



Extending the PHP Language

Dave Liddament | Lamp Bristol

@daveliddament



IF ONLY PHP HAD FEATURE ...
SIMILAR TO LANGUAGE ...



WOULDN'T IT BE GREAT IF PHP COULD
DO ...



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SIMILAR TO LANGUAGE ...

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DO ...

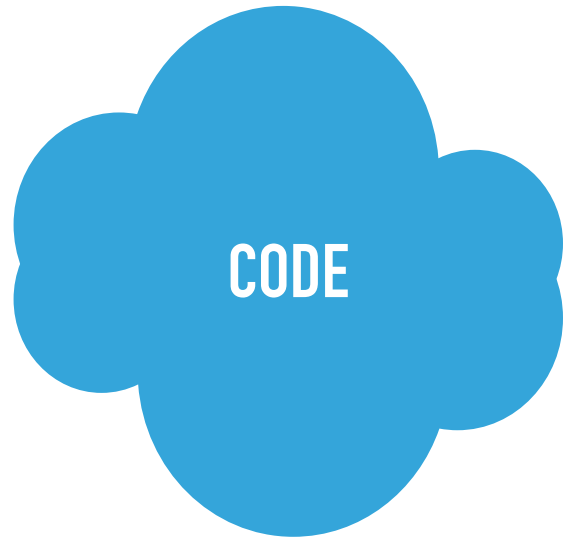


HOW I BUILT NEW LANGUAGE FEATURES

Preconditions



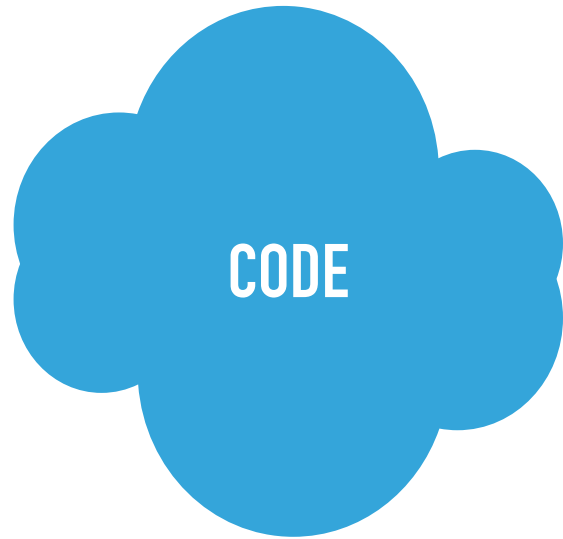
One of many examples...



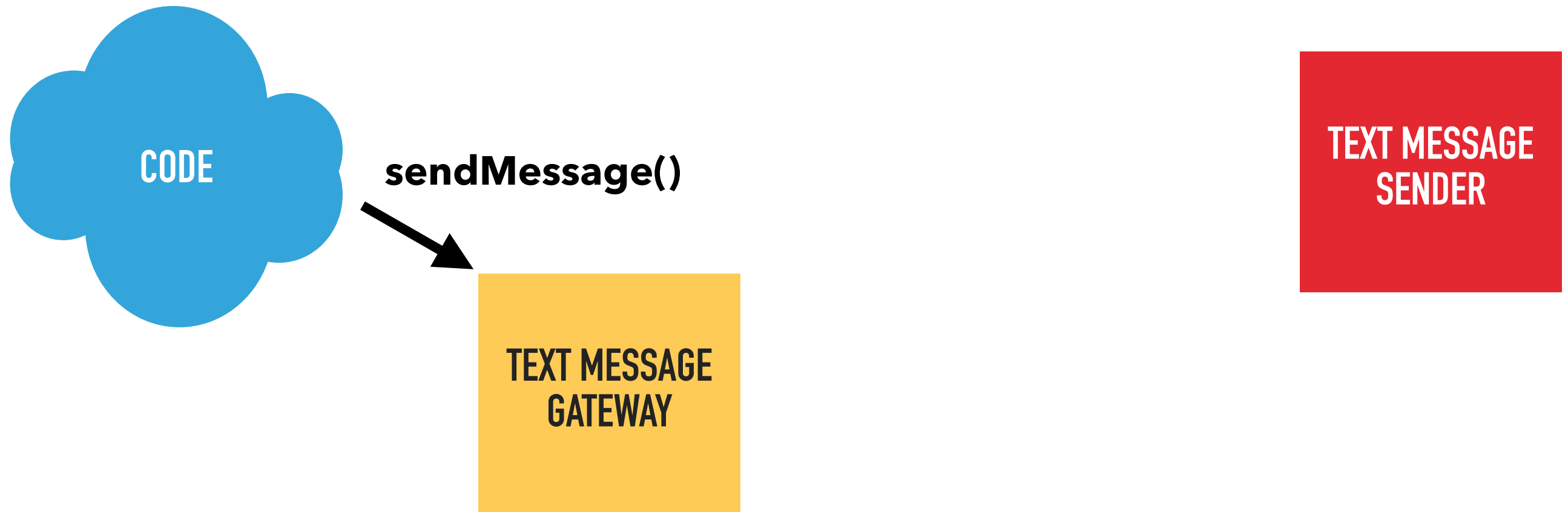
One of many examples...



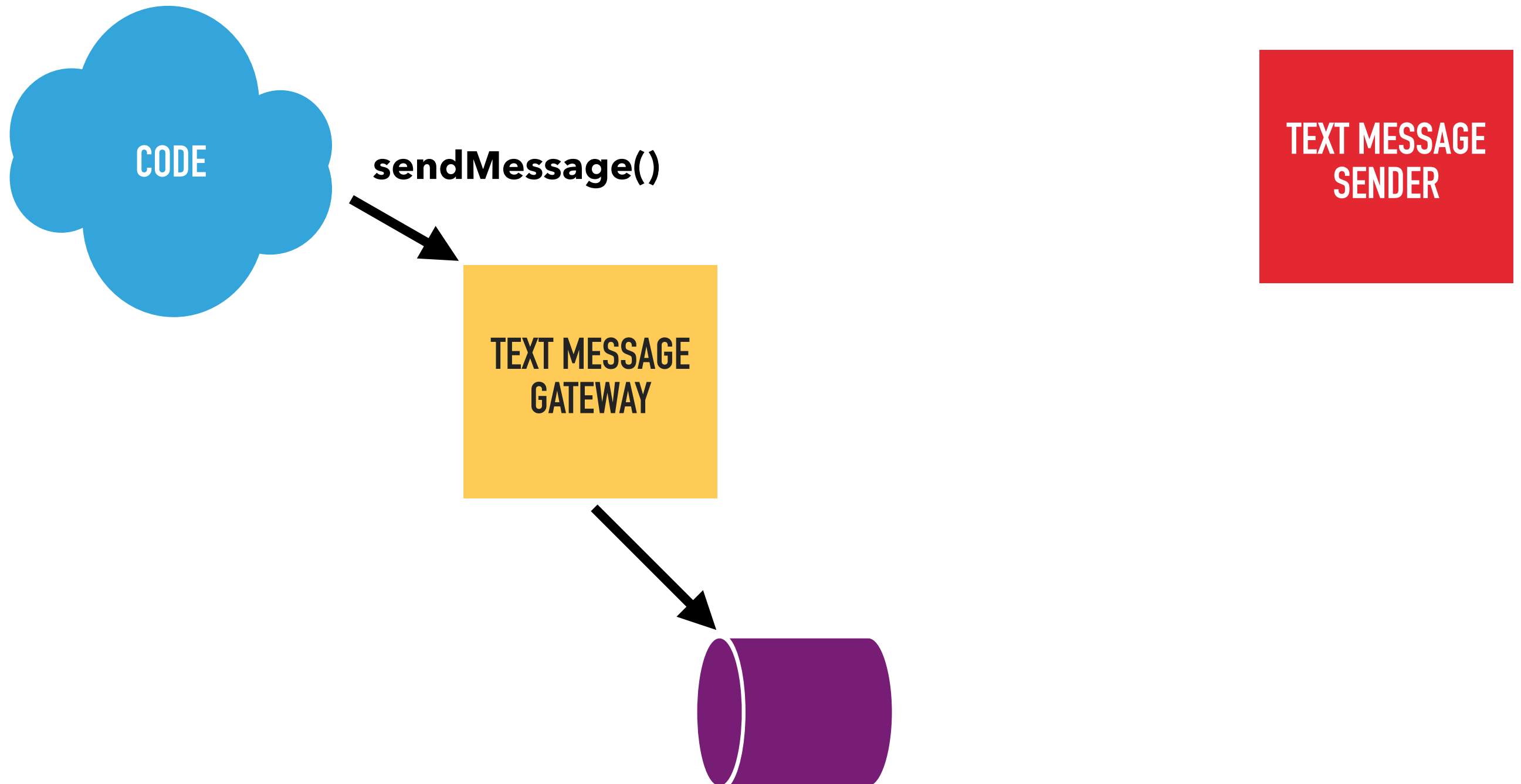
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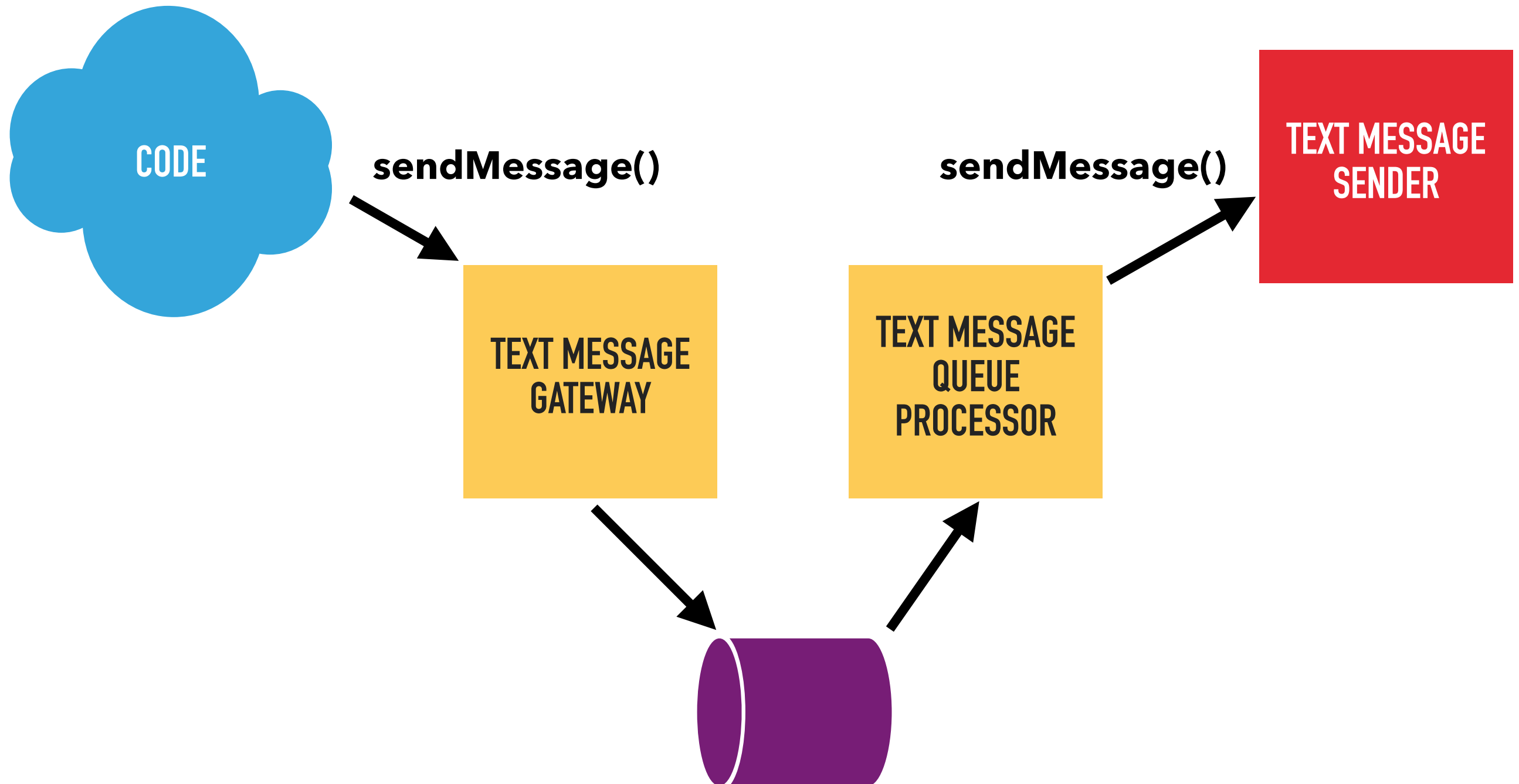
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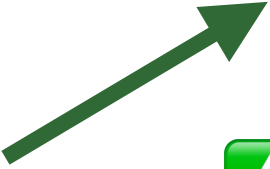
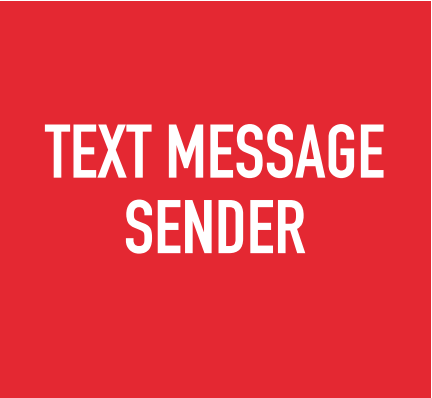
One of many examples...

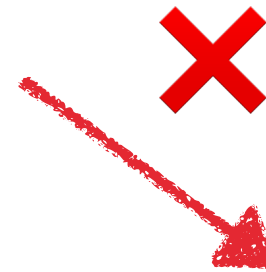
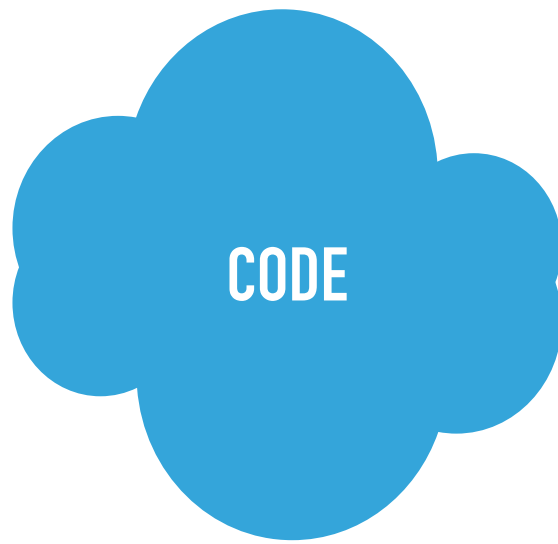


sendMessage()

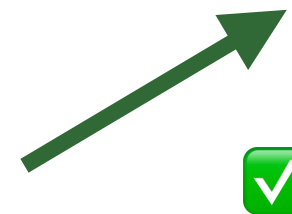
**TEXT MESSAGE
SENDER**

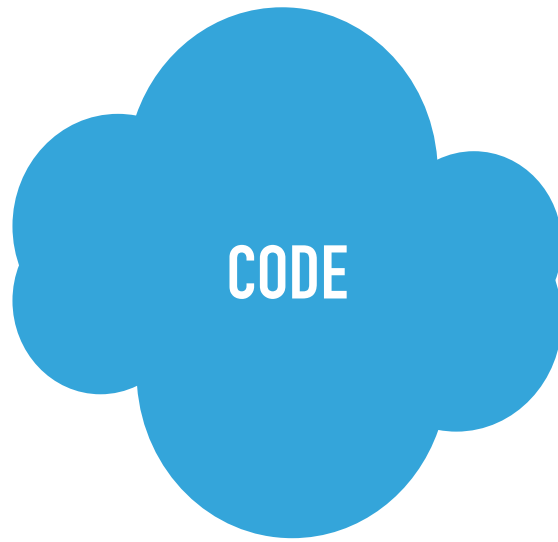
sendMessage()





sendMessage()





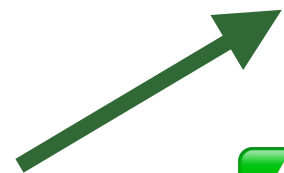
public

protected

private

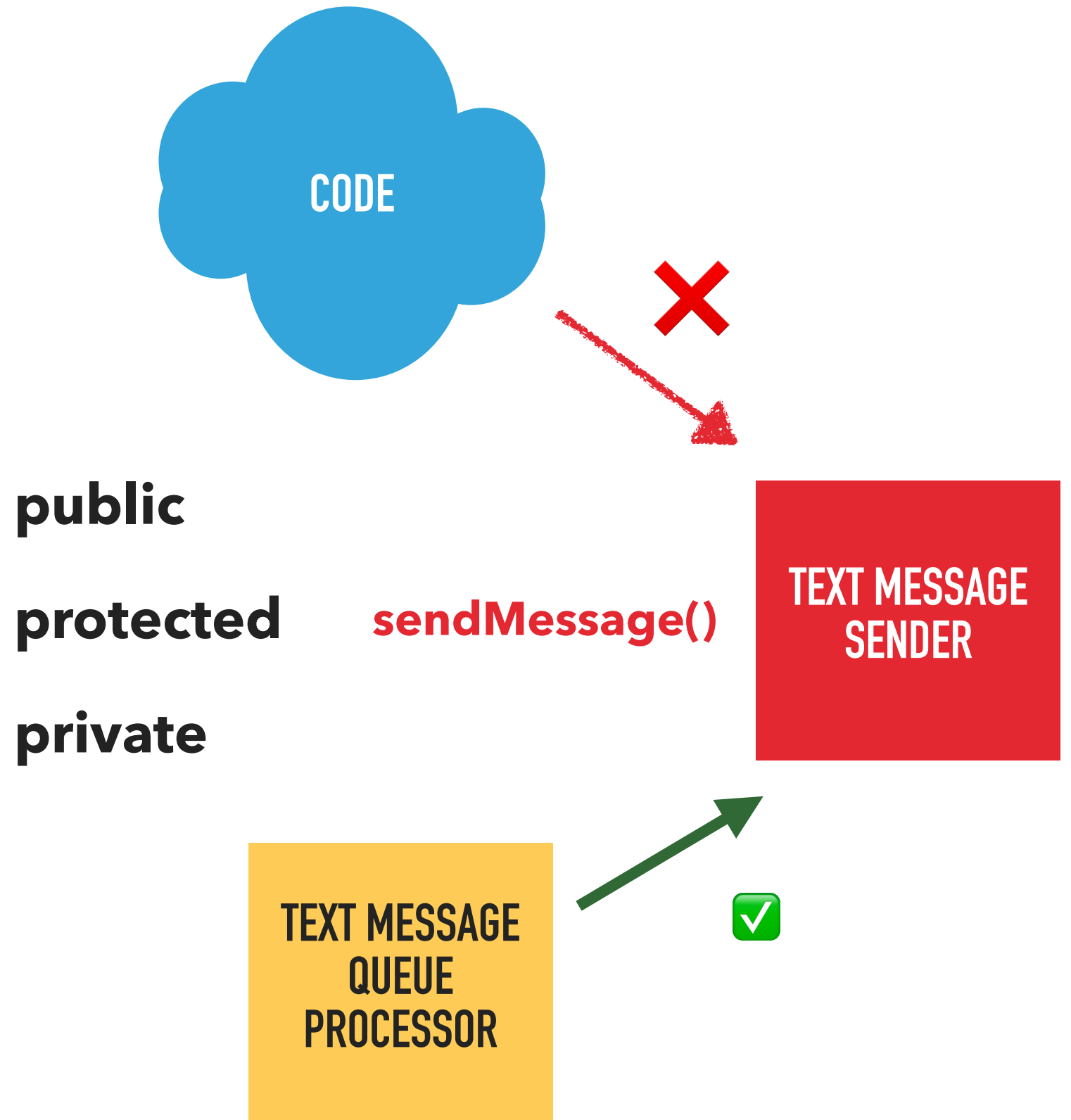
sendMessage()

