PHP 8.1
What's new and changed

Ayesh Karunaratne | https://aye.sh/talk/php81-groningenphp

#groningenphp

PHP 8.1
What's new and changed

#groningenphp

Ayesh Karunaratne | https://aye.sh/talk/php81-groningenphp

Ayesh Karunaratne

Freelance Software Developer, Security Researcher, Full-time traveler

Kandy, Sri Lanka - Everywhere

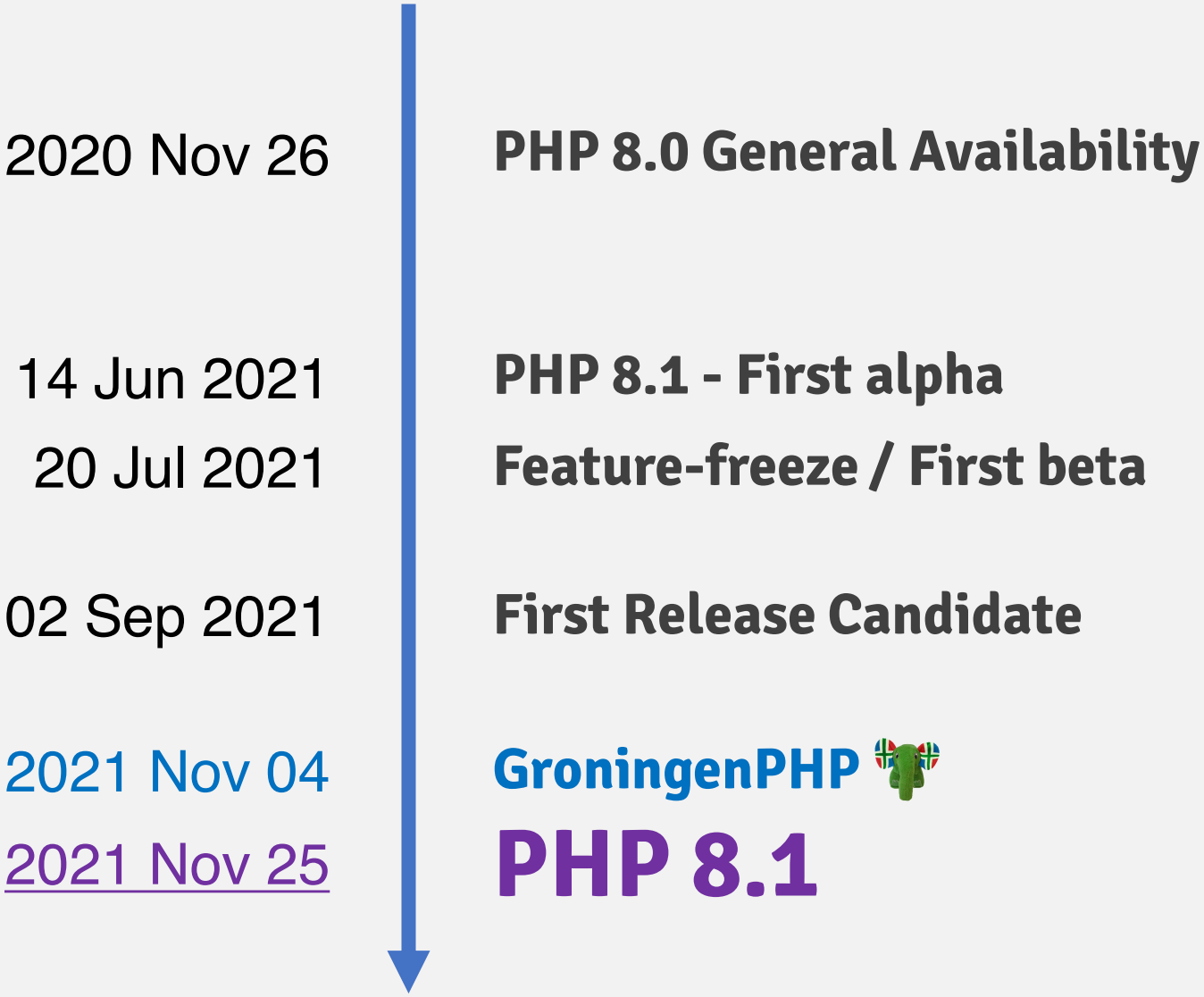
https://aye.sh | https://php.watch

@Ayeshlive | @phpwch

ayesh@aye.sh

PHP 8.1
New and changed

PHP 8.1
New and changed


2020 Nov 26
PHP 8.0 General Availability
14 Jun 2021
PHP 8.1 - First alpha
20 Jul 2021
Feature-freeze / First beta
02 Sep 2021
First Release Candidate
2021 Nov 04
GroningenPHP
2021 Nov 25
PHP 8.1

PHP 8.1: New and Changed

New Features

Enums

Fibers

Readonly Properties

Type System Improvements

Misc.

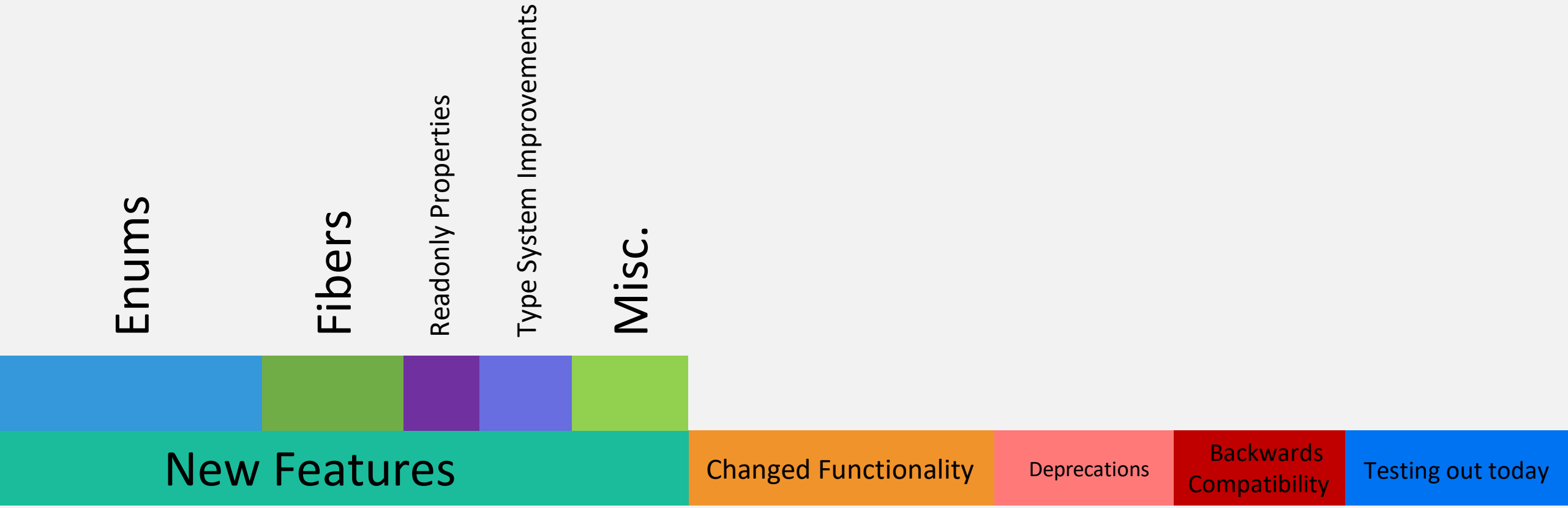
Changed Functionality

Deprecations

Backwards Compatibility

Testing out today

PHP 8.1: New and Changed



PHP 8.1
New Features

Enums

```
/**
 * Interface definition for Comment items.
 */
interface CommentItemInterface {
      const HIDDEN = 0;
      const CLOSED = 1;
      const OPEN = 2;
}
```


```
/**
 * Interface definition for Comment items.
 */
interface CommentItemInterface {
      const HIDDEN = 0;
      const CLOSED = 1;
      const OPEN = 2;
}
```

