStan magic to Drupal ✨

Autoloading

Autoloading extensions and functions

- PHPStan supports path based autoloading, but the goal is to mimic the Drupal bootstrap process
- Drupal has various includes for “legacy” functions not registered in its autoloader
- ***All*** extension namespaces are registered at runtime with the autoloader and their extension file loaded
- Loads files for hook includes (`views.inc`, `tokens.inc`, `pathauto.inc`)
- Loads Drush includes for functions as well

Service container

Services return types and deprecations

- Scans for *all* extensions and loads their extension file, along with registering their `services.yml` definitions.
- A service map is maintained to allow rules and return type extensions to interact with services that would exist in Drupal's container
- Reports when retrieving a deprecated service (`$container->get` / `\Drupal::service`)
- Allows detecting if invalid or deprecated method is called from the service

Entity integration

Entity mapping

- Contains a repository of entity information
- Correct storage class returned from entity type manager
- Correct entity class returned from entity storage methods
- Contrib can define their own mappings to be included (link)

```
drupal:
    entityMapping:
        block:
            class: Drupal\block\Entity\Block
        block_content:
            class: Drupal\block_content\Entity\BlockContent
        node:
            class: Drupal\node\Entity\Node
            storage: Drupal\node\NodeStorage
        taxonomy_term:
            class: Drupal\taxonomy\Entity\Term
            storage: Drupal\taxonomy\TermStorage
```

```php
$etm = \Drupal::entityTypeManager();

assertType('Drupal\node\NodeStorage', $etm->getStorage('node'));
assertType('Drupal\user\UserStorage', $etm->getStorage('user'));
assertType('Drupal\taxonomy\TermStorage', $etm->getStorage('taxonomy_term'));
```

Example of entity storage type assertions

```php
$nodeStorage = \Drupal::entityTypeManager()->getStorage('node');

assertType('Drupal\node\Entity\Node', $nodeStorage->create(['type' => 'page']));
assertType('Drupal\node\Entity\Node|null', $nodeStorage->load(42));
assertType('Drupal\node\Entity\Node|null', $nodeStorage->loadUnchanged(42));
assertType('array<int, Drupal\node\Entity\Node>', $nodeStorage->loadMultiple());
```

Example of entity storage method assertions

Entity queries

- Determines the array return type for queries

  `array<int, string>` vs. `array<string, string>`

- Returns correct type if turned into a `count` query.

- **TODO!** Verify that `accessCheck` has been invoked (now required in 10.0.x)

```php
assertType(
   'array<int, string>',
   $nodeStorage->getQuery()
       ->accessCheck(TRUE)
       ->execute()
);
assertType(
   'int',
   $nodeStorage->getQuery()
       ->accessCheck(TRUE)
       ->count()
       ->execute()
);
```

kudos!

beram (Benjamin Rambaud) for the major contributions to the entity storage dynamic return type extensions

Render arrays

Trusted callbacks

- Verifies callbacks are closures or implement `TrustedCallbackInterface` or `RenderCallbackInterface`
- Checks `#pre_render`, `#post_render`, `#access_callback`, and `#lazy_builder`
- Supports normal and service name callable format
- Warns if using a closure within a form class (serialization = 💥)

Loaded includes

Loaded includes

- Handles `ModuleHandlerInterface::loadIncludes` or the deprecated `module_load_include` function
- Verifies that the extension exists
- Verifies the file exists
- Performs `require_once` to bring the file into scope to make the functions within the file accessible

Miscellaneous awesome

Class resolver

- Correct object types from the class resolver
- `getInstanceFromDefinition` will return an instance of the correct class
- Allows proper inspections from this dynamic class instantiation

```php
function workspaces_entity_type_build(array &$entity_types) {
 return \Drupal::service('class_resolver')
   ->getInstanceFromDefinition(EntityTypeInfo::class)
   ->entityTypeBuild($entity_types);
}

function workspaces_entity_type_alter(array &$entity_types) {
 \Drupal::service('class_resolver')
   ->getInstanceFromDefinition(EntityTypeInfo::class)
   ->entityTypeAlter($entity_types);
}
```

Entity access results

- Checks if calls to an entity access method should return **`AccessResultInterface`** or **`bool`**
- Handles **`access`**, **`createAccess`**, **`fieldAccess`**.

```
assertType(
   'bool',
   $accessControlHandler->access(Node::create(), 'view')
);

assertType(
   AccessResultInterface::class,
   $accessControlHandler->access(
       Node::create(),
       'view label',
       null,
       true
   )
);
```

Extending `@internal` code

- Checks if a class extends `@internal` code outside of its namespace
- Only flags an error when using `@internal` outside of shared namespace
- Shared namespace? `\Drupal\{Core|Component|module|theme}`
- The second part of the namespace must match

How to add PHPStan to your codebase

```
composer require  --dev phpstan/phpstan \
    phpstan/extension-installer \
    mglaman/phpstan-drupal \
    phpstan/phpstan-deprecation-rules
```

Use Composer to add PHPStan to require-dev

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```

Run PHPStan against custom modules

What's on the horizon?

What's on the horizon?

- Better tracking of change records from Drupal core to make sure phpstan-drupal has the rules or return types to PHPStan to detect the change.
- Better support for entity fields and field properties
- Drush command to help generate entity mapping and field information for phpstan-drupal 🤔
- And all of your suggestions 😄

Resources

#phpstan

Join the **#phpstan** channel on Drupal Slack.

GitHub bot will notify of new releases.

Links

- https://www.drupal.org/docs/develop/development-tools/phpstan
- https://phpstan.org/
- https://github.com/mglaman/phpstan-drupal
- https://beram-presentation.gitlab.io/php-static-analysis-101/
- https://www.twitch.tv/mglaman (live coding, Wednesdays 2PM US Central)