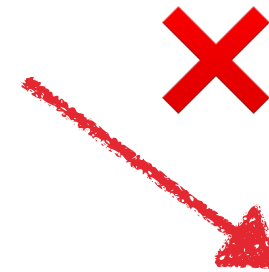
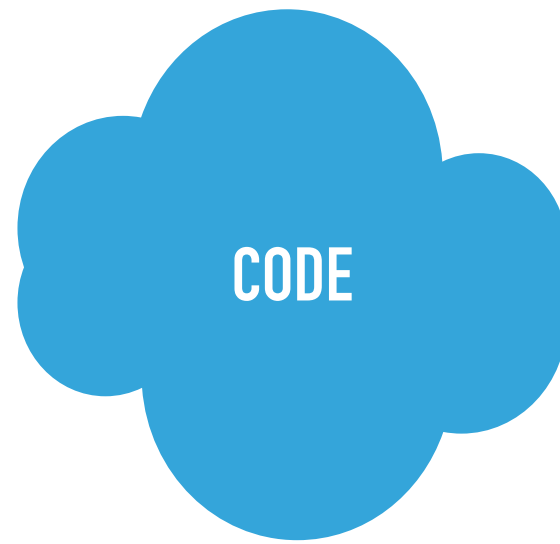
**TEXT MESSAGE
SENDER**



Existing visibility modifiers are not fine grained enough.

We need more control.





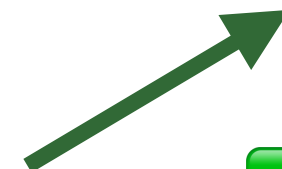
public

protected

private

sendMessage()

**TEXT MESSAGE
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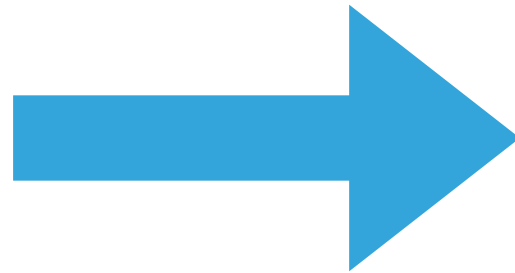


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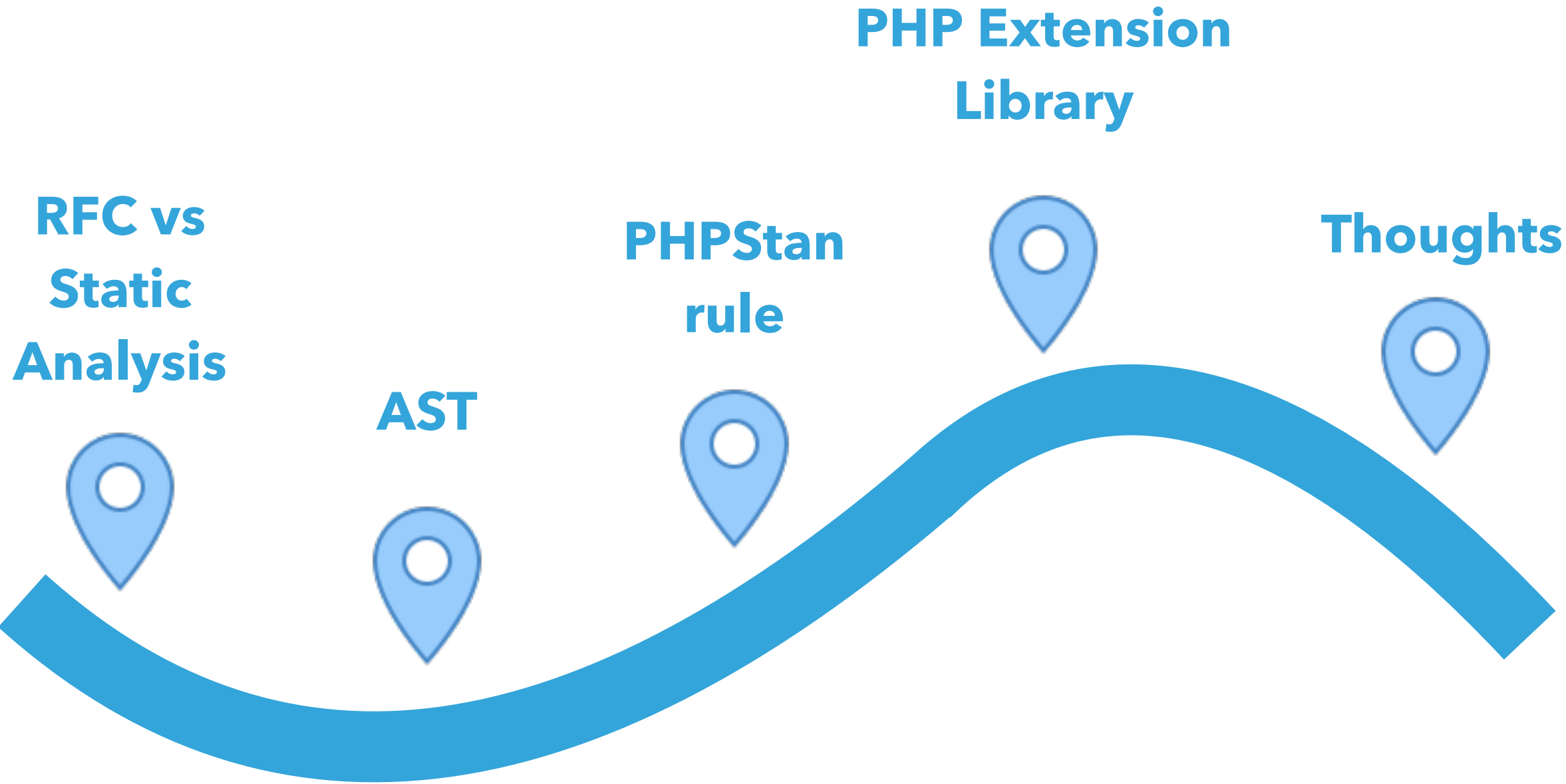
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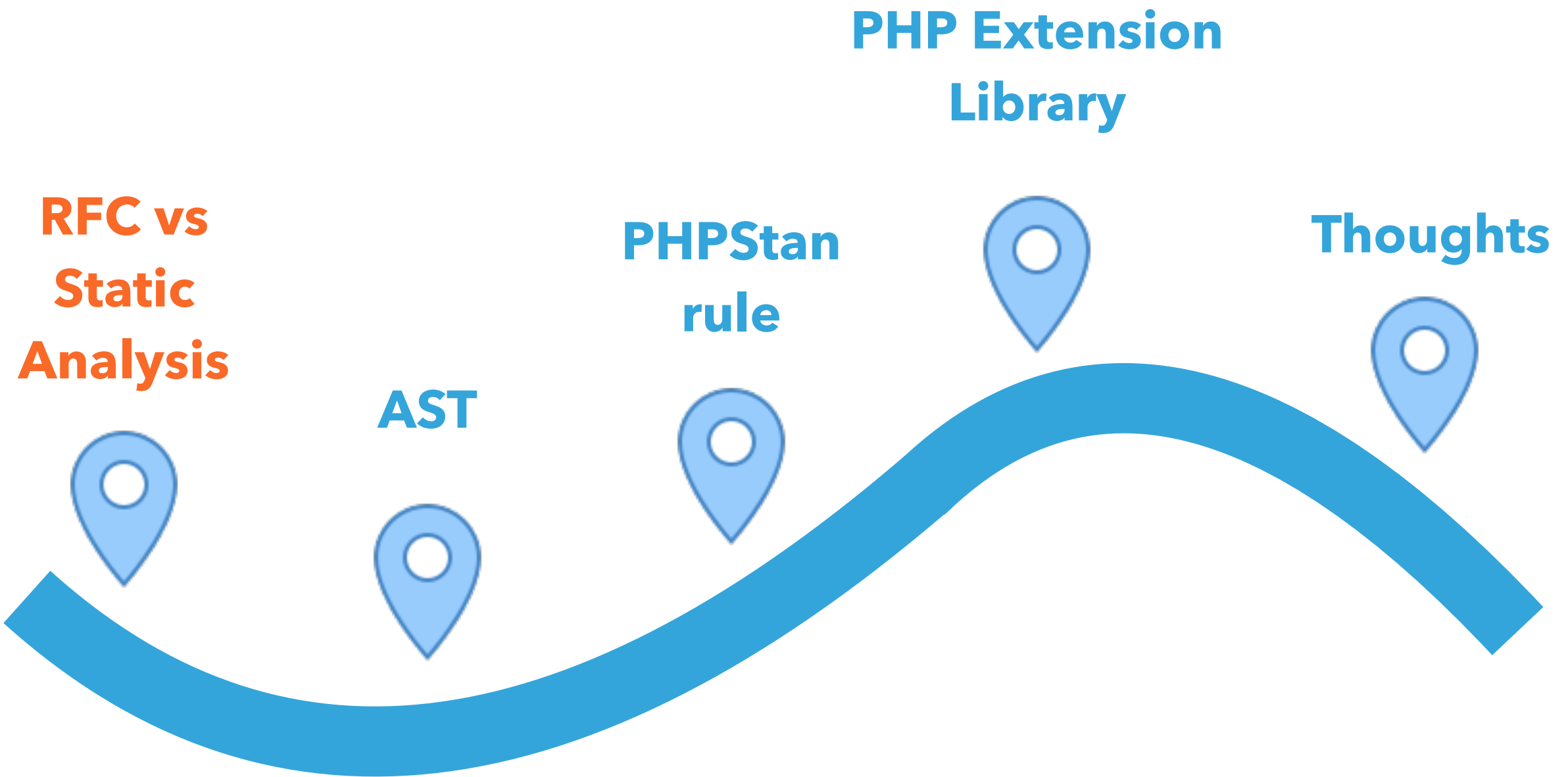
Automate checks to stop me, or other developers, breaking this constraint

Very
specific
constraint

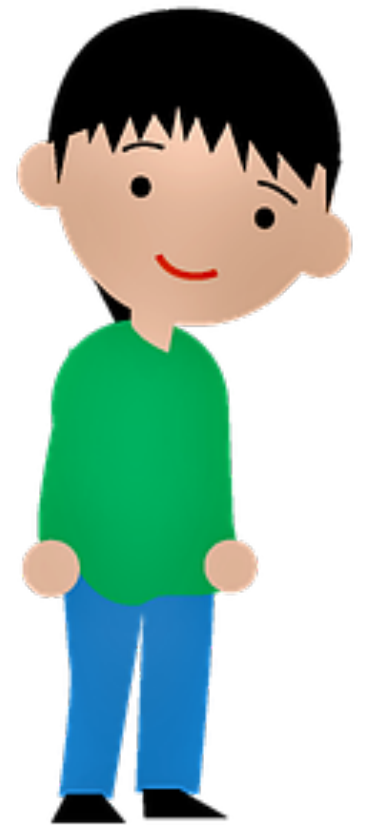


Generalised
version that
could be a
useful on your
project



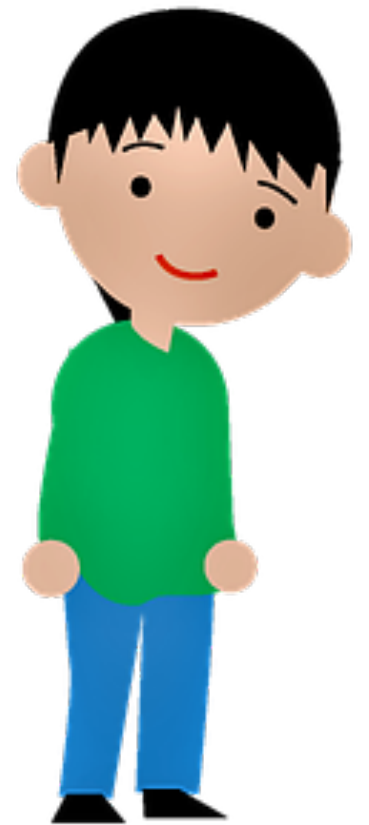


TELL ME ABOUT PHP'S RFC PROCESS



TELL ME ABOUT PHP'S RFC PROCESS

FIRST YOU WRITE AN RFC





TELL ME ABOUT PHP'S RFC PROCESS

FIRST YOU WRITE AN RFC

TALK



TELL ME ABOUT PHP'S RFC PROCESS

FIRST YOU WRITE AN RFC

TALK

VOTE



TELL ME ABOUT PHP'S RFC PROCESS

FIRST YOU WRITE AN RFC

TALK

VOTE

IMPLEMENT



TELL ME ABOUT PHP'S RFC PROCESS

FIRST YOU WRITE AN RFC

TALK

VOTE

IMPLEMENT

A LONG AND DIFFICULT PROCESS!

THERE IS ANOTHER WAY...

THERE IS ANOTHER WAY...

... FOR SOME FUNCTIONALITY

Run time

```
class Person  
{  
    private function update()  
    {  
        // Some code  
    }  
}
```

```
$person = new Person();  
$person->update();
```

Run time

```
class Person
{
    private function update()
    {
        // Some code
    }
}
```

```
$person = new Person();  
$person->update();
```

Uncaught Error: Call to private method Person::update()

Static analysis

```
class Person
{
    private function update()
    {
        // Some code
    }
}
```

```
$person = new Person();
$person->update();
```

Static analysis

```
class Person
{
    private function update()
    {
        // Some code
    }
}
```

```
$person = new Person();
```

```
$person->update(); ❌
```



Static analysis gives us generics now

```
/** @return Person[] */  
function getPeople():array {...}  
  
function process(Car $car) {...}  
  
for (getPeople() as $person) {  
    process($person);  
}
```


Static analysis gives us generics now

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/** @return Person[] */  
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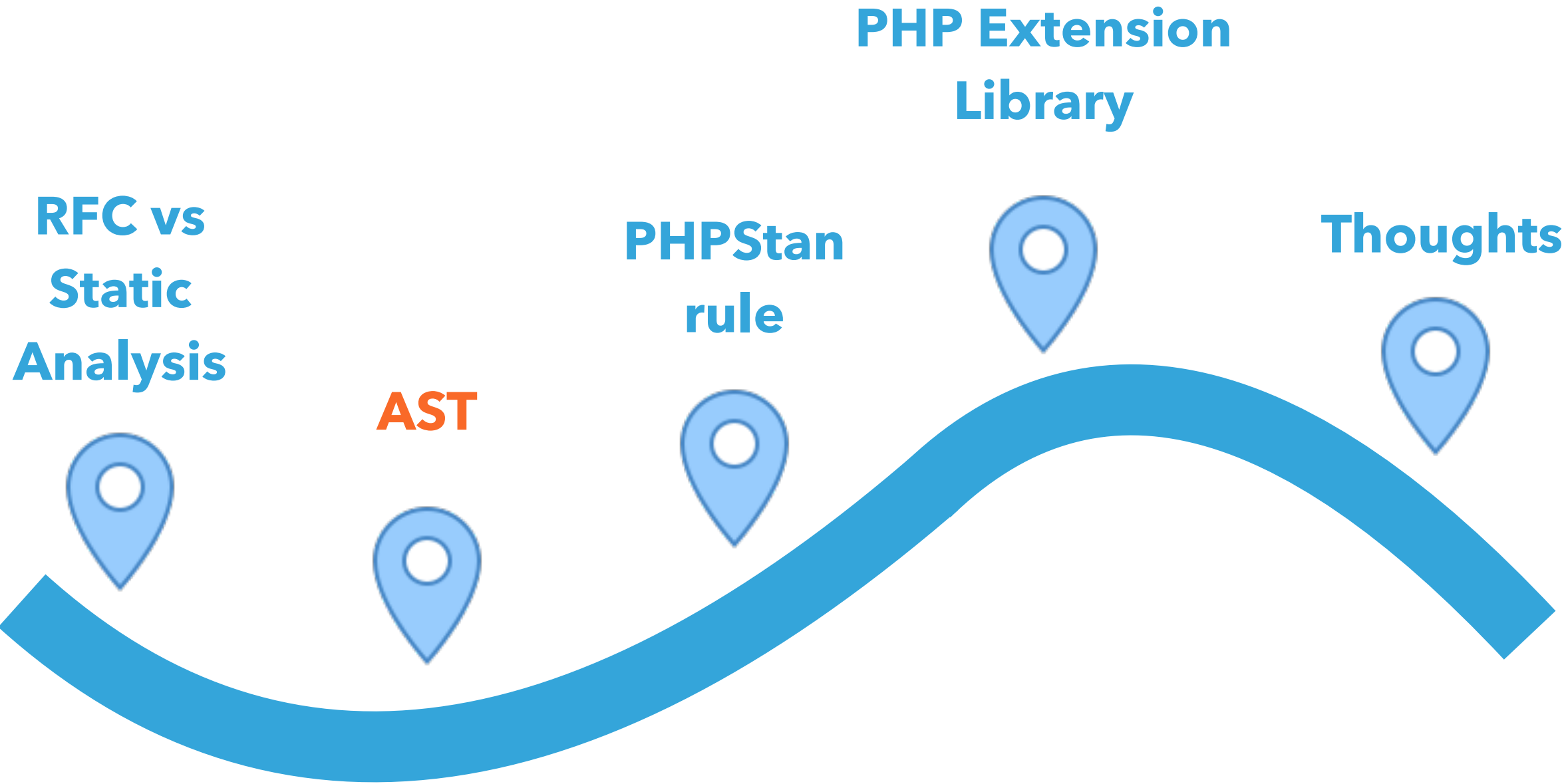
Add static analysis to dev process