New Features: Enums

```php
/**
 * Interface definition for Comment items.
 */
interface CommentItemInterface {
      const HIDDEN = 0;
      const CLOSED = 1;
      const OPEN = 2;
}
```

```php
$node->setCommentStatus(CommentItemInterface::HIDDEN);
$node->save();
```

```php
/**
 * Interface definition for Comment items.
 */
interface CommentItemInterface {
      const HIDDEN = 0;
      const CLOSED = 1;
      const OPEN = 2;
}
```

```php
$node->setCommentStatus(CommentItemInterface::HIDDEN);
$node->save();
```

New Features: Enums

```php
/**
 * Interface definition for Comment items.
 */
interface CommentItemInterface {
      const HIDDEN = 0;
      const CLOSED = 1;
      const OPEN = 2;
}
```

```php
$node->setCommentStatus(CommentItemInterface::HIDDEN);
$node->save();
```

```php
/**
 * Interface definition for Comment items.
 */
interface CommentItemInterface {
      const HIDDEN = 0;
      const CLOSED = 1;
      const OPEN = 2;
}
```

```php
$node->setCommentStatus(0);
$node->save();
```

New Features: Enums

```
/**
 * Interface definition for Comment items.
 */
interface CommentItemInterface {
      const HIDDEN = 0;
      const CLOSED = 1;
      const OPEN = 2;
}
```

```
public function getValueOptions() {
   $this->valueOptions = [
     CommentItemInterface::HIDDEN => $this->t('Hidden'),
     CommentItemInterface::CLOSED => $this->t('Closed'),
     CommentItemInterface::OPEN => $this->t('Open'),
   ];
   return $this->valueOptions;
 }
```


```php
/**
 * Interface definition for Comment items.
 */
interface CommentItemInterface {
    const HIDDEN = 0;
    const CLOSED = 1;
    const OPEN = 2;
}
```

```php
public function getValueOptions() {
    $this->valueOptions = [
        CommentItemInterface::HIDDEN => $this->t('Hidden'),
        CommentItemInterface::CLOSED => $this->t('Closed'),
        CommentItemInterface::OPEN => $this->t('Open'),
    ];
    return $this->valueOptions;
}
```

New Features: Enums

```
/**
 * Interface definition for Comment items.
 */
interface CommentItemInterface {
      const HIDDEN = 0;
      const CLOSED = 1;
      const OPEN = 2;
}
```

```
public function setCommentStatus(int $state) {
      $node ->set('comment', $state);
}
```

```php
/**
 * Interface definition for Comment items.
 */
interface CommentItemInterface {
	const HIDDEN = 0;
	const CLOSED = 1;
	const OPEN = 2;
}
```

```php
public function setCommentStatus(int $state) {
	$node ->set('comment', $state);
}
```


```php
/**
 * Interface definition for Comment items.
 */
interface CommentItemInterface {
    const HIDDEN = 0;
    const CLOSED = 1;
    const OPEN = 2;
}
```

```php
public function setCommentStatus(int $state) {
    if (   $state !== CommentItemInterface::HIDDEN)
        && $state !== CommentItemInterface::CLOSED
        && $state !== CommentItemInterface::OPEN){
         throw new InvalidArgumentException('Invalid comment state');
       }

       $node ->set('comment', $state);
}
```

```php
/**
 * Interface definition for Comment items.
 */
interface CommentItemInterface {
    const HIDDEN = 0;
    const CLOSED = 1;
    const OPEN = 2;
}
```

```php
public function setCommentStatus(int $state) {
    if (   $state !== CommentItemInterface::HIDDEN)
        && $state !== CommentItemInterface::CLOSED
        && $state !== CommentItemInterface::OPEN){
         throw new InvalidArgumentException('Invalid comment state');
       }

       $node ->set('comment', $state);
}
```

New Features: Enums

```
enum CommentStatus {

}
```

```
enum CommentStatus {
    case HIDDEN;
    case CLOSED;
    case OPEN;
}
```

```php
enum CommentStatus {
    case HIDDEN;
    case CLOSED;
    case OPEN;
}
```

```php
/**
 * Interface definition for Comment items.
 */
interface CommentItemInterface {
        const HIDDEN = 0;
        const CLOSED = 1;
        const OPEN = 2;
}
```

```php
public function setCommentStatus(int $state) {
    if (   $state !== CommentItemInterface::HIDDEN)
         && $state !== CommentItemInterface::HIDDEN
         && $state !== CommentItemInterface::HIDDEN){
          throw new InvalidArgumentException('Invalid comment state'
        }

       $node ->set('comment', $state);
}
```


```php
enum CommentStatus {
    case HIDDEN;
    case CLOSED;
    case OPEN;
}
```

```php
/**
 * Interface definition for Comment items.
 */
interface CommentItemInterface {
        const HIDDEN = 0;
        const CLOSED = 1;
        const OPEN = 2;
}
```

```php
public function setCommentStatus(int $state) {
    if (   $state !== CommentItemInterface::HIDDEN)
         && $state !== CommentItemInterface::HIDDEN
         && $state !== CommentItemInterface::HIDDEN){
          throw new InvalidArgumentException('Invalid comment state'
        }

       $node ->set('comment', $state);
}
```


```
enum CommentStatus {
    case HIDDEN;
    case CLOSED;
    case OPEN;
}
```

```
/**
 * Interface definition for Comment items.
 */
interface CommentItemInterface {
        const HIDDEN = 0;
        const CLOSED = 1;
        const OPEN = 2;
}
```

```
public function setCommentStatus(int $state) {
    if (   $state !== CommentItemInterface::HIDDEN)
         && $state !== CommentItemInterface::HIDDEN
         && $state !== CommentItemInterface::HIDDEN){
          throw new InvalidArgumentException('Invalid comment state'
        }

        $node ->set('comment', $state);
}
```


```php
enum CommentStatus {
    case HIDDEN;
    case CLOSED;
    case OPEN;
}
```

```php
/**
 * Interface definition for Comment items.
 */
interface CommentItemInterface {
        const HIDDEN = 0;
        const CLOSED = 1;
        const OPEN = 2;
}
```

```php
public function setCommentStatus(int $state) {
    if (   $state !== CommentItemInterface::HIDDEN)
         && $state !== CommentItemInterface::HIDDEN
         && $state !== CommentItemInterface::HIDDEN){
          throw new InvalidArgumentException('Invalid comment state'
        }

       $node->set('comment', $state);
}
```


```php
enum CommentStatus {
    case HIDDEN;
    case CLOSED;
    case OPEN;
}
```

```php
/**
 * Interface definition for Comment items.
 */
interface CommentItemInterface {
        const HIDDEN = 0;
        const CLOSED = 1;
        const OPEN = 2;
}
```

```php
public function setCommentStatus(CommentStatus $state) {
    if (   $state !== CommentItemInterface::HIDDEN)
         && $state !== CommentItemInterface::HIDDEN
         && $state !== CommentItemInterface::HIDDEN){
          throw new InvalidArgumentException('Invalid comment state'
        }

        $node ->set('comment', $state);
}
```


```php
enum CommentStatus {
    case HIDDEN;
    case CLOSED;
    case OPEN;
}
```

```php
/**
 * Interface definition for Comment items.
 */
interface CommentItemInterface {
        const HIDDEN = 0;
        const CLOSED = 1;
        const OPEN = 2;
}
```

```php
public function setCommentStatus(CommentStatus $state) {
    if (   $state !== CommentItemInterface::HIDDEN)
         && $state !== CommentItemInterface::HIDDEN
         && $state !== CommentItemInterface::HIDDEN){
          throw new InvalidArgumentException('Invalid comment state'
        }

        $node ->set('comment', $state);
}
```

New Features: Enums

```php
enum CommentStatus {
    case HIDDEN;
    case CLOSED;
    case OPEN;
}
```

```php
/**
 * Interface definition for Comment items.
 */
interface CommentItemInterface {
        const HIDDEN = 0;
        const CLOSED = 1;
        const OPEN = 2;
}
```

```php
public function setCommentStatus(CommentStatus $state) {
    if (   $state !== CommentItemInterface::HIDDEN)
        && $state !== CommentItemInterface::HIDDEN
        && $state !== CommentItemInterface::HIDDEN){
         throw new InvalidArgumentException('Invalid comment state'
        }

        $node ->set('comment', $state);
}
```

New Features: Enums

```php
enum CommentStatus {
    case HIDDEN;
    case CLOSED;
    case OPEN;
}
```

```php
/**
 * Interface definition for Comment items.
 */
interface CommentItemInterface {
}
```

```php
public function setCommentStatus(CommentStatus $state) {
        $node ->set('comment', $state);
}
```

New Features: Enums

```php
public function setCommentStatus(CommentStatus $state) {
        $node->set('comment', $state);
}
```

```php
enum CommentStatus {
    case HIDDEN;
    case CLOSED;
    case OPEN;
}
```

```php
$node ->setCommentStatus(CommentStatus::OPEN);
```

New Features: Enums

```php
enum CommentStatus {
    case HIDDEN;
    case CLOSED;
    case OPEN;
}
```

```php
public function setCommentStatus(CommentStatus $state) {
        $node ->set('comment', $state);
}
```

```php
$node ->setCommentStatus(CommentStatus::OPEN);
```


```php
enum CommentStatus {
    case HIDDEN;
    case CLOSED;
    case OPEN;
}
```

```php
public function setCommentStatus(CommentStatus $state) {
        $node ->set('comment', $state);
}
```

```php
$node ->setCommentStatus(Node::Published);
$node ->setCommentStatus('potato');
$node ->setCommentStatus(null);
$node ->setCommentStatus(3.14);
```

New Features: Enums

```php
enum CommentStatus {
    case HIDDEN;
    case CLOSED;
    case OPEN;
}
```

```php
public function setCommentStatus(CommentStatus $state) {
        $node ->set('comment', $state);
}
```

```php
$node->setCommentStatus(Node::Published);
$node->setCommentStatus('potato');
$node->setCommentStatus(null);
$node->setCommentStatus(3.14);
```

```
TypeError: setCommentStatus(): Argument #1 ($state)
must be of type CommentStatus, string given  …
```


```php
function setIsSponsored(bool $sponsored): void {

}

function isSponsored(): bool {

}

setIsSponsored(true);
setIsSponsored(false);
```


- **Enums can have zero or more members**

```
enum Suit {
}
```

- **Enums can have zero or more members**

```
enum Suit {
    case Clubs;
    case Diamonds;
    case Spades;
    case Hearts;
}
```

- Enums can have zero or more members
- **Enum members are `objects`**

```php
enum Suit {
    case Clubs;
    case Diamonds;
    case Spades;
    case Hearts;
}
```

```php
is_object(Suit::Hearts);
// true
```


- Enums can have zero or more members
- **Enum members are `objects`**

```php
enum Suit {
    case Clubs;
    case Diamonds;
    case Spades;
    case Hearts;
}
```

```php
var_dump(Suit::Hearts);
// enum(Suit::Hearts)
```


- Enums can have zero or more members
- Enum members are `objects`
- **Enums can be namespaced and autoloaded**

```php
namespace App\PlayingCards;

enum Suit {
    case Clubs;
    case Diamonds;
    case Spades;
    case Hearts;
}
```

```php
namespace App\PlayingCards;

enum Suit: int {
    case Clubs = 1;
    case Diamonds = 2;
    case Spades = 3;
    case Hearts = 4;
}
```

- Enums can have zero or more members
- Enum members are `objects`
- Enums can be namespaced and autoloaded
- **May contain `string|int` backed values**

```php
namespace App\PlayingCards;

enum Suit: string {
    case Clubs = '♣';
    case Diamonds = '♦';
    case Spades = '♠';
    case Hearts = '♥';
}
```

- Enums can have zero or more members
- Enum members are `objects`
- Enums can be namespaced and autoloaded
- **May contain `string|int` backed values**

```php
namespace App\PlayingCards;

enum Suit: string {

    const AWESOME = 'Yes';

    case Clubs = '♣';
    case Diamonds = '♦';
    case Spades = '♠';
    case Hearts = '♥';
}
```

- Enums can have zero or more members
- Enum members are `objects`
- Enums can be namespaced and autoloaded
- May contain `string|int` backed values
- **May contain non-duplicated constants**

```php
namespace App\PlayingCards;

enum Suit: string {

    const AWESOME = 'Yes';

    case Clubs = '♣';
    case Diamonds = '♦';
    case Spades = '♠';
    case Hearts = '♥';

    public static function cheer(): void {
        echo 'Yay!';
    }
}
```

- Enums can have zero or more members
- Enum members are `objects`
- Enums can be namespaced and autoloaded
- May contain `string|int` backed values
- May contain non-duplicated constants
- **May contain `static` methods**

```php
Suit::cheer();
// Yay!
```


```php
namespace App\PlayingCards;

enum Suit: string {
    const AWESOME = 'Yes';

    case Clubs = '♣';
    case Diamonds = '♦';
    case Spades = '♠';
    case Hearts = '♥';

    public static function cheer(): void {
        echo 'Yay!';
    }

    public function show(): void {
        var_dump($this);
        var_dump($this->name);
        var_dump(self::Clubs->name);
        var_dump($this->value);
        var_dump(self::Clubs->value);
    }
}
```

- Enums can have zero or more members
- Enum members are `objects`
- Enums can be namespaced and autoloaded
- May contain `string|int` backed values
- May contain non-duplicated constants
- May contain `static` methods
- **May contain non-`static` methods**

```php
Suit::Clubs->show();
```

```php
namespace App\PlayingCards;

enum Suit: string {
    const AWESOME = 'Yes';

    case Clubs = '♣';
    case Diamonds = '♦';
    case Spades = '♠';
    case Hearts = '♥';

    public static function cheer(): void {
        echo 'Yay!';
    }

    public function show(): void {
        var_dump($this);
        var_dump($this->name);
        var_dump(self::Clubs->name);
        var_dump($this->value);
        var_dump(self::Clubs->value);
    }
}
```