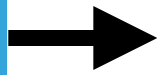
Add static analysis to dev process



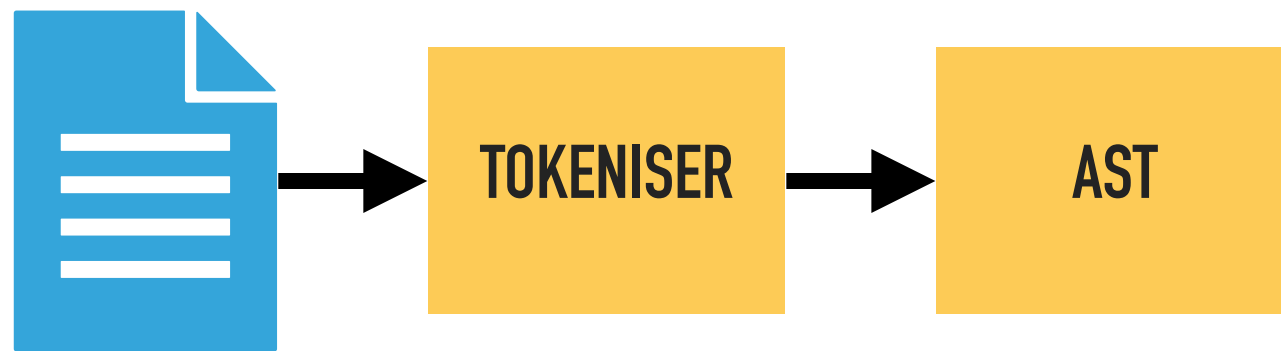
Create custom rules to emulate new language features

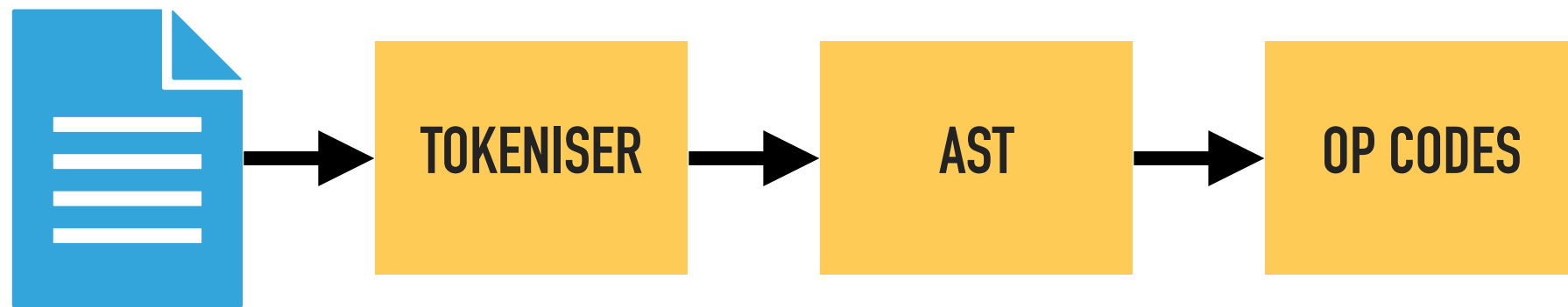




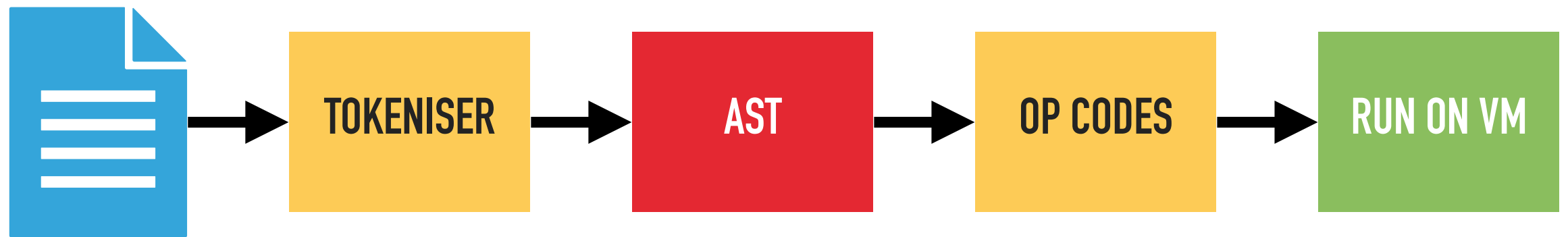


TOKENISER









```
class PersonNotifier  
{  
    private TextMessageSender $sender;  
    public function __construct() {...}  
    public function notifyPlayer() {...}  
}
```

```
class PersonNotifier
```

```
{
```

```
    private TextMessageSender $sender;
```

```
    public function __construct() {...}
```

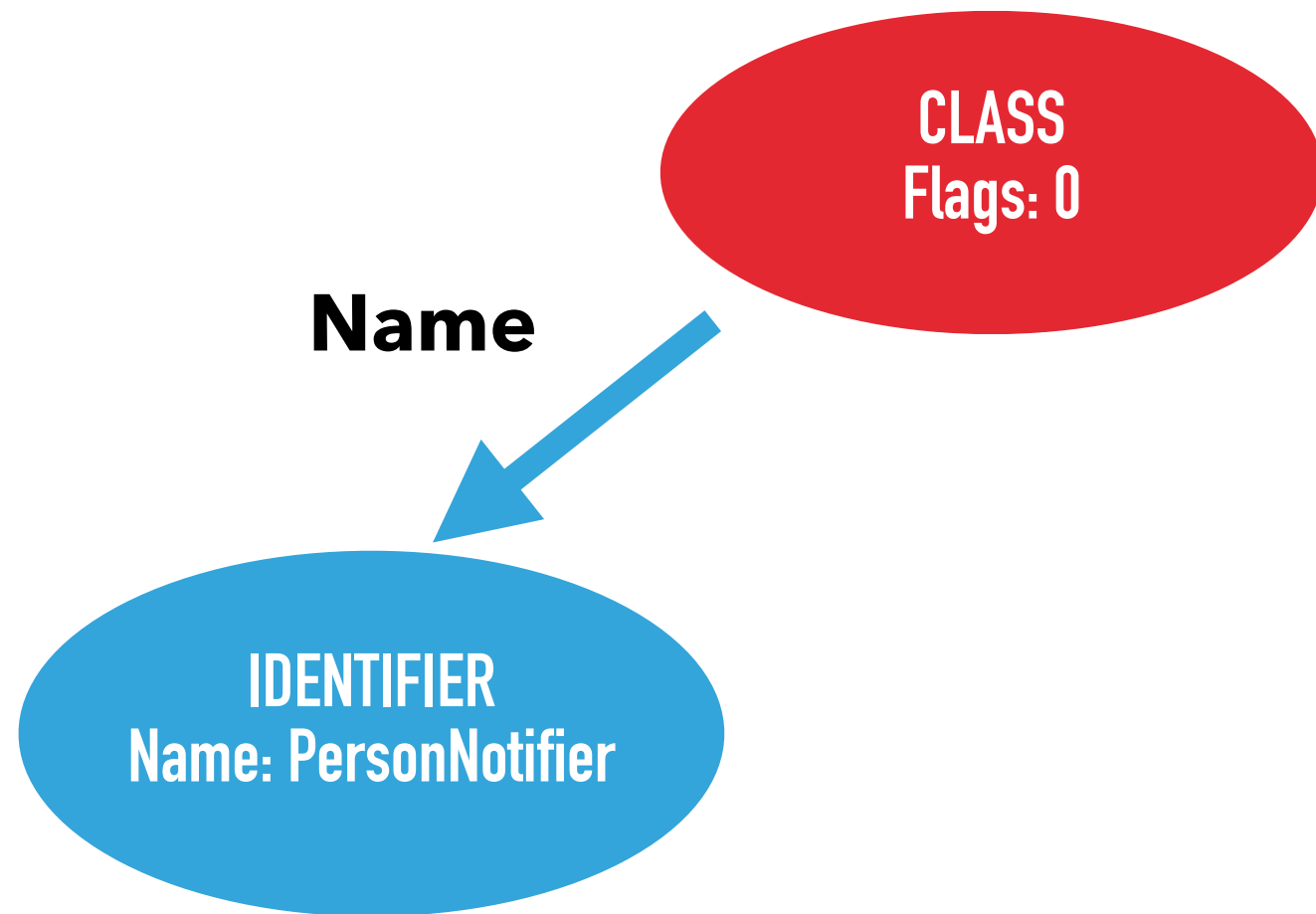
```
    public function notifyPlayer() {...}
```

```
}
```



CLASS
Flags: 0


```
class PersonNotifier
{
  private TextMessageSender $sender;
  public function __construct() {...}
  public function notifyPlayer() {...}
}
```



```
class PersonNotifier
```

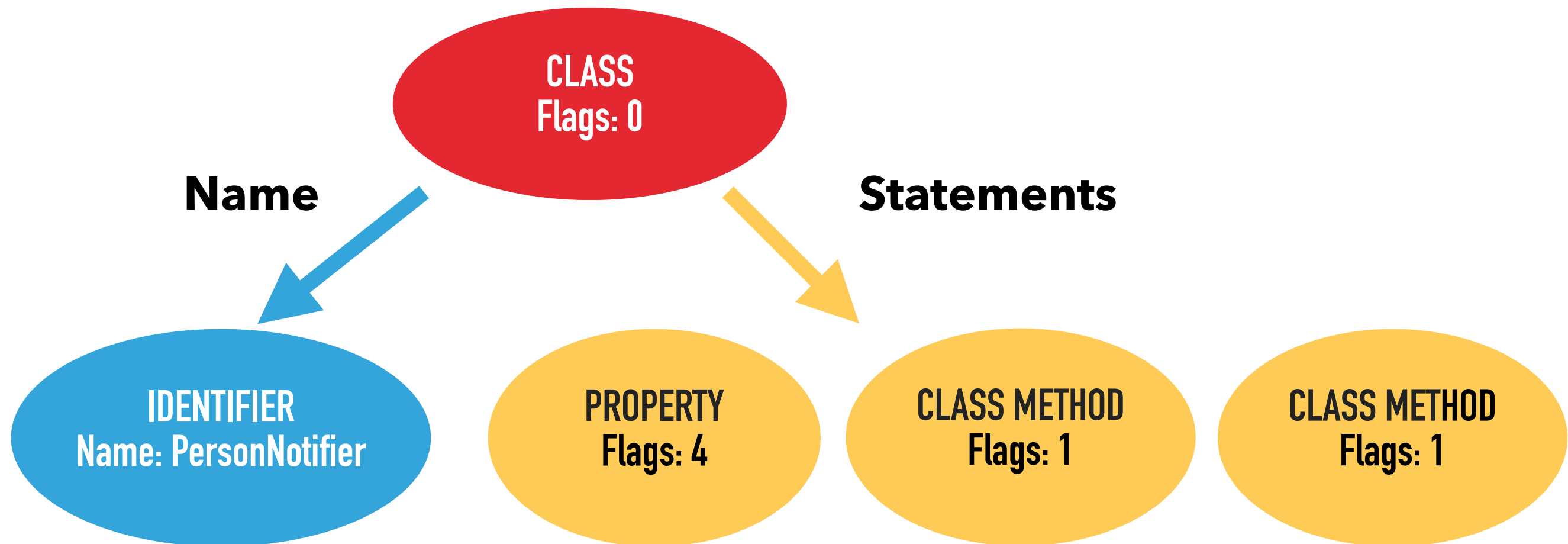
```
{
```

```
private TextMessageSender $sender;
```

```
public function __construct() {...}
```

```
public function notifyPlayer() {...}
```

```
}
```



```
public function notifyPlayer (string $msg)
{
    $this->sender->sendMessage ($msg) ;
}
```

```
public function notifyPlayer (string $msg)
{
    $this->sender->sendMessage ($msg) ;
}
```

CLASS METHOD
Flags: 1

```
public function notifyPlayer (string $msg)
{
    $this->sender->sendMessage ($msg) ;
}
```

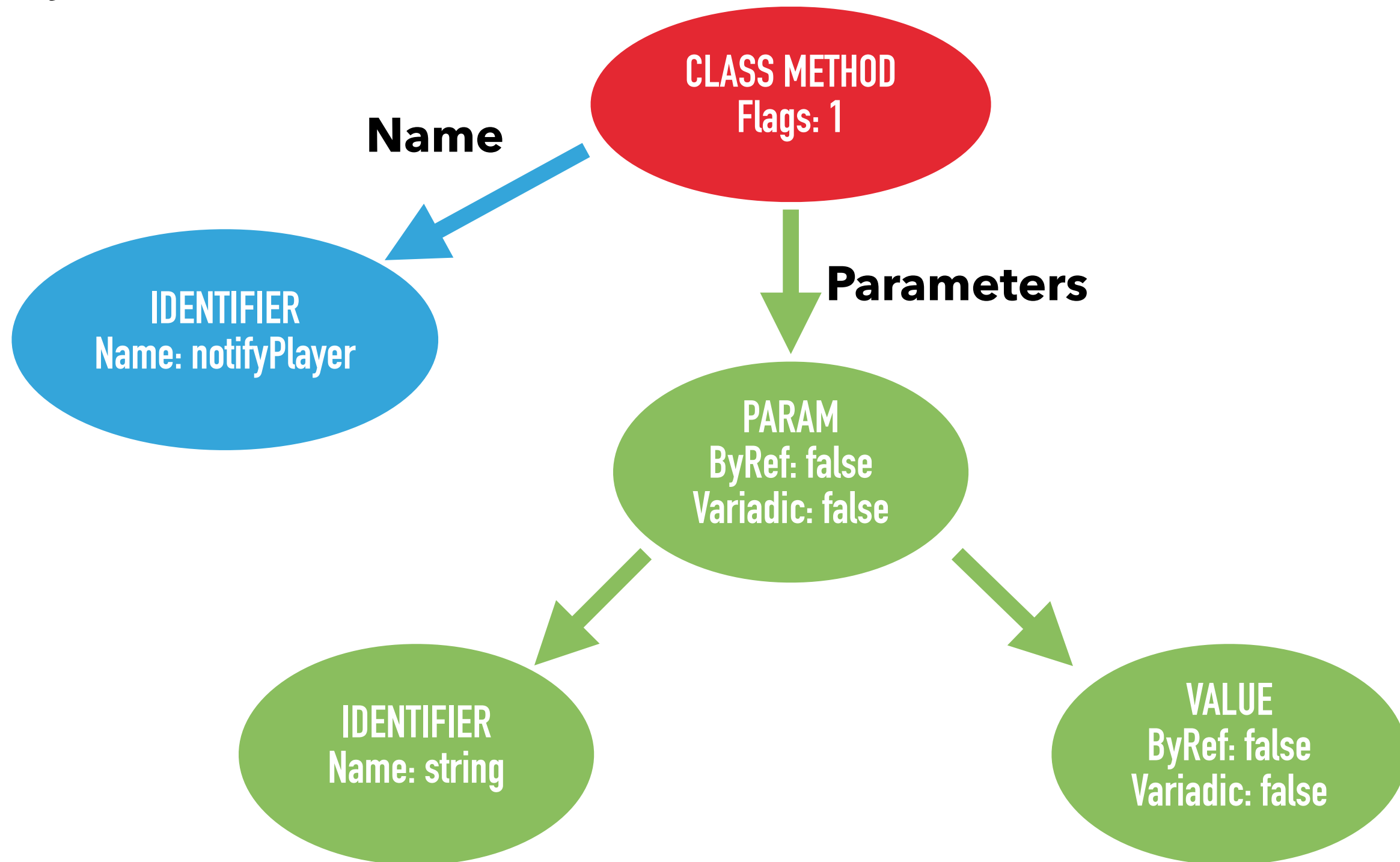
Name

CLASS METHOD
Flags: 1

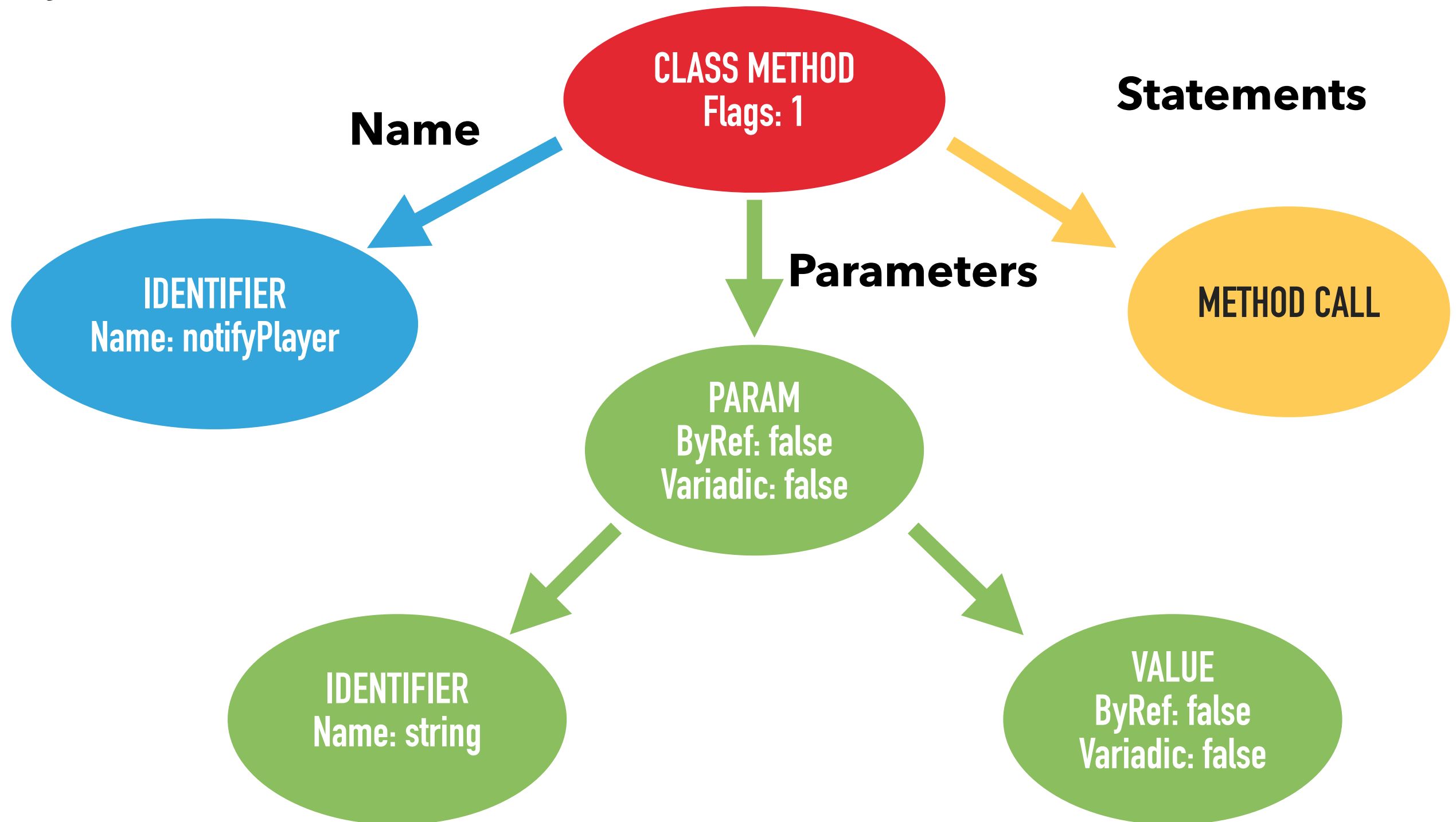
IDENTIFIER
Name: notifyPlayer



```
public function notifyPlayer (string $msg)
{
    $this->sender->sendMessage ($msg) ;
}
```



```
public function notifyPlayer (string $msg)
{
    $this->sender->sendMessage ($msg) ;
}
```



https://github.com/nikic/PHP-Parser

nikic / PHP-Parser Public Watch 232 Fork 891

[Code](#) [Issues 44](#) [Pull requests 9](#) [Actions](#) [Wiki](#) [Security](#) [Insights](#)

master 9 branches 80 tags Go to file Add file Code

nikic Bail out on PHP tags in removed code ... ✓ b0edd4c 2 hours ago 🕒 1,526 commits

📁 .github/workflows	Test PHP 8.2 in CI	3 days ago
📁 bin	Add --version flag to php-parse	17 days ago
📁 doc	Fix pretty printing example	17 days ago
📁 grammar	Support readonly before DNF type	3 days ago
📁 lib/PhpParser	Bail out on PHP tags in removed code	2 hours ago
📁 test	Bail out on PHP tags in removed code	2 hours ago
📁 test_old	Avoid repeatedly downloading archive in run-php-src.sh	2 months ago
📁 tools	Add tools/ directory	10 days ago
📄 .editorconfig	[PHP 8.1] Add support for enums (#758)	17 months ago
📄 .gitattributes	Add CONTRIBUTING.md	23 days ago
📄 .gitignore	gitignore: add phpunit test cache	3 years ago
📄 .php-cs-fixer.dist.php	Also format the grammar directory	23 days ago
📄 CHANGELOG.md	Release PHP-Parser 5.0.0-alpha1	17 days ago
📄 CONTRIBUTING.md	Add CONTRIBUTING.md	23 days ago
📄 LICENSE	Corrected license text	2 years ago
📄 README.md	Partial documentation update	17 days ago
📄 UPGRADE-1.0.md	Fix typos	8 years ago

About

A PHP parser written in PHP

[php](#) [parser](#) [static-analysis](#) [ast](#)

[Readme](#)
[BSD-3-Clause license](#)
★ 15.7k stars
👁 232 watching
🍴 891 forks

Releases 76


📦 **PHP-Parser 4.15.1** Latest
18 days ago

[+ 75 releases](#)

Packages

No packages published

Used by 1.5m

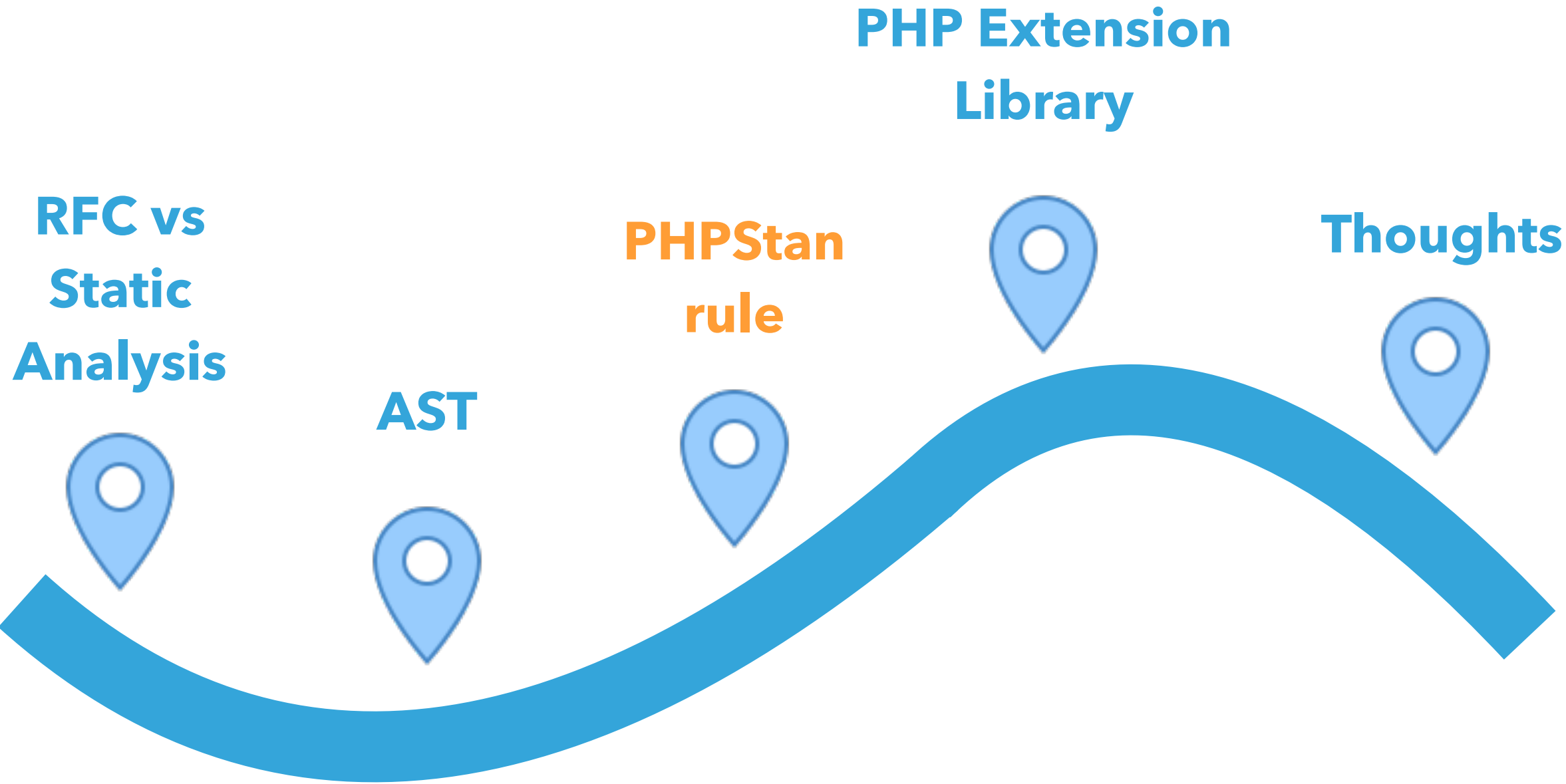
 + 1,486,143

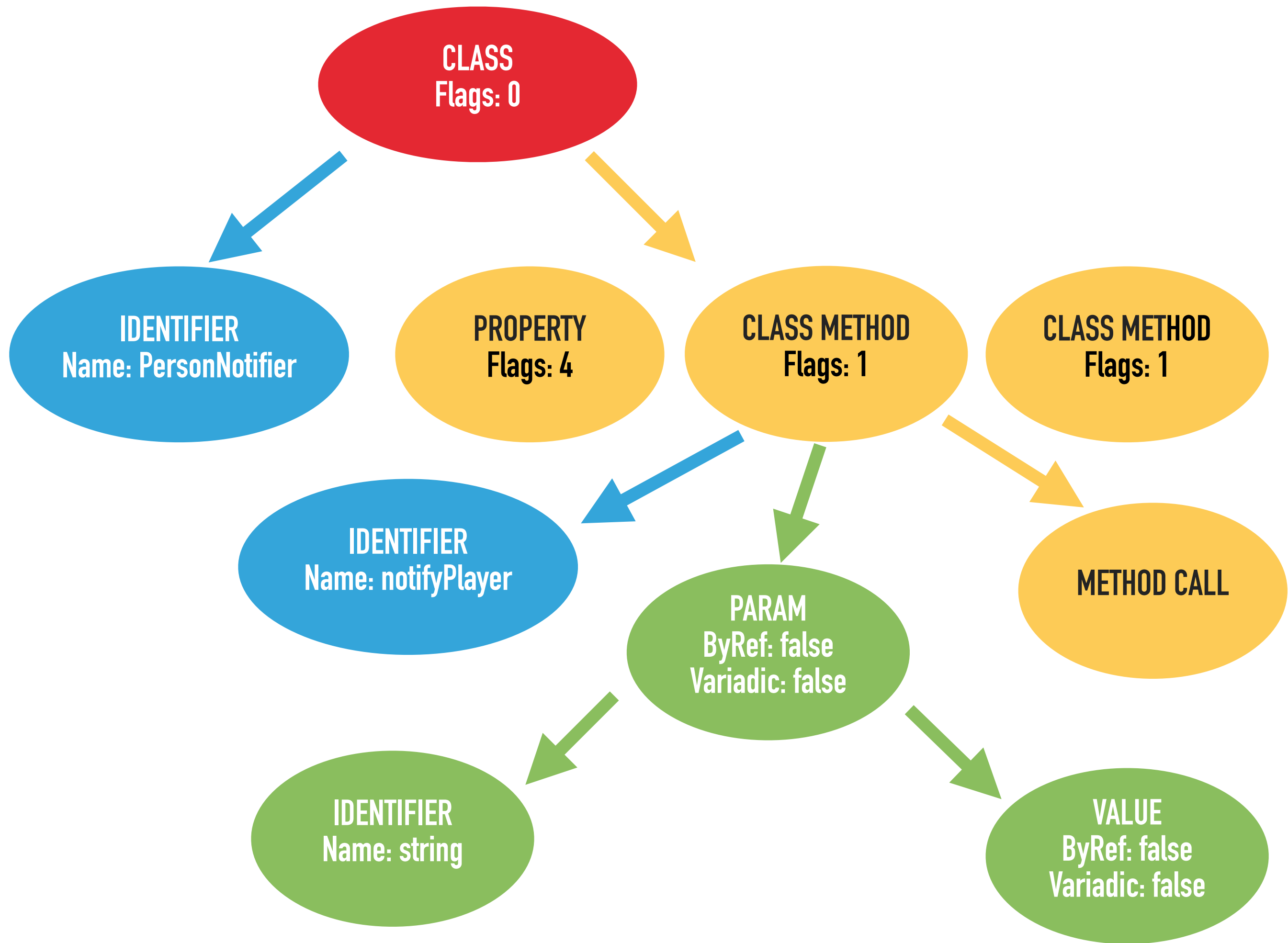
Contributors 123

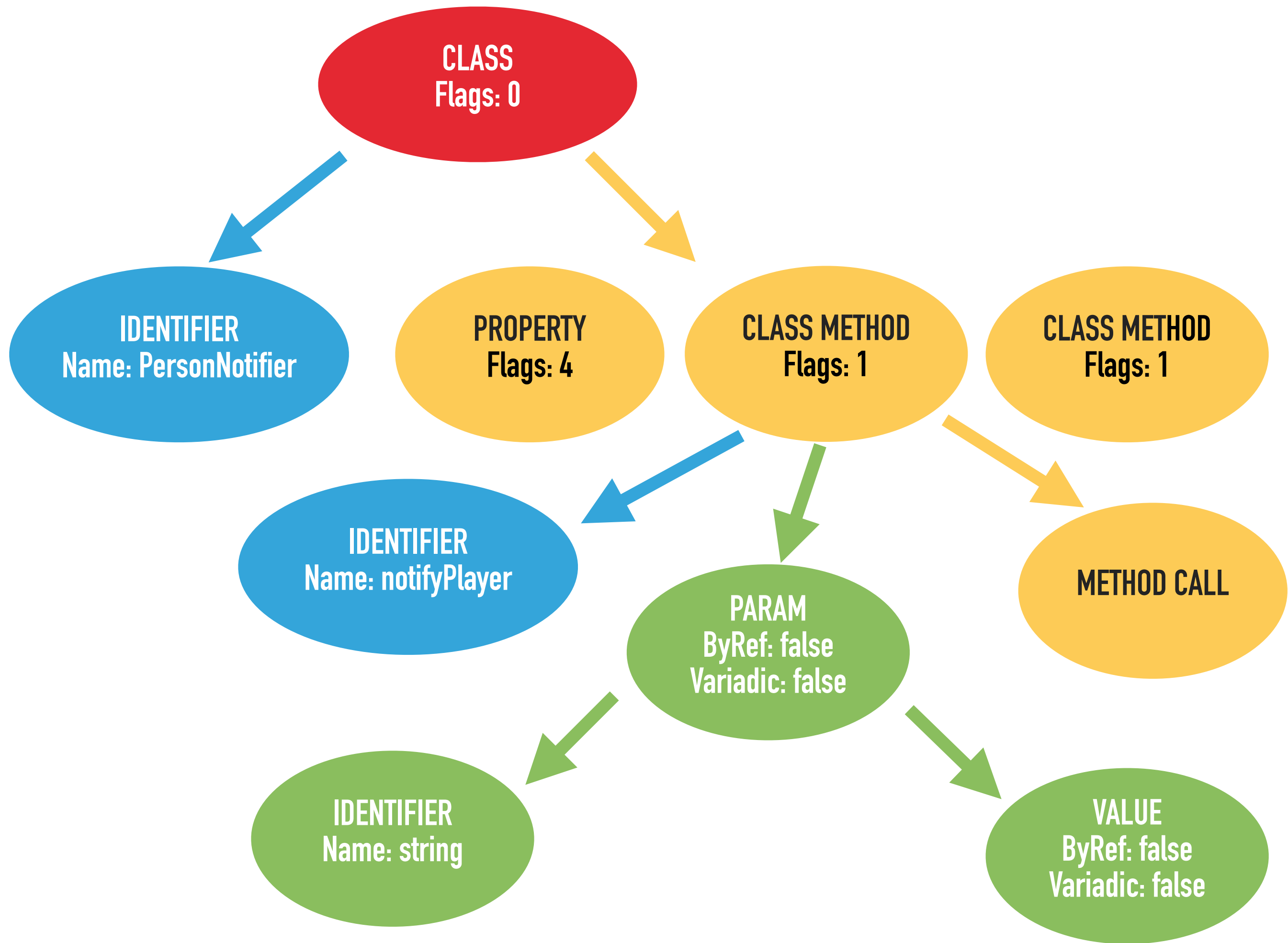
https://github.com/nikic/PHP-Parser

The screenshot shows the GitHub repository page for 'nikic/PHP-Parser'. At the top, the repository name 'nikic / PHP-Parser' is displayed with a 'Public' badge. To the right, there are 'Watch 232' and 'Fork 891' buttons. Below this, a navigation bar includes 'Code', 'Issues 44', 'Pull requests 9', 'Actions', 'Wiki', 'Security', and 'Insights'. The main content area shows the 'master' branch selected, with '9 branches' and '80 tags' indicated. A commit by 'nikic' is highlighted, titled 'Bail out on PHP tags in removed code', with a green checkmark, commit hash 'b0edd4c', and a timestamp of '2 hours ago'. It also shows '1,526 commits' and a file named '.github/workflows' with the description 'Test PHP 8.2 in CI' and a timestamp of '3 days ago'. On the right side, there is an 'About' section stating 'A PHP parser written in PHP' and several tags: 'php', 'parser', 'static-analysis', and 'ast'. A 'Readme' link is also visible.