- Enums can have zero or more members
- Enum members are `objects`
- Enums can be namespaced and autoloaded
- May contain `string|int` backed values
- May contain non-duplicated constants
- May contain `static` methods
- May contain non-`static` methods
- `$this` refers to the Enumerated element

```php
Suit::Clubs->show();
```

```
enum(App\PlayingCards\Suit::Clubs)
```


```php
namespace App\PlayingCards;

enum Suit: string {
    const AWESOME = 'Yes';

    case Clubs = '♣';
    case Diamonds = '♦';
    case Spades = '♠';
    case Hearts = '♥';

    public static function cheer(): void {
        echo 'Yay!';
    }

    public function show(): void {
        var_dump($this);
        var_dump($this->name);
        var_dump(self::Clubs->name);
        var_dump($this->value);
        var_dump(self::Clubs->value);
    }
}
```

- Enums can have zero or more members
- Enum members are `objects`
- Enums can be namespaced and autoloaded
- May contain `string|int` backed values
- May contain non-duplicated constants
- May contain `static` methods
- May contain non-`static` methods
- `$this` refers to the Enumerated element
- **`->name` property is the name of the member**

```php
Suit::Clubs->show();
```

```
enum(App\PlayingCards\Suit::Clubs)
string(5) "Clubs"
string(5) "Clubs"
```


```php
namespace App\PlayingCards;

enum Suit: string {
    const AWESOME = 'Yes';

    case Clubs = '♣';
    case Diamonds = '♦';
    case Spades = '♠';
    case Hearts = '♥';

    public static function cheer(): void {
        echo 'Yay!';
    }

    public function show(): void {
        var_dump($this);
        var_dump($this->name);
        var_dump(self::Clubs->name);
        var_dump($this->value);
        var_dump(self::Clubs->value);
    }
}
```

- Enums can have zero or more members
- Enum members are `objects`
- Enums can be namespaced and autoloaded
- May contain `string|int` backed values
- May contain non-duplicated constants
- May contain `static` methods
- May contain non-`static` methods
- `$this` refers to the Enumerated element
- `->name` property is the name of the member
- **`->value` property is the backed value**

```php
Suit::Clubs->show();
```

```
enum(App\PlayingCards\Suit::Clubs)
string(5) "Clubs"
string(5) "Clubs"
string(6) "♣"
string(6) "♣"
```


```php
namespace App\PlayingCards;

enum Suit: string {
    const AWESOME = 'Yes';

    case Clubs = '♣';
    case Diamonds = '♦';
    case Spades = '♠';
    case Hearts = '♥';

    public static function cheer(): void {
        echo 'Yay!';
    }

    public function show(): void {
        var_dump($this);
        var_dump($this->name);
        var_dump(self::Clubs->name);
        var_dump($this->value);
        var_dump(self::Clubs->value);
    }
}
```

- Enums can have zero or more members
- Enum members are `objects`
- Enums can be namespaced and autoloaded
- May contain `string|int` backed values
- May contain non-duplicated constants
- May contain `static` methods
- May contain non-`static` methods
- `$this` refers to the Enumerated element
- `->name` property is the name of the member
- `->value` property is the backed value

```php
Suit::Clubs->show();
```

```
enum(App\PlayingCards\Suit::Clubs)
string(5) "Clubs"
string(5) "Clubs"
string(6) "♣"
string(6) "♣"
```


Class Semantics

- Supports namespaces
- Supports traits
- Supports autoloading
- Supports magic constants
- Supports `instanceof`
- **Supports methods**

```php
namespace Foo\Bar;

enum PostStatus: string implements EntityStatues {

    use TestTrait;

    case DRAFT = 'draft';
    case PENDING = 'pending';
    case RETURNED = 'returned';
    case PUBLISHED = 'published';

    public static function showOff(): void {
        echo __CLASS__ . static::class;
    }

}
```


Enum Semantics

- Must not contain state

```
enum Suit {
    case Spades;
    case Hearts;
    case Clubs;
    case Diamonds;

    private string $foo;
}
```

```
Fatal error: Enums may not include
properties
```

Enum Semantics

- Must not contain state
- **Enum members are identical to same member**

```
CommentStatus::OPEN === CommentStatus::OPEN
```

```
enum CommentStatus {
    case HIDDEN;
    case CLOSED;
    case OPEN;
}
```

New Features: Enums

```
enum CommentStatus: int {
        case HIDDEN = 0;
        case CLOSED = 1;
        case OPEN = 2;
}
```

New Features: Enums

```php
enum CommentStatus: int {
        case HIDDEN = 0;
        case CLOSED = 1;
        case OPEN = 2;
}
```

```php
$connection->insert('mytable')
  ->fields([
    'entity_id' => $entity->getId(),
    'comment' => $commentState->value,
  ])
  ->execute();
```

New Features: Enums

```php
enum CommentStatus: int {
        case HIDDEN = 0;
        case CLOSED = 1;
        case OPEN = 2;
}
```

```php
$connection->insert('mytable')
  ->fields([
    'entity_id' => $entity->getId(),
    'comment' => $commentState->value,
  ])
  ->execute();
```

New Features: Enums

```php
enum CommentStatus: int {
        case HIDDEN = 0;
        case CLOSED = 1;
        case OPEN = 2;
}
```

```php
$database->query("
        SELECT entity_id
        FROM {my_table}
        WHERE status = :status",
        [':status' => CommentStatus::OPEN->value]
);
```

New Features: Enums

```php
enum CommentStatus: int {
        case HIDDEN = 0;
        case CLOSED = 1;
        case OPEN = 2;
}
```

```php
$database->query("
        SELECT entity_id
        FROM {my_table}
        WHERE status = :status",
        [':status' => CommentStatus::OPEN->value]
);
```

New Features: Enums

```php
enum CommentStatus: int {
        case HIDDEN = 0;
        case CLOSED = 1;
        case OPEN = 2;
}
```

```php
$database->query("
        SELECT entity_id
        FROM {my_table}
        WHERE status = :status",
        [':status' => CommentStatus::OPEN->value]
);
```

New Features: Enums

```php
enum CommentStatus: int {
        case HIDDEN = 0;
        case CLOSED = 1;
        case OPEN = 2;
}
```

```php
$database->query("
        SELECT entity_id
        FROM {my_table}
        WHERE status = :status",
        [':status' => CommentStatus::OPEN->value]
);
```

New Features: Enums

```php
enum CommentStatus: int {
        case HIDDEN = 0;
        case CLOSED = 1;
        case OPEN = 2;
}
```

```php
$state = $formState->getValue('comment_state');
$state = CommentStatus::from($state);
$node->setCommentState($state);
```

New Features: Enums

```php
enum CommentStatus: int {
        case HIDDEN = 0;
        case CLOSED = 1;
        case OPEN = 2;
}
```

```php
$state = $formState->getValue('comment_state');
$state = CommentStatus::from($state);
$node->setCommentState($state);
```

New Features: Enums

```php
enum CommentStatus: int {
        case HIDDEN = 0;
        case CLOSED = 1;
        case OPEN = 2;
}
```

```php
$state = $formState->getValue('comment_state');
$state = CommentStatus::from($state);
$node->setCommentState($state);
```

```
enum(CommentStatus::Open)
```

New Features: Enums

Fibers

Fibers

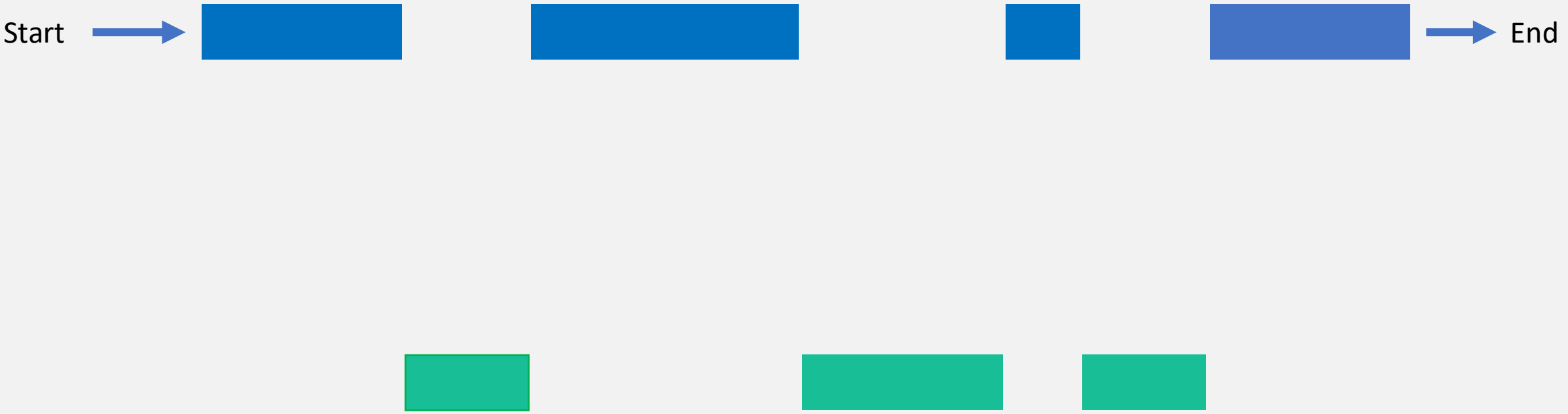
Lightweight and controlled concurrency to PHP

A Fiber is a code block that **maintains its own stack** (variables and state), that can be **started, suspended, or terminated cooperatively** by the main code and the Fiber.

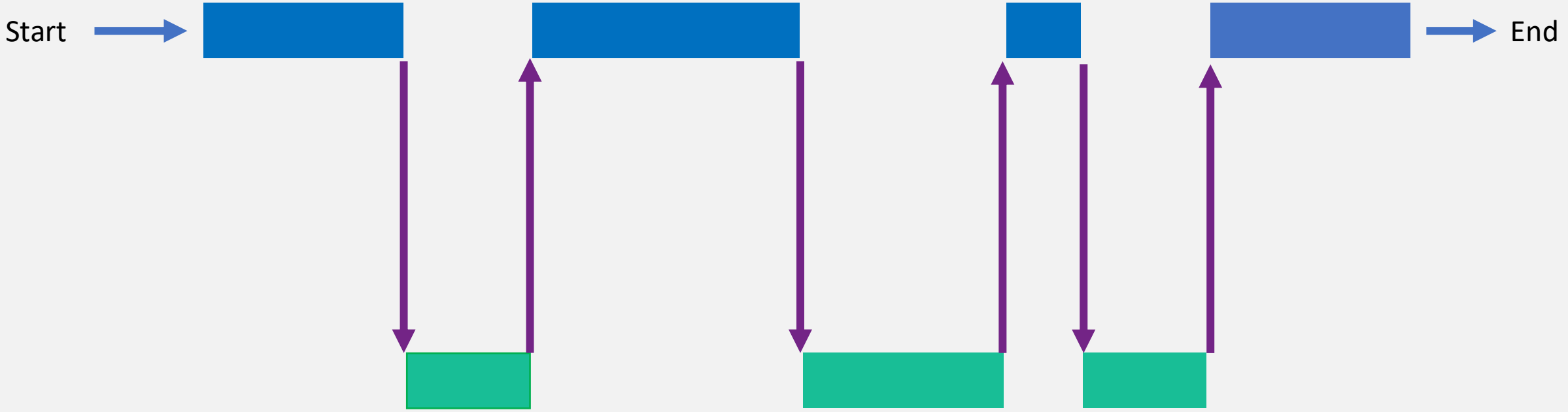
Normal Execution Flow

Concurrent Execution Flow

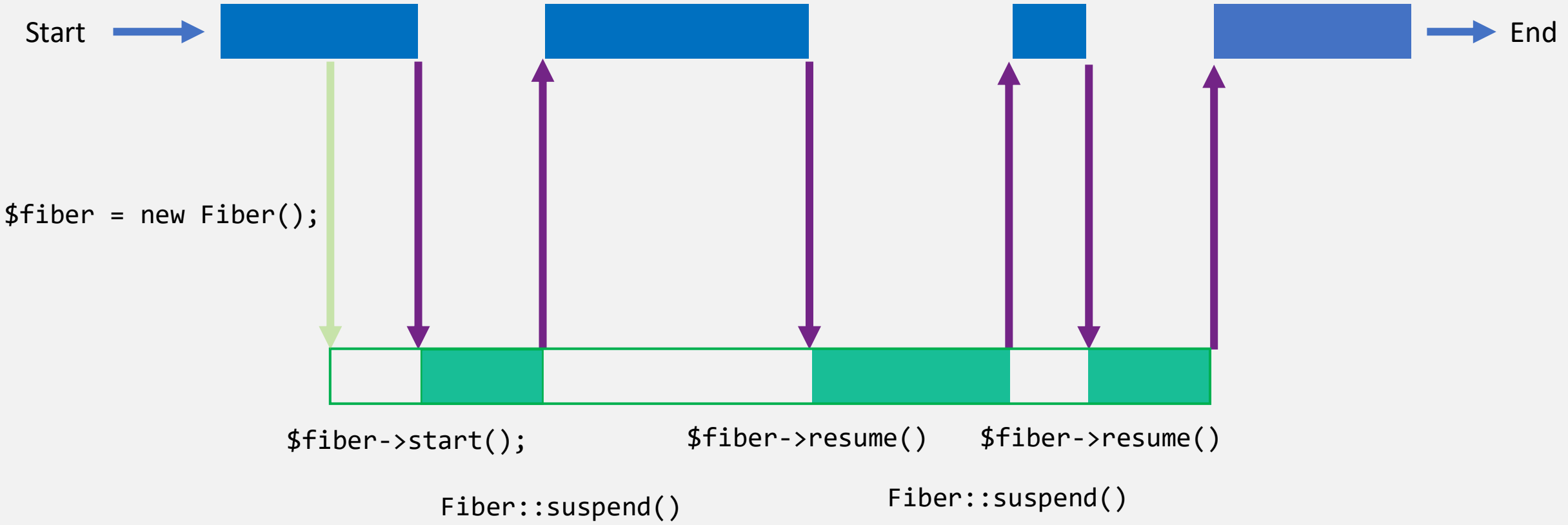
Concurrent Execution Flow



Concurrent Execution Flow



Concurrent Execution Flow



```php
echo "Main started";

$fiber = new Fiber(function(): void {
        echo "Fiber started";
        Fiber::suspend();
        echo "Fiber resumed";
});

$fiber->start();
echo "Fiber returned";
$fiber->resume();
echo "Fiber Ended";
```