- ▶ PHP code can be represented by an AST
- ▶ Different types of Node
- ▶ Nodes contain information
- ▶ Each type of node has different information





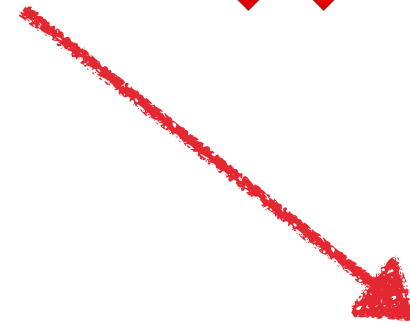
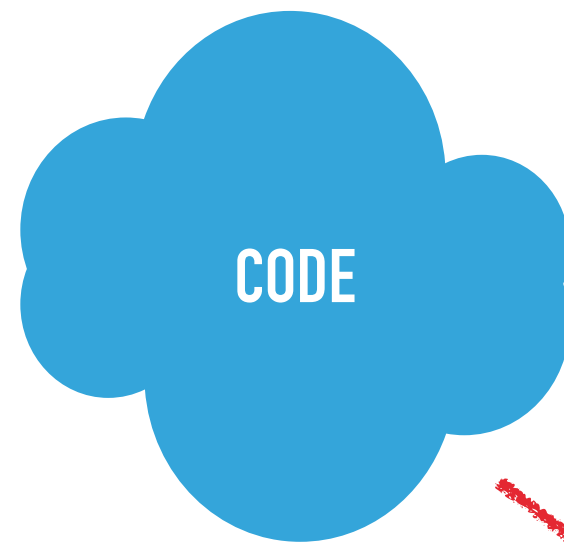


```
interface Rule
{

    public function getNodeTypes() : string;

    /**
     * @return (string|RuleError)[] errors
     */
    public function processNode(
        \PhpParser\Node $node,
        \PHPStan\Analyser\Scope $scope
) : array;

}
```



We can only call methods
in **TextMessageSender** from
TextMessageQueueProcessor

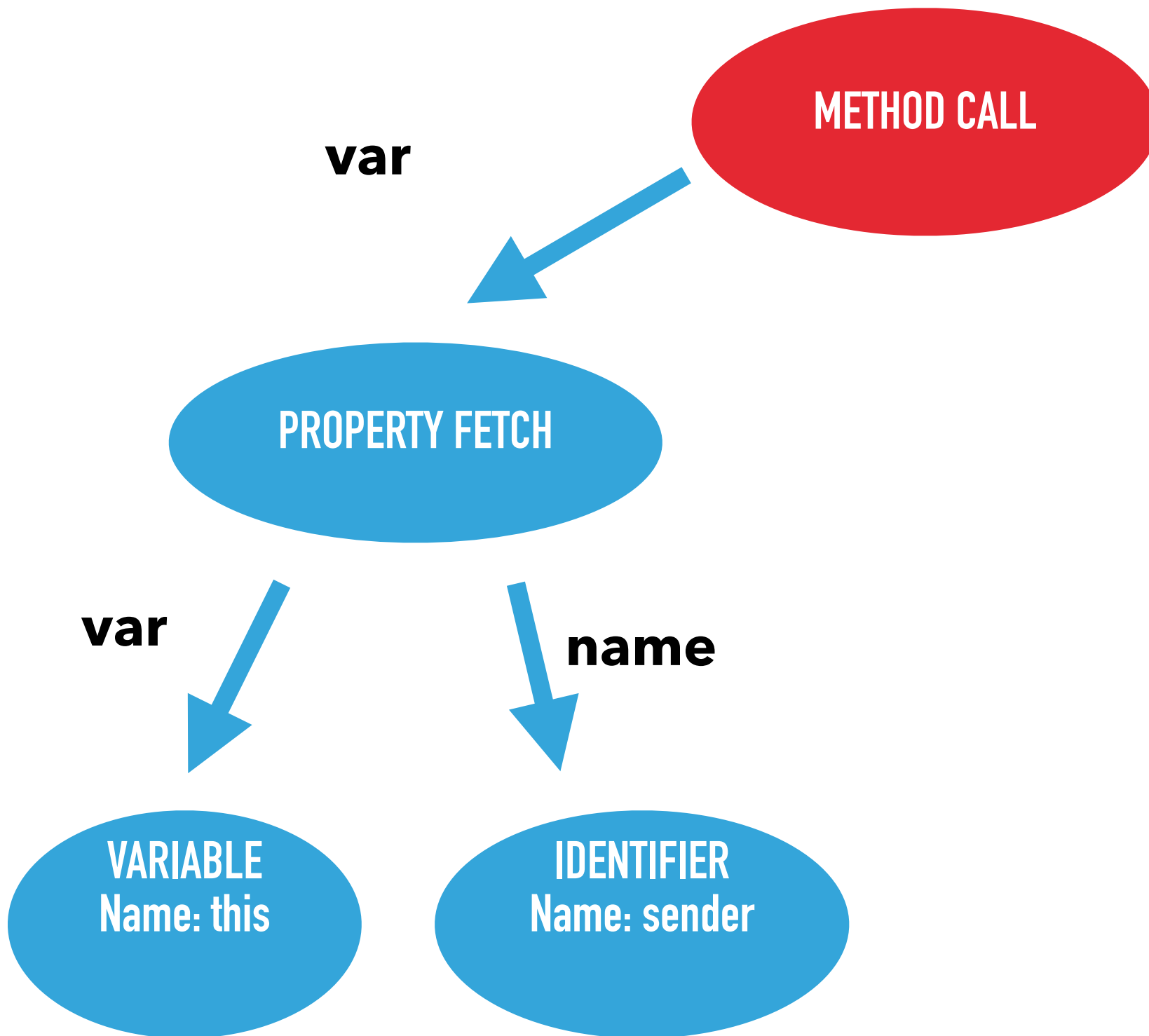


```
$this->sender -> sendMessage ($msg) ;
```

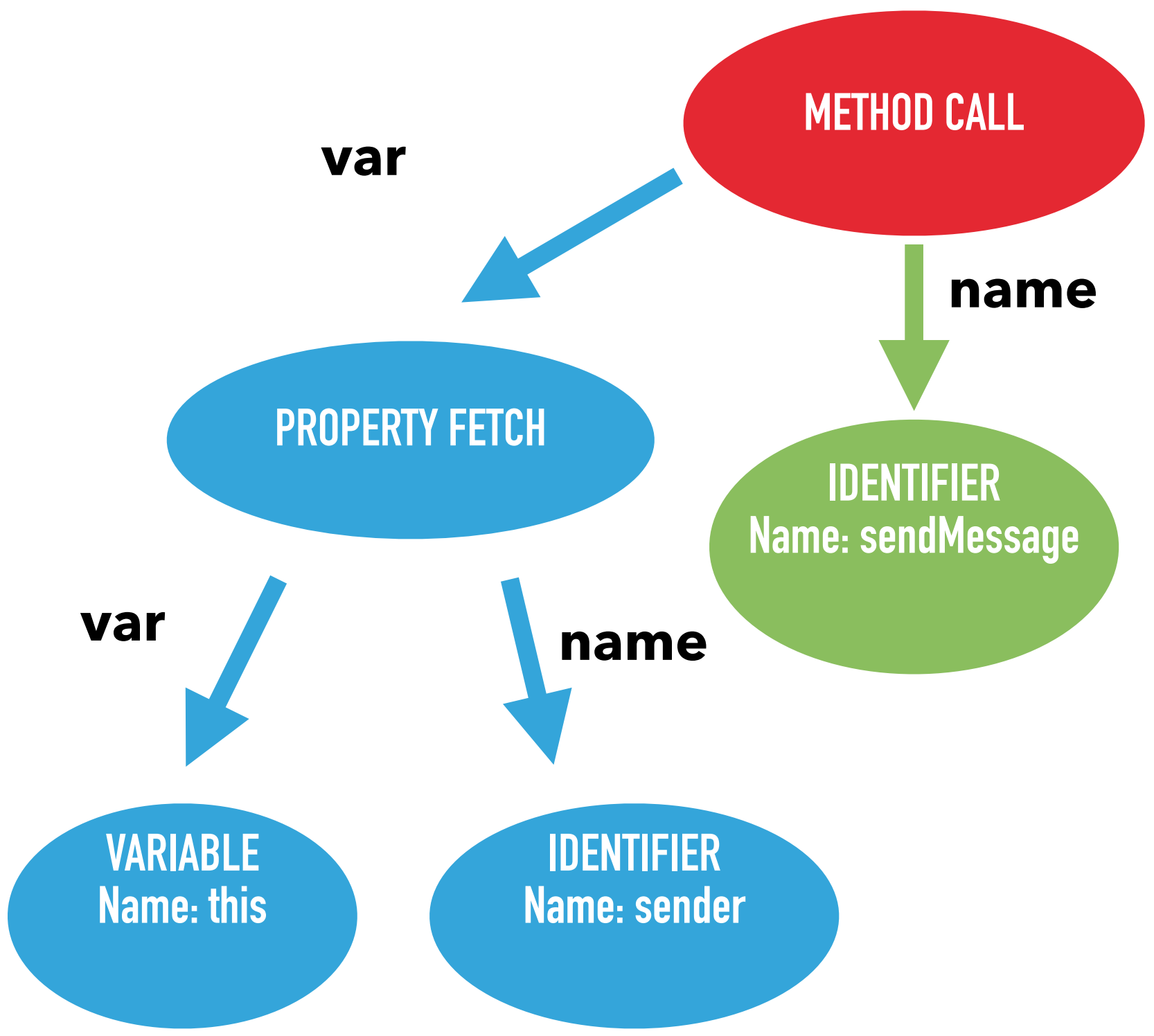


METHOD CALL

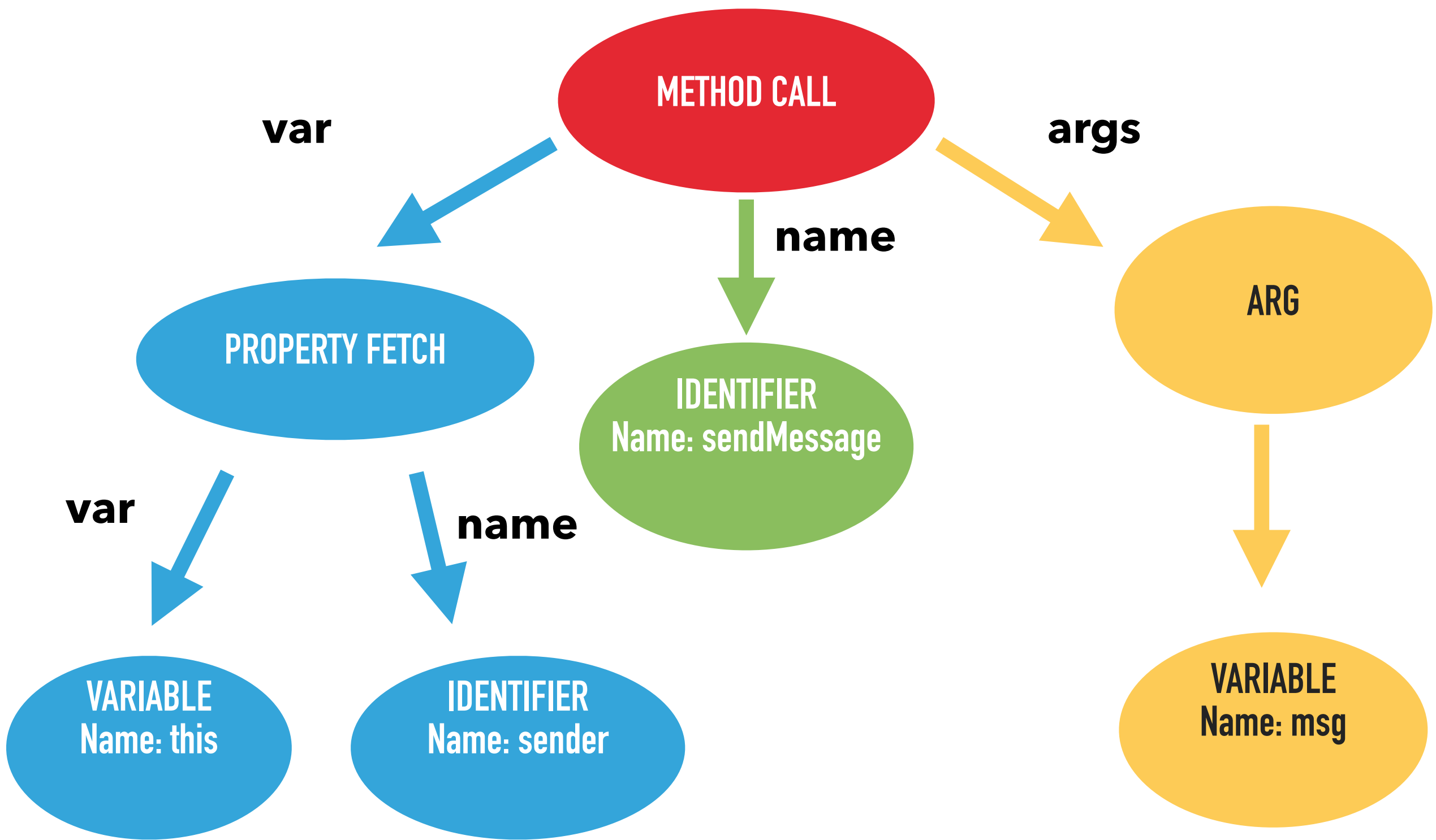
```
$this->sender -> sendMessage ($msg) ;
```




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```
class MethodCall extends \PhpParser\Node\Expr\CallLike
{

    /** @var Expr Variable holding object */
    public $var;

    /** @var Identifier|Expr Method name */
    public $name;

    /** @var array<Arg|VariadicPlaceholder> Arguments */
    public $args;

    // Rest of class ...
```

```
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class MethodCall extends \PhpParser\Node\Expr\CallLike
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```
// Rest of class ...
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```

```
// Rest of class ...
```

```
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```
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```

```
// Rest of class ...
```

```
$this->sender -> sendMessage ($msg);
```

```
class TextMessageSenderCallerRule  
  implements Rule  
{  
  
  public function getNodeType() : string  
  {  
    return MethodCall::class;  
  }
```

```
class TextMessageSenderCallerRule  
implements Rule
```

```
{
```

```
    public function getNodeTypes() : string  
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```

```
public function processNode(Node $node, Scope $scope): array
{
    $callingClass = $scope->getClassReflection()->getName();

    if ($callingClass === TextMessageQueueProcessor::class) {
        return [];
    }

    $type = $scope->getType($node->var);

    foreach ($type->getReferencedClasses() as $targetClass) {
        if ($targetClass === TextMessageSender::class) {
            $msg = "Cant call TextMessageSender from here";
            return [RuleErrorBuilder::message($message)->build()];
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    }

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```

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}
```

```
class PersonNotifier
{

private TextMessageSender $sender;

public function notifyPlayer(string $msg): void
{

    $this->sender->sendMessage($msg);

}

}
```

`$this->sender` is called from `PersonNotifier`

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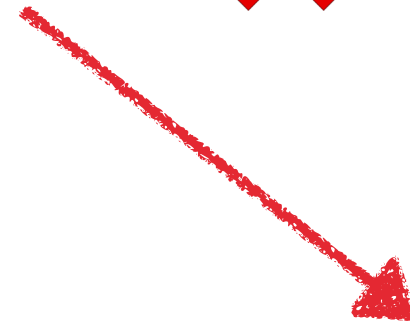
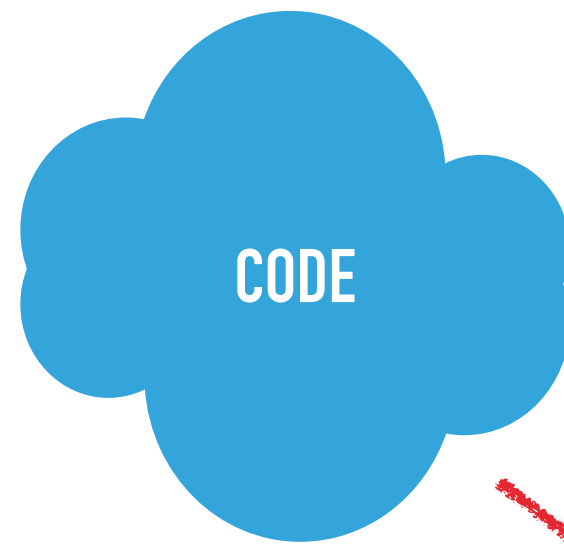
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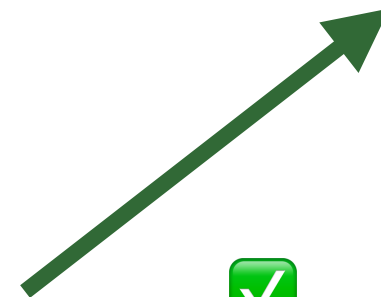
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{
    $callingClass = $scope->getClassReflection()->getName();

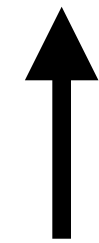
    if ($callingClass === TextMessageQueueProcessor::class) {
        return [];
    }

    $type = $scope->getType($node->var);

    foreach ($type->getReferencedClasses() as $targetClass) {
        if ($targetClass === TextMessageSender::class) {
            $msg = "Cant call TextMessageSender from here";
            return [RuleErrorBuilder::message($message)->build()];
        }
    }

    return [];
}
```

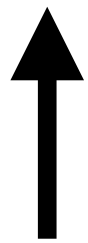
```
$this->sender->notifyPlayer($msg);
```



var



name



args

```
class PersonNotifier
```

```
{
```

```
private TextMessageSender $sender;
```

```
public function notifyPlayer(string $msg): void
```

```
{
```

```
$this->sender->sendMessage($msg);
```

```
}
```

```
}
```

`$this->sender` is of type `TextMessageSender`

```
public function processNode(Node $node, Scope $scope): array
{
    $callingClass = $scope->getClassReflection()->getName();

    if ($callingClass === TextMessageQueueProcessor::class) {
        return [];
    }

    $type = $scope->getType($node->var);

    foreach ($type->getReferencedClasses() as $targetClass) {
        if ($targetClass === TextMessageSender::class) {
            $msg = "Cant call TextMessageSender from here";
            return [RuleErrorBuilder::message($message)->build()];
        }
    }

    return [];
}
```

```
public function processNode(Node $node, Scope $scope): array
{
    $callingClass = $scope->getClassReflection()->getName();

    if ($callingClass === TextMessageQueueProcessor::class) {
        return [];
    }

    $type = $scope->getType($node->var);

    foreach ($type->getReferencedClasses() as $targetClass) {

        if ($targetClass === TextMessageSender::class) {
            $msg = "Cant call TextMessageSender from here";
            return [RuleErrorBuilder::message($message)->build()];
        }
    }

    return [];
}
```

```
class PersonNotifier
```

```
{
```

```
private TextMessageSender | WhatsappSender $sender;
```

```
public function notifyPlayer(string $msg): void
```

```
{
```

```
$this->sender->sendMessage($msg);
```

```
}
```

```
}
```

`$this->sender` is of type `TextMessageSender`

or `WhatsappSender`


```
public function processNode(Node $node, Scope $scope): array
{
    $callingClass = $scope->getClassReflection()->getName();

    if ($callingClass === TextMessageQueueProcessor::class) {
        return [];
    }