New Features: Fibers

```php
echo "Main started";

$fiber = new Fiber(function(): void {
        echo "Fiber started";
        Fiber::suspend();
        echo "Fiber resumed";
});

$fiber->start();
echo "Fiber returned";
$fiber->resume();
echo "Fiber Ended";
```

New Features: Fibers

```php
echo "Main started";

$fiber = new Fiber(function(): void {
        echo "Fiber started";
        Fiber::suspend();
        echo "Fiber resumed";
});

$fiber->start();
echo "Fiber returned";
$fiber->resume();
echo "Fiber Ended";
```


```php
echo "Main started";

$fiber = new Fiber(function(): void {
        echo "Fiber started";
        Fiber::suspend();
        echo "Fiber resumed";
});

$fiber->start();
echo "Fiber returned";
$fiber->resume();
echo "Fiber Ended";
```

New Features: Fibers

```php
echo "Main started";

$fiber = new Fiber(function(): void {
        echo "Fiber started";
        Fiber::suspend();
        echo "Fiber resumed";
});

$fiber->start();
echo "Fiber returned";
$fiber->resume();
echo "Fiber Ended";
```

New Features: Fibers

```php
echo "Main started";

$fiber = new Fiber(function(): void {
        echo "Fiber started";
        Fiber::suspend();
        echo "Fiber resumed";
});

$fiber->start();
echo "Fiber returned";
$fiber->resume();
echo "Fiber Ended";
```

```
Main started
```

New Features: Fibers

```php
echo "Main started";

$fiber = new Fiber(function(): void {
        echo "Fiber started";
        Fiber::suspend();
        echo "Fiber resumed";
});

$fiber->start();
echo "Fiber returned";
$fiber->resume();
echo "Fiber Ended";
```

```
Main started
```

New Features: Fibers

```php
echo "Main started";

$fiber = new Fiber(function(): void {
        echo "Fiber started";
        Fiber::suspend();
        echo "Fiber resumed";
});

$fiber->start();
echo "Fiber returned";
$fiber->resume();
echo "Fiber Ended";
```

```
Main started
```

New Features: Fibers

```php
echo "Main started";

$fiber = new Fiber(function(): void {
        echo "Fiber started";
        Fiber::suspend();
        echo "Fiber resumed";
});

$fiber->start();
echo "Fiber returned";
$fiber->resume();
echo "Fiber Ended";
```

```
Main started
Fiber started
```

New Features: Fibers

```php
echo "Main started";

$fiber = new Fiber(function(): void {
        echo "Fiber started";
        Fiber::suspend();
        echo "Fiber resumed";
});

$fiber->start();
echo "Fiber returned";
$fiber->resume();
echo "Fiber Ended";
```

```
Main started
Fiber started
```

New Features: Fibers

```php
echo "Main started";

$fiber = new Fiber(function(): void {
        echo "Fiber started";
        Fiber::suspend();
        echo "Fiber resumed";
});

$fiber->start();
echo "Fiber returned";
$fiber->resume();
echo "Fiber Ended";
```

```
Main started
Fiber started
Fiber returned
```

New Features: Fibers

```php
echo "Main started";

$fiber = new Fiber(function(): void {
        echo "Fiber started";
        Fiber::suspend();
        echo "Fiber resumed";
});

$fiber->start();
echo "Fiber returned";
$fiber->resume();
echo "Fiber Ended";
```

```
Main started
Fiber started
Fiber returned
```

New Features: Fibers

```php
echo "Main started";

$fiber = new Fiber(function(): void {
        echo "Fiber started";
        Fiber::suspend();
        echo "Fiber resumed";
});

$fiber->start();
echo "Fiber returned";
$fiber->resume();
echo "Fiber Ended";
```

```
Main started
Fiber started
Fiber returned
Fiber resumed
```

New Features: Fibers

```php
echo "Main started";

$fiber = new Fiber(function(): void {
        echo "Fiber started";
        Fiber::suspend();
        echo "Fiber resumed";
});

$fiber->start();
echo "Fiber returned";
$fiber->resume();
echo "Fiber Ended";
```

```
Main started
Fiber started
Fiber returned
Fiber resumed
Fiber Ended
```

New Features: Fibers

```php
final class Fiber {
    public function __construct(callable $callback) {}
    public function start(mixed ...$args): mixed {}
    public static function suspend(mixed $value = null): mixed {}
    public function resume(mixed $value = null): mixed {}
    public static function getCurrent(): ?self {}
    public function getReturn(): mixed {}
    public function throw(Throwable $exception): mixed {}
    public function isStarted(): bool {}
    public function isSuspended(): bool {}
    public function isRunning(): bool {}
    public function isTerminated(): bool {}
}
```

https://php.watch/versions/8.1/fibers

Readonly Properties

Readonly Properties

Properties with the readonly flag can only be initialized from object scope, and cannot be overwritten.

```php
class User {
    public int $uid;

    public function __construct(int $uid) {
       $this ->uid = $uid;
    }
}
```

New Features: Readonly Properties

```php
class User {
    public readonly int $uid;

    public function __construct(int $uid) {
       $this->uid = $uid;
    }
}
```

New Features: Readonly Properties

```php
class User {
    public readonly int $uid;

    public function __construct(int $uid) {
        $this->uid = $uid;
        $this->uid = $uid;
    }
}
```

```
Fatal error: Uncaught Error: Cannot modify readonly
property User::$uid in …:…
```

New Features: Readonly Properties

```php
class User {
    public readonly int $uid;
}
$user = new User();
$user->uid = 9;
```

```
Error: Cannot initialize readonly property
User::$uid from global scope in ...:...
```

New Features: Readonly Properties

Type System Improvements

Intersection Types

```php
function count_and_iterate(Iterator&Countable $value) {
    foreach($value as $val) {}
    count($value);
}
```


Intersection Types

```php
function count_and_iterate(Iterator&Countable $value) {
    foreach($value as $val) {}
    count($value);
}
```


Intersection Types

```php
function count_and_iterate(Iterator&Countable $value) {
    foreach($value as $val) {}
    count($value);
}
```


Intersection Types

```php
function count_and_iterate(Iterator&Countable $value) {
    foreach($value as $val) {}
    count($value);
}
```

```php
class CountableIterator implements Iterator, Countable {
    public function current(): mixed {}
    public function key(): mixed {}
    public function next(): void {}
    public function rewind(): void {}
    public function valid(): bool {}

    public function count(): int {}
}
```


Intersection Types

```php
function count_and_iterate(Iterator&Countable $value) {
    foreach($value as $val) {}
    count($value);
}
```

```php
class CountableIterator implements Iterator, Countable {
    public function current(): mixed {}
    public function key(): mixed {}
    public function next(): void {}
    public function rewind(): void {}
    public function valid(): bool {}

    public function count(): int {}
}
```


Intersection Types

```php
function count_and_iterate(Iterator&Countable $value) {
    foreach($value as $val) {}
    count($value);
}
```

```php
class CountableIterator implements Iterator, Countable {
    public function current(): mixed {}
    public function key(): mixed {}
    public function next(): void {}
    public function rewind(): void {}
    public function valid(): bool {}

    public function count(): int {}
}
```


`never` type

```php
function redirectUser(): void {
    header('Location: https://example.com');
    die();
}
```


`never` type

```php
function redirectUser(): never {
    header('Location: https://example.com');
    die();
}
```