    $type = $scope->getType($node->var);

    foreach ($type->getReferencedClasses() as $targetClass) {

        if ($targetClass === TextMessageSender::class) {
            $msg = "Cant call TextMessageSender from here";
            return [RuleErrorBuilder::message($message)->build()];
        }
    }

    return [];
}
```

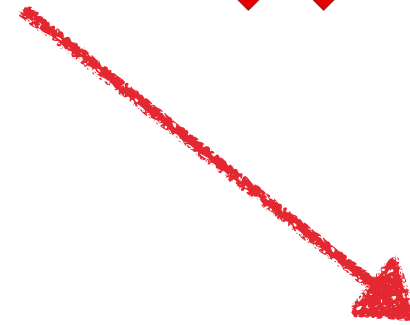
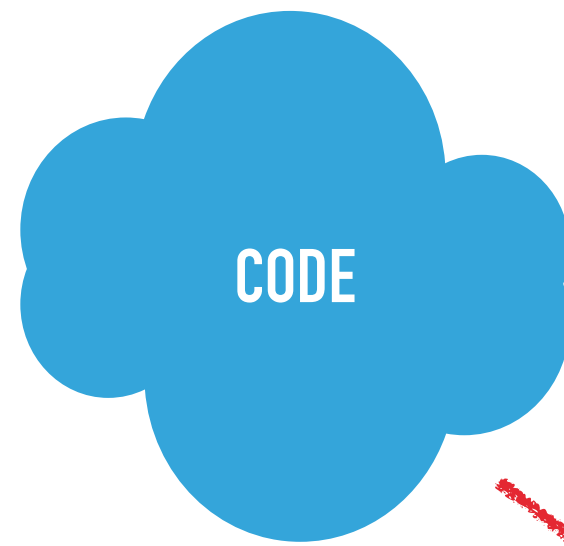
```
public function processNode(Node $node, Scope $scope): array
{
    $callingClass = $scope->getClassReflection()->getName();

    if ($callingClass === TextMessageQueueProcessor::class) {
        return [];
    }

    $type = $scope->getType($node->var);

    foreach ($type->getReferencedClasses() as $targetClass) {
        if ($targetClass === TextMessageSender::class) {
            $msg = "Cant call TextMessageSender from here";
            return [RuleErrorBuilder::message($message)->build()];
        }
    }

    return [];
}
```



We can only call methods
in **TextMessageSender** from
TextMessageQueueProcessor



```
public function processNode(Node $node, Scope $scope): array
{
    $callingClass = $scope->getClassReflection()->getName();

    if ($callingClass === TextMessageQueueProcessor::class) {
        return [];
    }

    $type = $scope->getType($node->var);

    foreach ($type->getReferencedClasses() as $targetClass) {

        if ($targetClass === TextMessageSender::class) {
            $msg = "Cant call TextMessageSender from here";
            return [RuleErrorBuilder::message($message)->build()];
        }
    }

    return [];
}
```

```
public function processNode(Node $node, Scope $scope): array
{
    $callingClass = $scope->getClassReflection()->getName();

    if ($callingClass === TextMessageQueueProcessor::class) {
        return [];
    }

    $type = $scope->getType($node->var);

    foreach ($type->getReferencedClasses() as $targetClass) {

        if ($targetClass === TextMessageSender::class) {
            $msg = "Cant call TextMessageSender from here";
            return [RuleErrorBuilder::message($message)->build()];
        }
    }

    return [];
}
```

```
public function processNode(Node $node, Scope $scope): array
{
    // Find the class that method call is in
    $callingClass = $scope->getClassReflection()->getName();

    // If in TextMessageQueueProcessor everything is OK
    if ($callingClass === TextMessageQueueProcessor::class) {
        return [];
    }

    // Get type of the class of the method call
    $type = $scope->getType($node->var);

    // Iterate through all the possible classes
    foreach ($type->getReferencedClasses() as $targetClass) {

        // Trying to call a method in TextMessageSender? Report error
        if ($targetClass === TextMessageSender::class) {
            $msg = "Cant call TextMessageSender from here";
            return [RuleErrorBuilder::message($message)->build()];
        }
    }

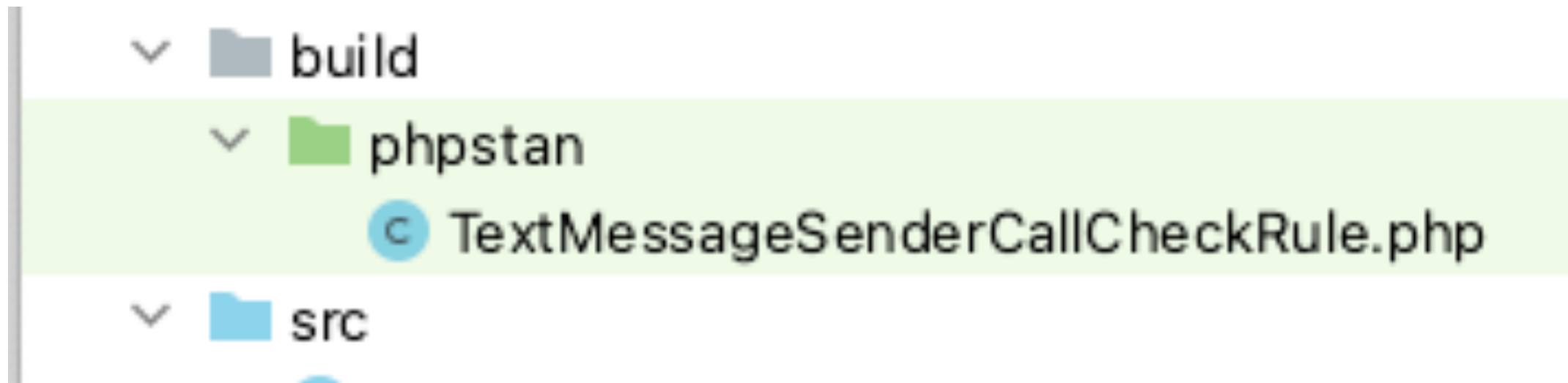
    // If we've got this far then there are no errors
    return [];
}
```

▼ build

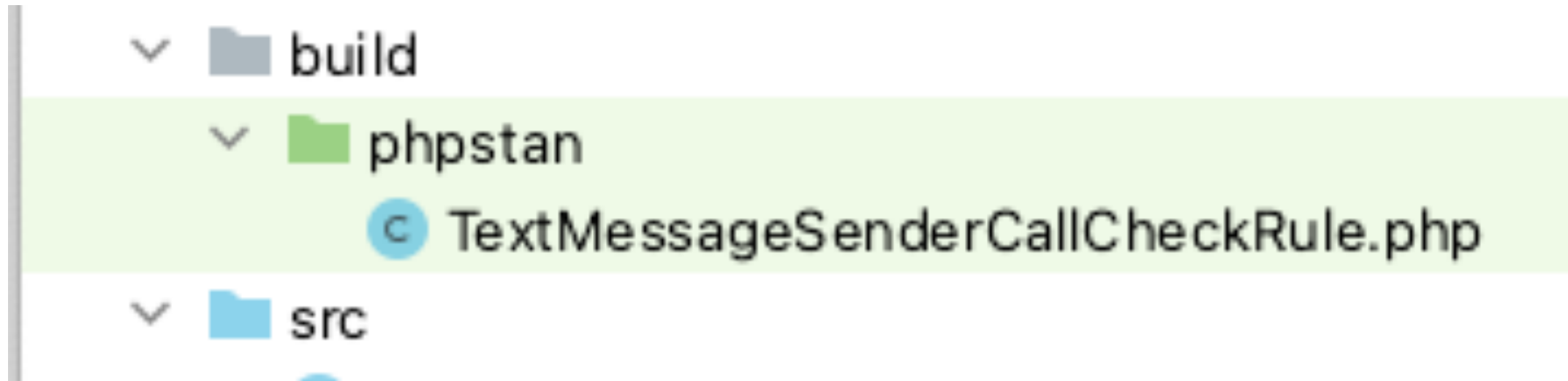
▼ phpstan

Ⓢ TextMessageSenderCallCheckRule.php

▼ src



```
"autoload-dev": {  
    "psr-4": {  
        "DaveLiddament\\PhpstanRules\\": "build/phpstan/"  
    }  
},
```

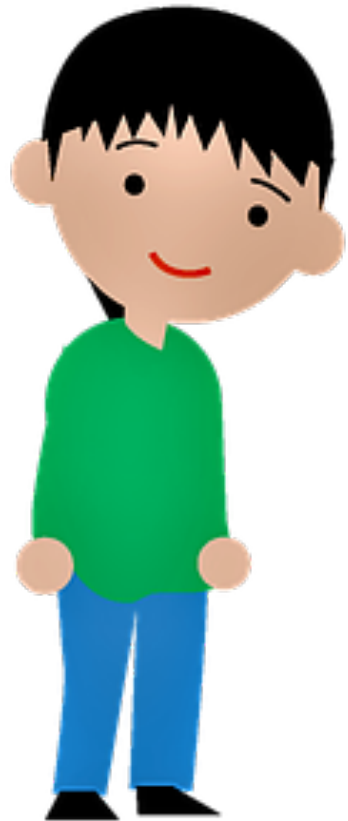
```
"autoload-dev": {  
    "psr-4": {  
        "DaveLiddament\\PhpstanRules\\": "build/phpstan/"  
    }  
},
```

services:

-

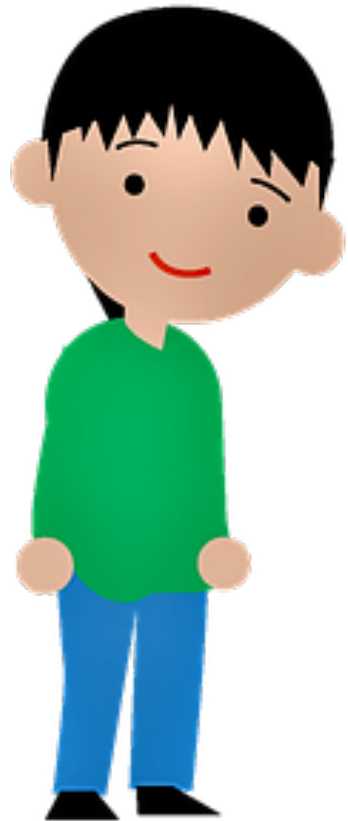
```
class: DaveLiddament\\PhpstanRules\\TextMessageSenderCallCheckRule  
tags:  
- phpstan.rules.rule
```

AMAZING!



AMAZING!

WE CAN DO BETTER...



**We can only call
methods in target class
from a specified
allowed calling class**

```
class TextMessageSenderCallerRule implements Rule  
{
```

```
    public function __construct(  
        private string $allowedCallingClass,  
        private string $targetClass,  
) {}
```

```
public function processNode(Node $node, Scope $scope): array
{
    $callingClass = $scope->getClassReflection()->getName();

    if ($callingClass === $this->allowedCallingClass) {
        return [];
    }

    $type = $scope->getType($node->var);

    foreach ($type->getReferencedClasses() as $targetClass) {
        if ($targetClass === $this->targetClass) {
            $msg = "Can not call {$this->targetClass} from here";
            return [RuleErrorBuilder::message($message)->build()];
        }
    }

    return [];
}
```

```
public function processNode(Node $node, Scope $scope): array
{
    $callingClass = $scope->getClassReflection()->getName();

    if ($callingClass === $this->allowedCallingClass) {
        return [];
    }

    $type = $scope->getType($node->var);

    foreach ($type->getReferencedClasses() as $targetClass) {

        if ($targetClass === $this->targetClass) {
            $msg = "Can not call {$this->targetClass} from here";
            return [RuleErrorBuilder::message($message)->build()];
        }
    }

    return [];
}
```

```
public function processNode(Node $node, Scope $scope): array
{
    $callingClass = $scope->getClassReflection()->getName();

    if ($callingClass === $this->allowedCallingClass) {
        return [];
    }

    $type = $scope->getType($node->var);

    foreach ($type->getReferencedClasses() as $targetClass) {
        if ($targetClass === $this->targetClass) {
            $msg = "Can not call {$this->targetClass} from here";
            return [RuleErrorBuilder::message($message)->build()];
        }
    }

    return [];
}
```


services:

-

class: PhpstanRules\TextMessageSenderCallCheckRule

tags:

- **phpstan.rules.rule**

arguments:

allowedCallingClass: RuleDemo\TextMessageQueueProcessor

targetClass: RuleDemo\TextMessageSender

services:

-

class: PhpstanRules\TextMessageSenderCallCheckRule

tags:

- **phpstan.rules.rule**

arguments:

allowedCallingClass: RuleDemo\TextMessageQueueProcessor

targetClass: RuleDemo\TextMessageSender

services:

-

class: PhpstanRules\TextMessageSenderCallCheckRule

tags:

- **phpstan.rules.rule**

arguments:

allowedCallingClass: RuleDemo\TextMessageQueueProcessor

targetClass: RuleDemo\TextMessageSender

class: PhpstanRules\TextMessageSenderCallCheckRule

tags:

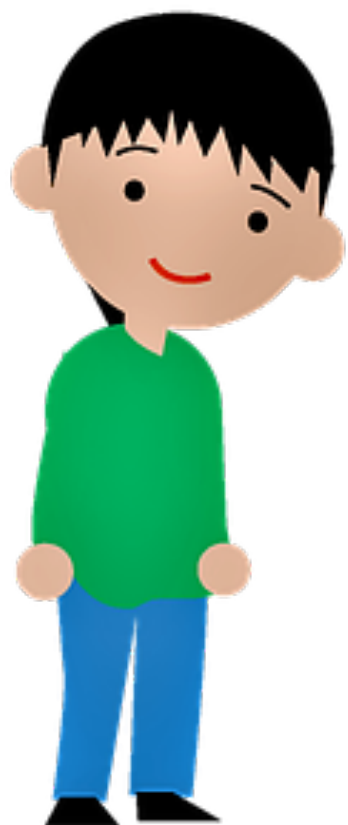
- **phpstan.rules.rule**

arguments:

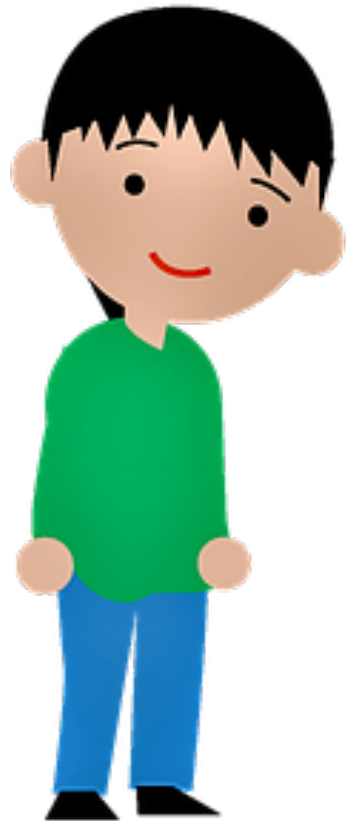
allowedCallingClass: Foo

targetClass: Bar

I WAS AMAZED BEFORE. NOW I'M
EVEN MORE AMAZED!



**I WAS AMAZED BEFORE. NOW I'M
EVEN MORE AMAZED!**



WE CAN DO BETTER...



```
/**  
 * Can only be called from TextMessageQueueProcessor  
 */  
class TextMessageSender  
{  
  
}
```

```
/**  
 * Can only be called from TextMessageQueueProcessor  
 */  
class TextMessageSender  
{  
  
}
```

```
/**  
 * Can only be called from TextMessageQueueProcessor  
 */  
class TextMessageSender  
{  
  
}
```

- ▶ **Remember to document**
- ▶ **Remember to setup some config**
- ▶ **What happens if we rename a class?**


```
#[Attribute(Attribute::TARGET_CLASS)]  
class Friend  
{  
  
    /** @param class-string $friend */  
public function __construct(  
    public string $friend,  
) {}  
}
```

```
# [Attribute(Attribute::TARGET_CLASS)]  
class Friend  
{  
  
    /** @param class-string $friend */  
    public function __construct(  
        public string $friend,  
    ) {}  
}
```

```
# [Friend(TextMessageQueueProcessor::class)]  
class TextMessageSender  
{  
  
}
```

```
# [Attribute(Attribute::TARGET_CLASS)]  
class Friend  
{  
  
    /** @param class-string $friend */  
    public function __construct(  
        public string $friend,  
    ) {}  
}
```

```
# [Friend(TextMessageQueueProcessor::class)]  
class TextMessageSender  
{  
  
}
```

```
public function processNode(Node $node, Scope $scope): array
{

    $callingClass = $scope->getClassReflection()->getName();
    $type = $scope->getType($node->var);

    foreach ($type->getReferencedClasses() as $targetClass) {

        // TODO:
        // 1. Does $targetClass have a #[Friend] attribute
        // 2. Yes? Check $callingClass is a friend of $targetClass

    }

    return [];
}
```

```
public function processNode(Node $node, Scope $scope): array
{
    $callingClass = $scope->getClassReflection()->getName();
    $type = $scope->getType($node->var);

    foreach ($type->getReferencedClasses() as $targetClass) {

        // TODO:
        // 1. Does $targetClass have a #[Friend] attribute
        // 2. Yes? Check $callingClass is a friend of $targetClass

    }

    return [];
}
```

```
public function processNode(Node $node, Scope $scope): array
{

    $callingClass = $scope->getClassReflection()->getName();
    $type = $scope->getType($node->var);

    foreach ($type->getReferencedClasses() as $targetClass) {

        // TODO:
        // 1. Does $targetClass have a #[Friend] attribute
        // 2. Yes? Check $callingClass is a friend of $targetClass

    }

    return [];
}
```

```
class TextMessageSenderCallerRule implements Rule  
{
```

```
    public function __construct(  
        private ReflectionProvider $reflectionProvider,  
    ) {}
```

```
foreach ($type->getReferencedClasses() as $targetClass) {  
  
    // 1. Does $targetClass have a #[Friend] attribute  
  
    $info = $this->reflectionProvider->getClass($targetClass);  
  
    $nativeReflection = $info->getNativeReflection();  
  
    $friendAttributes = $nativeReflection  
                        ->getAttributes(Friend::class);  
  
    if (count($friendAttributes) !== 1) {  
        continue;  
    }  
  
    $friendAttribute = $friendAttributes[0];  
    $friendArguments = $friendAttribute->getArguments();  
  
    if (count($friendArguments) !== 1) {  
        continue;  
    }  
  
    $friendClass = $friendArguments[0];  
}
```



```
foreach ($type->getReferencedClasses() as $targetClass) {
```

```
    // 1. Does $targetClass have a #[Friend] attribute
```

```
    $info = $this->reflectionProvider->getClass($targetClass);
```

```
    $nativeReflection = $info->getNativeReflection();
```

```
    $friendAttributes = $nativeReflection  
                        ->getAttributes(Friend::class);
```