`never` type

```php
function redirectUser(): never {
    header('Location: https://example.com');
    return;
}
```

```
Fatal error: A never-returning function must not
return in … on line …
```


`never` type

```php
function redirectUser(): never {
    header('Location: https://example.com');
}
```

```
Fatal error: A never-returning function must not
implicitly return in … on line …
```


Other New Features

- Final class constants
- New `fsync` and `fdatasync` functions
- New `array_is_list` function
- Sodium functions
- First-class callable syntax
- Explicit Octal numeral notation
- xxHash and MurmurHash3 hashing algorithms
- Directory-upload support with `$_FILES['full_path']`

Changed Functionality

Tentative Return Types

```php
interface ArrayAccess {
    /** @return bool */
    public function offsetExists($offset);

    /** @return mixed */
    public function offsetGet($offset);

    /** @return void */
    public function offsetSet($offset, $value);

    /** @return void */
    public function offsetUnset($offset);
}
```


Tentative Return Types

```php
interface ArrayAccess {
    public function offsetExists($offset): bool;

    public function offsetGet($offset): mixed;

    public function offsetSet($offset, $value): void;

    public function offsetUnset($offset): void;
}
```


Tentative Return Types

```php
interface ArrayAccess {
    public function offsetExists($offset): bool;
    public function offsetGet($offset): mixed;
    public function offsetSet($offset, $value): void;
    public function offsetUnset($offset): void;
}


class Foo implements ArrayAccess {
    public function offsetExists(mixed $offset) {}
    // ...
}
```


Tentative Return Types

```php
interface ArrayAccess {
    public function offsetExists($offset): bool;
    public function offsetGet($offset): mixed;
    public function offsetSet($offset, $value): void;
    public function offsetUnset($offset): void;
}


class Foo implements ArrayAccess {
    public function offsetExists(mixed $offset) {}
    // ...
}
```

```
Deprecated: Return type of Test::offsetExists(mixed $offset) should either be
compatible with ArrayAccess::offsetExists(mixed $offset): bool, or the
#[\ReturnTypeWillChange] attribute should be used to temporarily suppress the
notice in ... on line ...
```


Tentative Return Types

```php
interface ArrayAccess {
    public function offsetExists($offset): bool;
    public function offsetGet($offset): mixed;
    public function offsetSet($offset, $value): void;
    public function offsetUnset($offset): void;
}
```

```php
class Foo implements ArrayAccess {
    public function offsetExists(mixed $offset): bool {}
    // ...
}
```


Tentative Return Types

```php
interface ArrayAccess {
    public function offsetExists($offset): bool;
    public function offsetGet($offset): mixed;
    public function offsetSet($offset, $value): void;
    public function offsetUnset($offset): void;
}
```

```php
class Foo implements ArrayAccess {
    #[\ReturnTypeWillChange]
    public function offsetExists(mixed $offset){}
    // ...
}
```


$GLOBALS Variable Restrictions

```php
$GLOBALS = get_new_vars();
```

```
Fatal error: $GLOBALS can only
be modified using the
$GLOBALS[$name] = $value syntax
in ... on line ...
```

$GLOBALS Variable Restrictions

```php
$GLOBALS = get_new_vars();
$GLOBALS = [];
$GLOBALS = ['foo' => 1, 'bar' => 2];
$GLOBALS =& $new_vars;
list($GLOBALS) = [1];
foreach ($new_var_c as $GLOBALS) {}
unset($GLOBALS);
```

```
Fatal error: $GLOBALS can only
be modified using the
$GLOBALS[$name] = $value syntax
in ... on line ...
```

Resource to Object Migrations

Extension	resource (PHP < 8.1)	object (PHP >= 8.1)
GD	gd font (*integer*)	GdFont
FTP	ftp	FTP\Connection
IMAP	imap	IMAP\Connection
finfo	file_info	finfo
PSpell	pspell (*int*)	PSpell\Dictionary
PSpell	pspell config (*int*)	PSpell\Config
LDAP	ldap link	LDAP\Connection
LDAP	ldap result	LDAP\Result
LDAP	ldap result entry	LDAP\ResultEntry
PgSQL	pgsql link	\PgSql\Connection
PgSQL	pgsql result	\PgSql\Result
PgSQL	pgsql large object	\PgSql\Lob

Deprecations

Deprecations in PHP 8.1

- Passing `null` to non-nullable internal function parameters is deprecated
- Return types in PHP built-in class methods and deprecation notices
- Automatic conversion of "false" into an empty array on write operands is deprecated.
- Serializable interface deprecated
- Implicit incompatible float to int conversion is deprecated
- Calling a static method or accessing a static property directly on a trait is deprecated
- mysqli::get_client_info method and mysqli_get_client_info($param) is deprecated
- date_sunrise, date_sunset functions and related INI settings are deprecated
- strftime() and gmstrftime() functions are deprecated
- mhash*() functions (hash extension) are deprecated
- filter.default and filter.default_options INI settings are deprecated
- PDO::FETCH_SERIALIZE is deprecated
- auto_detect_line_endings INI directive is deprecated
- MySQLi: mysqli_driver->driver_version property is deprecated

Backwards Compatibility

Syntax changes are **not backwards** compatible

- Enums
- Intersection types
- Readonly properties
- Final class constants
- First-class callable syntax
- Octal numeral syntax

System changes are not backwards compatible

- Fibers
- `never` return type
- `$_FILES`: New `full_path` value for directory-uploads
- `fsync` and `fdatasync` functions

Some functionality can be polyfilled

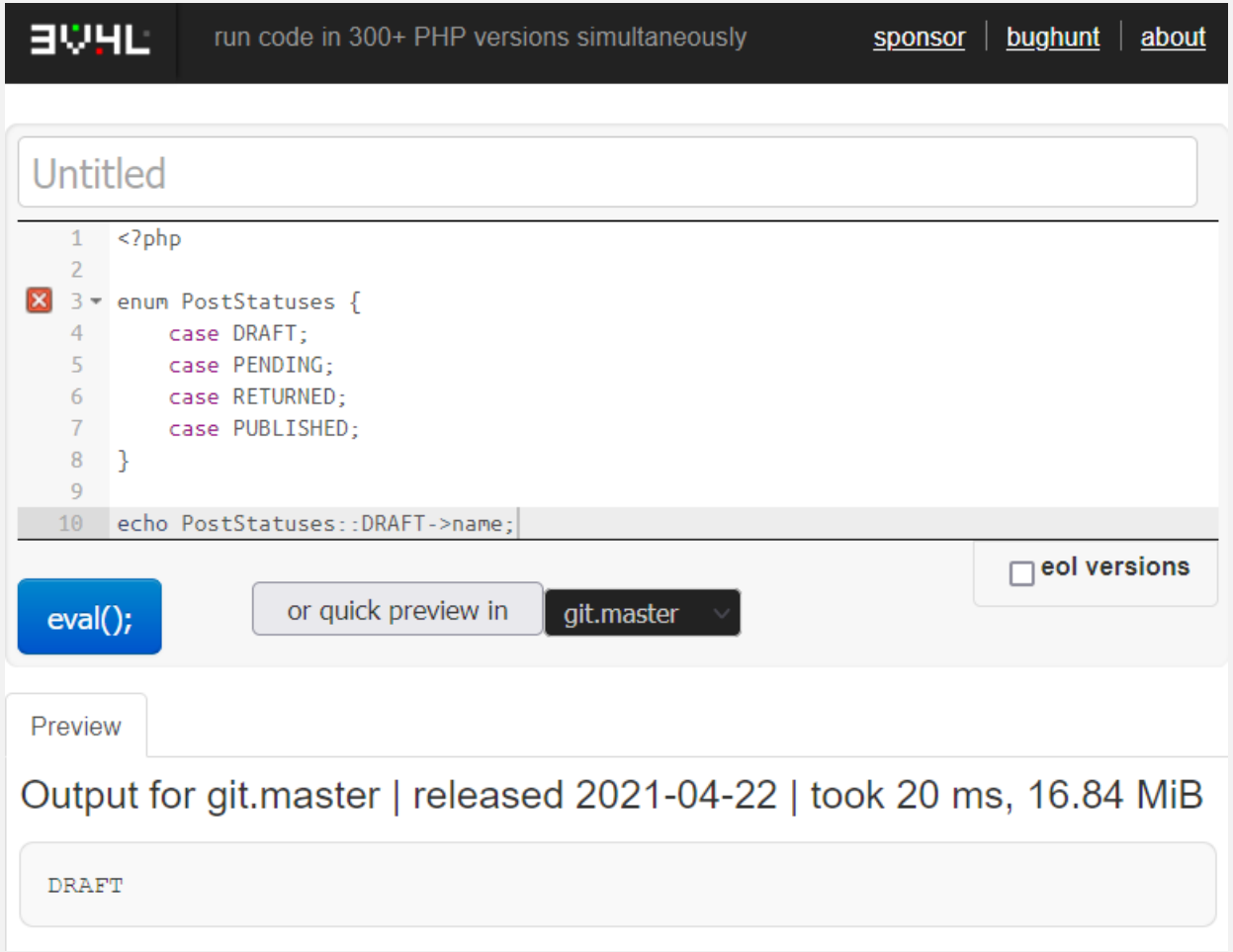
- `array_is_list` function
- xxHash hashing algorithm
- MurMurHash hashing algorithm