```
    if (count($friendAttributes) !== 1) {  
        continue;  
    }
```

```
    $friendAttribute = $friendAttributes[0];  
    $friendArguments = $friendAttribute->getArguments();
```

```
    if (count($friendArguments) !== 1) {  
        continue;  
    }
```

```
    $friendClass = $friendArguments[0];
```

```
foreach ($type->getReferencedClasses() as $targetClass) {  
  
    // 1. Does $targetClass have a #[Friend] attribute  
  
    $info = $this->reflectionProvider->getClass($targetClass);  
  
    $nativeReflection = $info->getNativeReflection();  
  
    $friendAttributes = $nativeReflection  
                        ->getAttributes(Friend::class);  
  
    if (count($friendAttributes) !== 1) {  
        continue;  
    }  
  
    $friendAttribute = $friendAttributes[0];  
    $friendArguments = $friendAttribute->getArguments();  
  
    if (count($friendArguments) !== 1) {  
        continue;  
    }  
  
    $friendClass = $friendArguments[0];  
}
```

```
foreach ($type->getReferencedClasses() as $targetClass) {  
  
    // 1. Does $targetClass have a #[Friend] attribute  
  
    $info = $this->reflectionProvider->getClass($targetClass);  
  
    $nativeReflection = $info->getNativeReflection();  
  
    $friendAttributes = $nativeReflection  
                        ->getAttributes(Friend::class);  
  
    if (count($friendAttributes) !== 1) {  
        continue;  
    }  
  
    $friendAttribute = $friendAttributes[0];  
    $friendArguments = $friendAttribute->getArguments();  
  
    if (count($friendArguments) !== 1) {  
        continue;  
    }  
  
    $friendClass = $friendArguments[0];  
}
```

```
foreach ($type->getReferencedClasses() as $targetClass) {  
  
    // 1. Does $targetClass have a #[Friend] attribute  
  
    $info = $this->reflectionProvider->getClass($targetClass);  
  
    $nativeReflection = $info->getNativeReflection();  
  
    $friendAttributes = $nativeReflection  
                        ->getAttributes(Friend::class);  
  
    if (count($friendAttributes) !== 1) {  
        continue;  
    }  
  
    $friendAttribute = $friendAttributes[0];  
    $friendArguments = $friendAttribute->getArguments();  
  
    if (count($friendArguments) !== 1) {  
        continue;  
    }  
  
    $friendClass = $friendArguments[0];  
}
```

```
foreach ($type->getReferencedClasses() as $targetClass) {  
  
    // 1. Does $targetClass have a #[Friend] attribute  
  
    $info = $this->reflectionProvider->getClass($targetClass);  
  
    $nativeReflection = $info->getNativeReflection();  
  
    $friendAttributes = $nativeReflection  
                        ->getAttributes(Friend::class);  
  
    if (count($friendAttributes) !== 1) {  
        continue;  
    }  
  
    $friendAttribute = $friendAttributes[0];  
    $friendArguments = $friendAttribute->getArguments();  
  
    if (count($friendArguments) !== 1) {  
        continue;  
    }  
  
    $friendClass = $friendArguments[0];  
}
```

```
foreach ($type->getReferencedClasses() as $targetClass) {  
    // Step 1 see previous slide  
  
    // 2. Yes? Check $callingClass is a friend of $targetClass  
  
    if ($callingClass !== $friendClass) {  
  
        $msg = sprintf(  
            "%s can only be called its friend %s and not from %s",  
            $targetClass,  
            $friendClass,  
            $callingClass);  
  
        return [RuleErrorBuilder::message($msg)->build()];  
  
    }  
  
}
```

```
foreach ($type->getReferencedClasses() as $targetClass) {  
    // Step 1 see previous slide  
  
    // 2. Yes? Check $callingClass is a friend of $targetClass  
  
    if ($callingClass !== $friendClass) {  
  
        $msg = sprintf(  
            "%s can only be called its friend %s and not from %s",  
            $targetClass,  
            $friendClass,  
            $callingClass);  
  
        return [RuleErrorBuilder::message($msg)->build()];  
  
    }  
  
}
```

```
#[Attribute(Attribute::TARGET_CLASS)]
class Friend
{

    /** @param class-string $friend */
    public function __construct(
        public string $friend,
    ) {}
}
```



```

class TextMessageSenderCallCheckRule implements Rule
{
    public function __construct(
        private ReflectionProvider $reflectionProvider,
    ) {}

    public function getNodeType(): string
    {
        return MethodCall::class;
    }

    public function processNode(Node $node, Scope $scope): array
    {
        $callingClass = $scope->getClassReflection()->getName();
        $type = $scope->getType($node->var);

        foreach ($type->getReferencedClasses() as $targetClass) {
            $nativeReflection = $this->reflectionProvider->getClass($targetClass)->getNativeReflection();
            $friendAttributes = $nativeReflection->getAttributes(Friend::class);
            if (count($friendAttributes) !== 1) {
                continue;
            }

            $friendAttribute = $friendAttributes[0];
            $friendArguments = $friendAttribute->getArguments();
            if (count($friendArguments) !== 1) {
                continue;
            }

            $friend = $friendArguments[0];
            if ($callingClass !== $friend) {
                $msg = sprintf("Can not call %s from %s", $targetClass, $callingClass);
                return [RuleErrorBuilder::message($msg)->build()];
            }
        }

        return [];
    }
}

```

```

#[Attribute(Attribute::TARGET_CLASS)]
class Friend
{
    /** @param class-string $friend */
    public function __construct(
        public string $friend,
    ) {}
}

```

```

class TextMessageSenderCallCheckRule implements Rule
{
    public function __construct(
        private ReflectionProvider $reflectionProvider,
    ) {}

    public function getNodeTypes(): string
    {
        return MethodCall::class;
    }

    public function processNode(Node $node, Scope $scope): array
    {
        $callingClass = $scope->getClassReflection()->getName();
        $type = $scope->getType($node->var);

        foreach ($type->getReferencedClasses() as $targetClass) {
            $nativeReflection = $this->reflectionProvider->getClass($targetClass)->getNativeReflection();
            $friendAttributes = $nativeReflection->getAttributes(Friend::class);
            if (count($friendAttributes) !== 1) {
                continue;
            }

            $friendAttribute = $friendAttributes[0];
            $friendArguments = $friendAttribute->getArguments();
            if (count($friendArguments) !== 1) {
                continue;
            }

            $friend = $friendArguments[0];
            if ($callingClass !== $friend) {
                $msg = sprintf("Can not call %s from %s", $targetClass, $callingClass);
                return [RuleErrorBuilder::message($msg)->build()];
            }
        }
    }
}

```

```

#[Attribute(Attribute::TARGET_CLASS)]
class Friend
{
    /** @param class-string $friend */
    public function __construct(
        public string $friend,
    ) {}
}

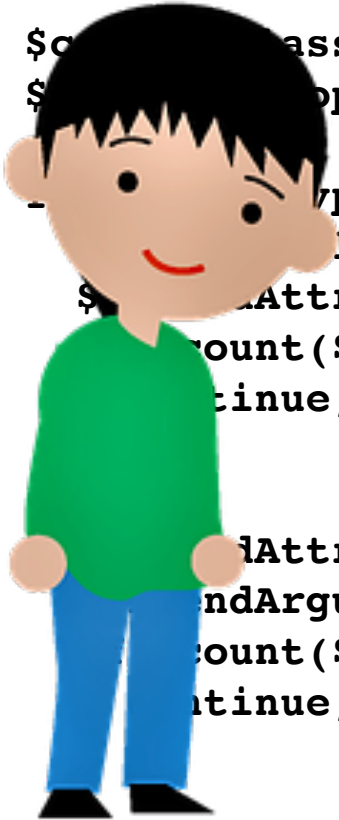
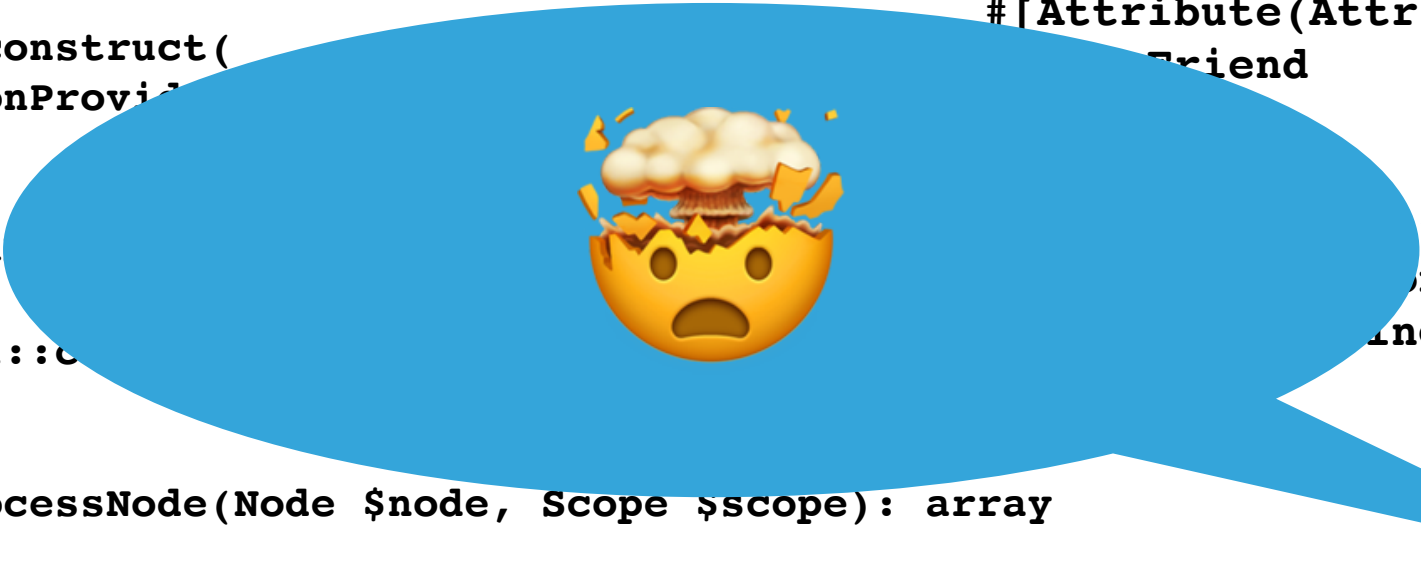
```

<https://github.com/DaveLiddament/phpstan-rule-demo>

```
class TextMessageSenderCallCheckRule implements Rule
{
    public function __construct(
        private ReflectionProvider $reflectionProvider,
        #[Attribute(Attribute::TARGET_CLASS)]
        Friend $friend
    ) {}

    public function getTargetClassString($friend) /*
    {
        return MethodCall::class;
    }

    public function processNode(Node $node, Scope $scope): array
    {
        $callingClass = $scope->getClassReflection()->getName();
        $nodeType = $scope->getType($node->var);
        $referencedClassReflection = $this->reflectionProvider->getNativeReflection($node->var);
        $attribute = $this->reflectionProvider->getNativeReflection($node->var)->getNativeReflection($node->var);
        $attributeCount = count($friendArguments);
        if ($attributeCount !== 1) {
            continue;
        }
        $friend = $friendArguments[0];
        if ($callingClass !== $friend) {
            $msg = sprintf("Can not call %s from %s", $targetClass, $callingClass);
            return [RuleErrorBuilder::message($msg)->build()];
        }
    }
}
```



I KNOW, IT'S AMAZING.
2 HOURS OF WORK VS RFC

<https://github.com/DaveLiddament/phpstan-rule-demo>

Custom Static Analysis Rules

+

Attributes

=

New Language Features

PHP Extension Library

**RFC vs
Static
Analysis**



AST



**PHPStan
rule**



Thoughts



main 1 branch 3 tags

Go to file Add file Code

	Merge pull request #6 from DaveLiddament/fix/test-tag-attrib... aa2f632 8 days ago 22 commits
	.github/workflows FIX remove unused section of github actions 2 months ago
	examples ADD InjectableVersion Attribute 9 days ago
	src FIX copy and paste error with TestTag 8 days ago
	.gitignore ADD linting, coding standards and phpstan 2 months ago
	.php-cs-fixer.php ADD linting, coding standards and phpstan 2 months ago
	CONTRIBUTING.md ADD contributing notes and update example code 2 months ago
	LICENSE.md INITIAL CHECK IN 2 months ago
	README.md ADD InjectableVersion Attribute 9 days ago
	composer.json ADD keywords to composer.json 2 months ago
	composer.lock ADD psalm 2 months ago
	phpstan.neon UPDATE Friend and Sealed to use variadic for friends/permitted 2 months ago
	psalm.xml ADD psalm 2 months ago

README.md

PHP Language Extensions (currently in BETA)

This library provides attributes for extending the PHP language (e.g. adding `package` visibility). The intention, at least initially, is that these extra language features are enforced by static analysis tools (such as Psalm, PHPStan and, ideally, PhpStorm) and NOT at runtime.

Language feature added:

- Friend
- InjectableVersion
- Package
- Sealed
- TestTag

About

Attributes to define PHP language extensions (to be enforced by static analysis)

Readme MIT license 16 stars 2 watching 1 fork

Releases 3

0.2.1 Latest 8 days ago

+ 2 releases

Packages

No packages published

Publish your first package

Contributors 2

- DaveLiddament Dave Liddament
- ruudk Ruud Kamphuis

Languages



<https://github.com/DaveLiddament/php-language-extensions>

main 1 branch 3 tags

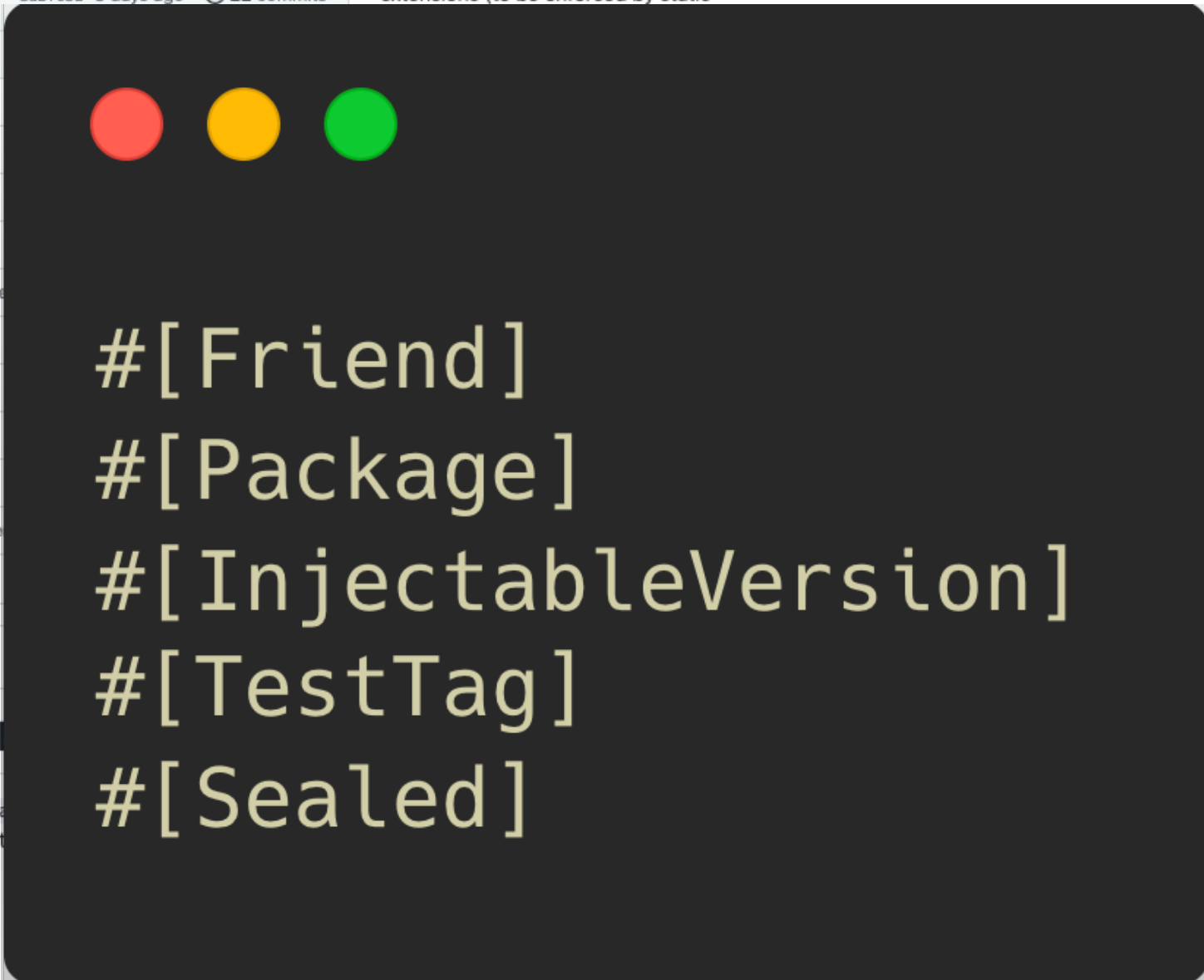
Go to file Add file Code

About

DaveLiddament Merge pull request #6 from DaveLiddament/fix/test-tag-attrib... aa2f632 8 days ago 22 commits

.github/workflows	FIX remove unused section of github actions
examples	ADD InjectableVersion Attribute
src	FIX copy and paste error with TestTag
.gitignore	ADD linting, coding standards and phpstan
.php-cs-fixer.php	ADD linting, coding standards and phpstan
CONTRIBUTING.md	ADD contributing notes and update example code
LICENSE.md	INITIAL CHECK IN
README.md	ADD InjectableVersion Attribute
composer.json	ADD keywords to composer.json
composer.lock	ADD psalm
phpstan.neon	UPDATE Friend and Sealed to use variadic for frie
psalm.xml	ADD psalm

Attributes to define PHP language extensions (to be enforced by static



README.md

PHP Language Extensions (currently in B...

This library provides attributes for extending the PHP language (e.g. adding `package` least initially, is that these extra language features are enforced by static analysis tools (e.g. Psalm, and, ideally, PhpStorm) and NOT at runtime.

Language feature added:

- [Friend](#)
- [InjectableVersion](#)
- [Package](#)
- [Sealed](#)
- [TestTag](#)

<https://github.com/DaveLiddament/php-language-extensions>

Definition

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Definition

[**https://github.com/DaveLiddament/php-language-extensions**](https://github.com/DaveLiddament/php-language-extensions)



[**https://github.com/DaveLiddament/phpstan-php-language-extensions**](https://github.com/DaveLiddament/phpstan-php-language-extensions)

Definition

<https://github.com/DaveLiddament/php-language-extensions>



<https://github.com/DaveLiddament/phpstan-php-language-extensions>



#[Friend]

Only allowed to
call method from
specified classes

```
class Person
{
    #[Friend(PersonBuilder::class)]
    public function __construct()
    {...}
}

class PersonBuilder
{
    public function create(): Person {
        return new Person();
    }
}

class AnotherClass
{
    public function doSomething() {
        $person = new Person();
    }
}
```

#[Friend]

Only allowed to
call method from
specified classes

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class Person
{
    #[Friend(PersonBuilder::class)]
    public function __construct()
    {
        ...
    }
}

class PersonBuilder
{
    public function create(): Person {
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class AnotherClass
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}
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```
class Person
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    {
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}

class PersonBuilder
{
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    }
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{
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class AnotherClass
{
    public function doSomething() {
        $person = new Person();
    }
}
```



#[Package]

Only allowed
to call methods
from the same
namespace

```
namespace ShoppingBasket;

class PriceCalculator {
    public function calculatePrice(): Money {
        // Some code
        DiscountCaluclator::getDiscount($items);
    }
}

class DiscountCalculator {
    #[Package]
    public static function getDiscount($items) {
        // Some code
        return $discount;
    }
}
```



#[Package]

Only allowed
to call methods
from the same
namespace

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```
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    #[Package]
    public static function getDiscount($items) {
        // Some code
        return $discount;
    }
}
```

#[Package]

Only allowed to call methods from the same namespace

#[Package]

Only allowed
to call methods
from the same
namespace

```
namespace ShoppingBasket;
```

```
class PriceCalculator {  
    public function calculatePrice(): Money {  
        // Some code
```

```
DiscountCalculator::getDiscount($items);  
    }  
}
```

```
class DiscountCalculator {  
    #[Package]  
    public static function getDiscount($items)
```

```
        // Some code  
        return $discount;  
    }  
}
```


#[Package]

Only allowed
to call methods
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```
namespace ShoppingBasket;
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    public function calculatePrice(): Money {  
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    public static function getDiscount($items) {
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        return $discount;
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}
```

```
namespace SomeNamespace;

class SomeClass {
    public function SomeMethod() {
        // Some code
        DiscountCaluclator::getDiscount($items);
    }
}
```

```
namespace ShoppingBasket;

class PriceCalculator {
    public function calculatePrice(): Money {
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namespace SomeNamespace;
```

```
class SomeClass {
    public function SomeMethod() {
```

```
        // Some code
```

```
        DiscountCaluclator::getDiscount($items);
```

```
    }
}
```

```
namespace ShoppingBasket;
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```
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```
        // some code
```

```
        DiscountCaluclator::getDiscount($items); ❌
```

#[TestTag]

Only allowed to
call method from
test code

```
class Person
{
    #[TestTag]
    public function setId(int $id) {
        $this->id = $id;
    }
}

function updatePerson(Person $person) {
    $person->setId(3);
}

// Tests
class MyTest
{
    public function testSomething() {
        $person = new Person();
        $person->setId(6);
    }
}
```


#[TestTag]

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}
```


#[InjectableVersion]

If the class hierarchy contains an interface or class with this attribute only that version may be injected into constructors

```
#[InjectableVersion]
interface Emailer {
    public function sendEmail();
}

class PhpMailer implements Emailer {
    public function sendEmail()
    { ... }
}

class SignupService {
    public function __construct(
        public Emailer $emailer,
    ) {}
}

class MarketingService {
    public function __construct(
        public PhpMailer $emailer,
    ) {}
}
```

#[InjectableVersion]

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```

Attributes

<https://github.com/DaveLiddament/php-language-extensions>












PHPStan

<https://github.com/DaveLiddament/phpstan-php-language-extensions>

Psalm and others

Contributions welcome

<https://github.com/DaveLiddament/php-language-extensions>

- ▼ examples
 - > callableFrom
 - > friend
 - > injectableVersion
 - > namespaceVisibility
 - > package
 - > sealed
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 -  testTagOnConstructorIgnoredInTestClass.php
 -  testTagOnConstructorIgnoredInTestNamespace.php
 -  testTagOnMethod.php
 -  testTagOnMethodIgnoredInTestClass.php
 -  testTagOnMethodIgnoredInTestNamespace.php
 -  testTagOnStaticMethod.php
 -  testTagOnStaticMethodIgnoredInTestClass.php
 -  testTagOnStaticMethodIgnoredInTestNamespace.php
- ▼ src
 -  CallableFrom.php
 -  CheckInjectableVersion.php

<https://github.com/DaveLiddament/php-language-extensions>

examples

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testTag

PHP testTagOnConstructor.php

PHP testTagOnConstructorIgnoredInTestClass.php

PHP testTagOnConstructorIgnoredInTestNamespace.php

PHP testTagOnMethod.php

PHP testTagOnMethodIgnoredInTestClass.php

PHP testTagOnMethodIgnoredInTestNamespace.php

PHP testTagOnStaticMethod.php

PHP testTagOnStaticMethodIgnoredInTestClass.php

PHP testTagOnStaticMethodIgnoredInTestNamespace.php

src

CallableFrom.php

CheckInjectableVersion.php

<https://github.com/DaveLiddament/php-language-extensions>

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 - testTagOnStaticMethod.php
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examples

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PHP testTagOnMethod.php

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PHP testTagOnMethodIgnoredInTestNamespace.php

PHP testTagOnStaticMethod.php

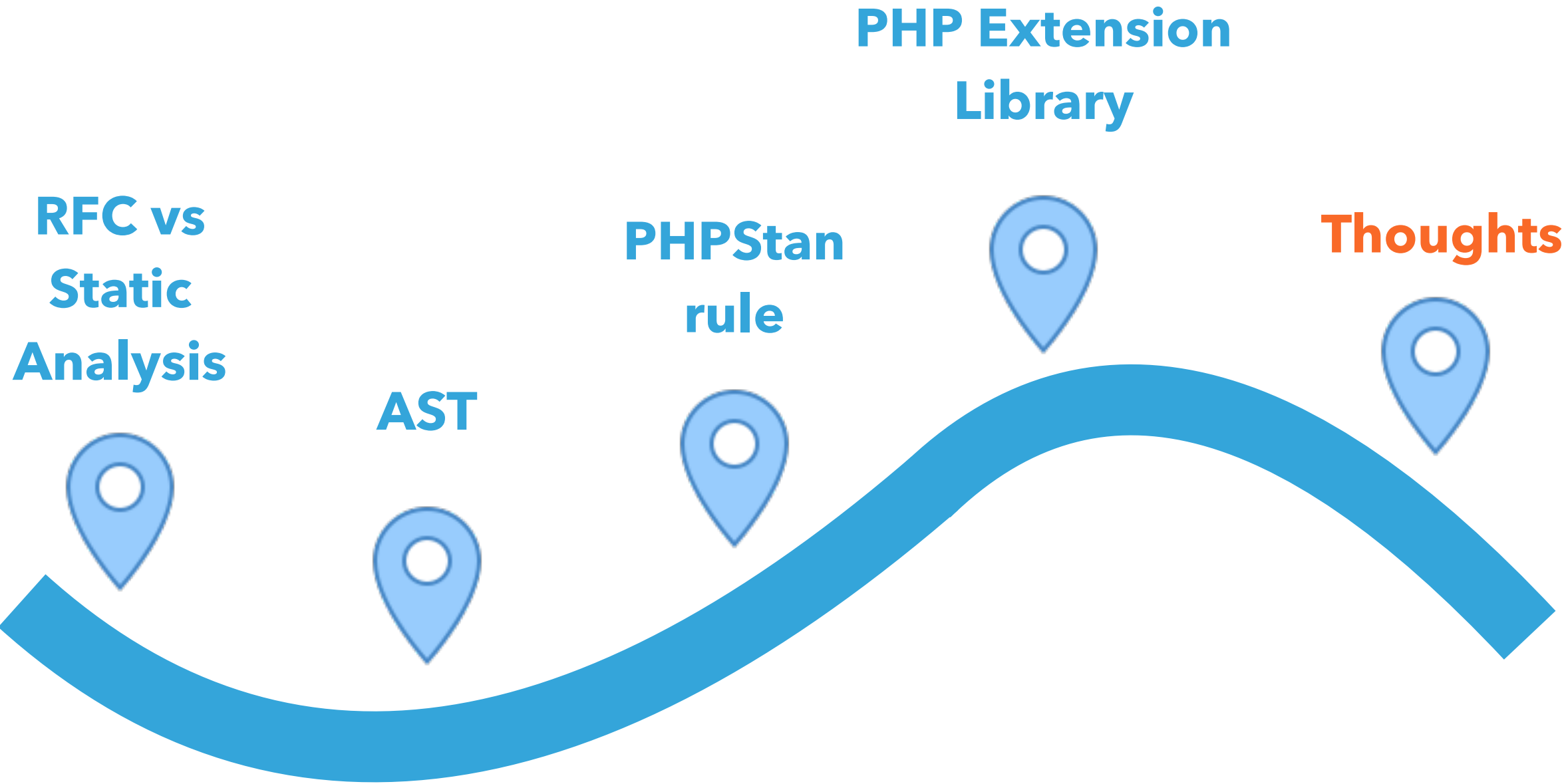
PHP testTagOnStaticMethodIgnoredInTestClass.php

PHP testTagOnStaticMethodIgnoredInTestNamespace.php

src

CallableFrom.php

CheckInjectableVersion.php





SECURITY

SYNTACTIC SUGAR

SECURITY

SYNTACTIC SUGAR

SECURITY

PERFORMANCE

SYNTACTIC SUGAR

SECURITY

PERFORMANCE

NEW FEATURES

SYNTACTIC SUGAR

SECURITY

PERFORMANCE

NEW FEATURES

**COMMUNICATING
INTENTION**

SYNTACTIC SUGAR

SECURITY

PERFORMANCE

NEW FEATURES

**COMMUNICATING
INTENTION**

OVERLAP

SYNTACTIC SUGAR

SECURITY

PERFORMANCE

NEW FEATURES

**COMMUNICATING
INTENTION**

public

final

protected

abstract

private

readonly

type declarations

type hints

public

protected

private

final

abstract

readonly

type declarations

type hints



public

final

protected

abstract

private

readonly

type declarations

Friend

type hints

Sealed



Package

InjectableVersion

public

final

protected

abstract

private

readonly

type declarations

Friend

type hints

Sealed



Package

InjectableVersion

AUTOMATE CHECKS FOR VIOLATIONS

Try out ideas...

Today

```
# [Friend(TextMessageQueueProcessor::class)]  
class TextMessageSender  
{  
  
}
```

Try out ideas...

Today

```
# [Friend(TextMessageQueueProcessor::class)]  
class TextMessageSender  
{  
  
}
```

PHP 8.3+ ?

```
class TextMessageSender  
    friend TextMessageQueueProcessor  
{  
  
}
```

Try out ideas...

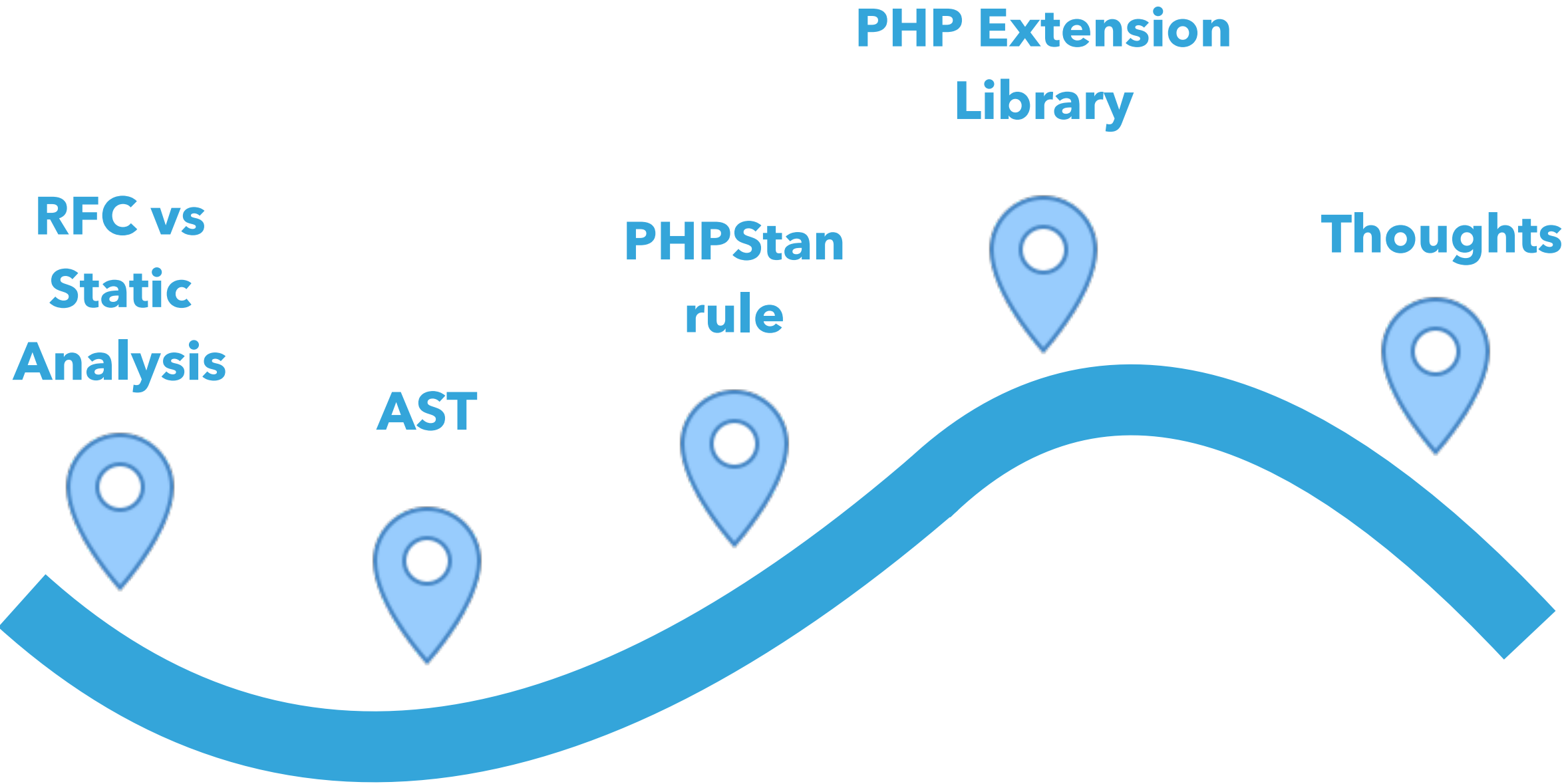
Today

```
#[Friend(TextMessageQueueProcessor::class)]  
class TextMessageSender  
{  
  
}
```

PHP 8.3+ ?

```
class TextMessageSender  
    friend TextMessageQueueProcessor  
{  
  
}
```

never return type (added in PHP 8.1)



Custom static analysis rules empower developers to:

- ▶ automatically enforce project conventions
- ▶ create new language features

Thank you for
listening

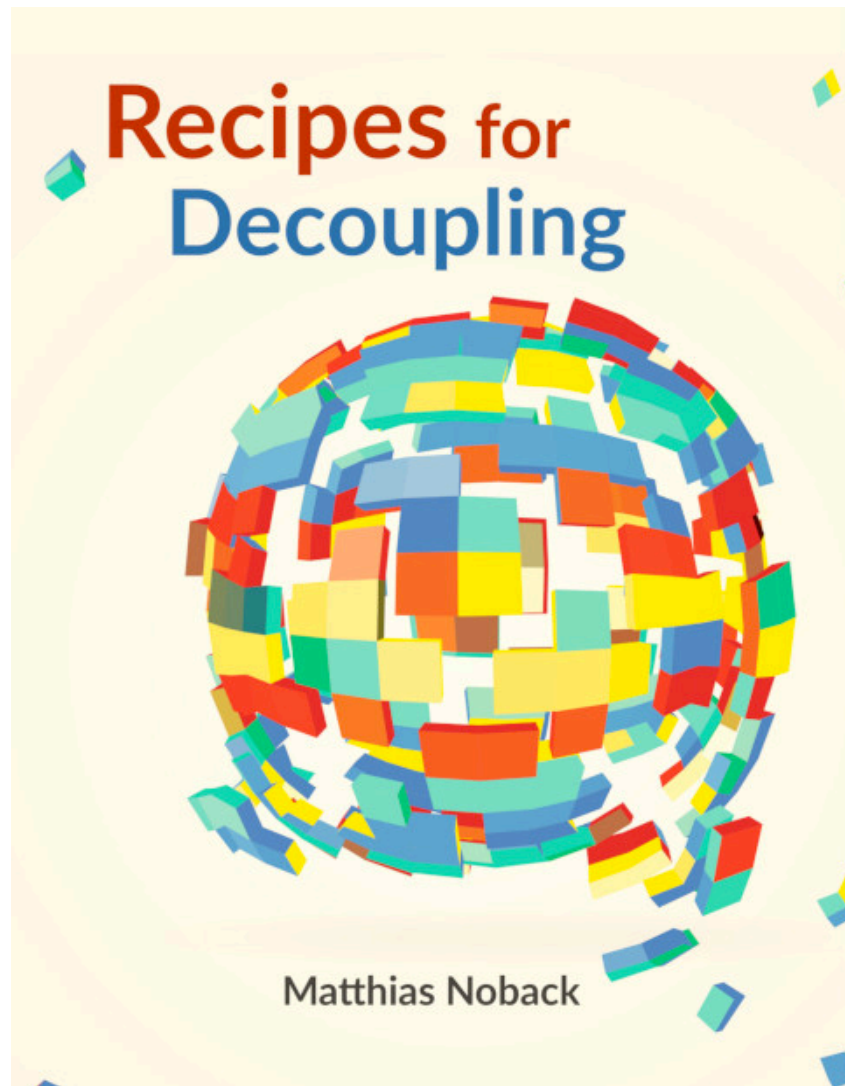


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Further information

<https://phpstan.org/developing-extensions/rules>



**Workshop:
Writing custom PHPStan rules**