Some changes can be accommodated

- `array_is_list` function
- Resource to object migrations
- All of the deprecations
- Tentative return type changes
- Phar signature changes

Trying Out PHP 8.1

Try it online with [3v4l.org](3v4l.org)



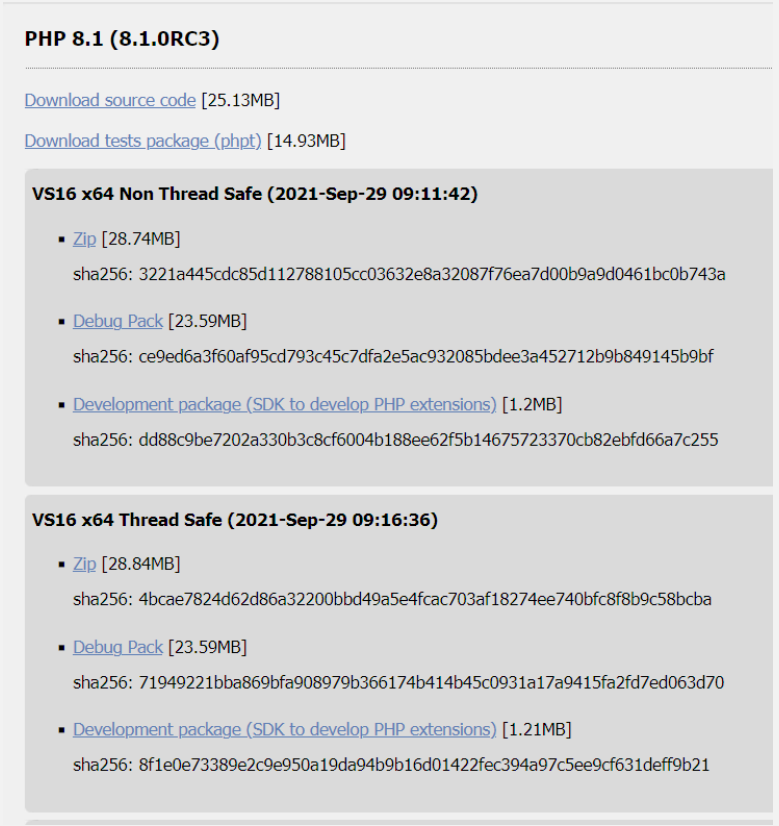
Nightly Docker Images

```
docker pull phpdaily/php:8.1-dev
```


Compiled Windows Binaries

https://windows.php.net/qa/

https://www.apachehaus.com/cgi-bin/download.plx



PHP 8.1 (8.1.0RC3)

Download source code [25.13MB]

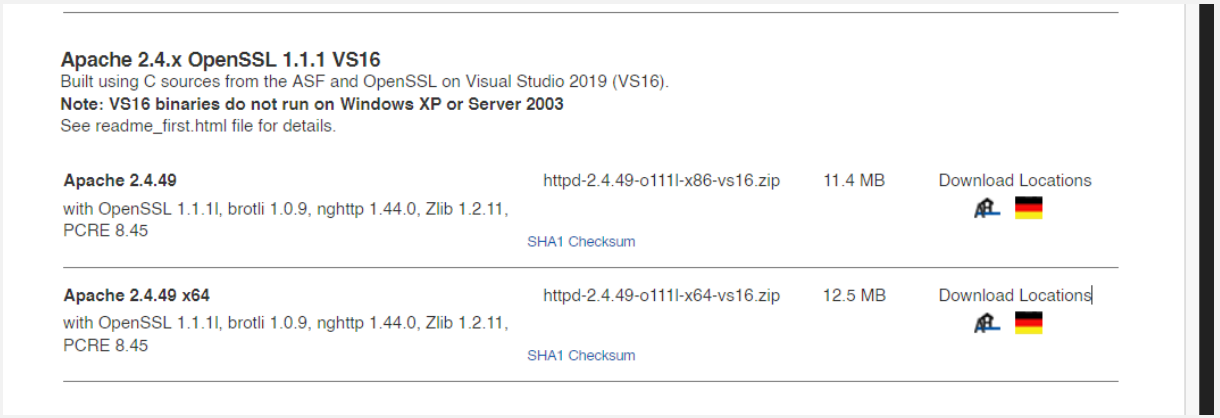
Download tests package (phpt) [14.93MB]

VS16 x64 Non Thread Safe (2021-Sep-29 09:11:42)

- Zip [28.74MB]
  sha256: 3221a445cdc85d112788105cc03632e8a32087f76ea7d00b9a9d0461bc0b743a
- Debug Pack [23.59MB]
  sha256: ce9ed6a3f60af95cd793c45c7dfa2e5ac932085bdee3a452712b9b849145b9bf
- Development package (SDK to develop PHP extensions) [1.2MB]
  sha256: dd88c9be7202a330b3c8cf6004b188ee62f5b14675723370cb82ebfd66a7c255

VS16 x64 Thread Safe (2021-Sep-29 09:16:36)

- Zip [28.84MB]
  sha256: 4bcae7824d62d86a32200bbd49a5e4fcac703af18274ee740bfc8f8b9c58bcba
- Debug Pack [23.59MB]
  sha256: 71949221bba869bfa908979b366174b414b45c0931a17a9415fa2fd7ed063d70
- Development package (SDK to develop PHP extensions) [1.21MB]
  sha256: 8f1e0e73389e2c9e950a19da94b9b16d01422fec394a97c5ee9cf631deff9b21



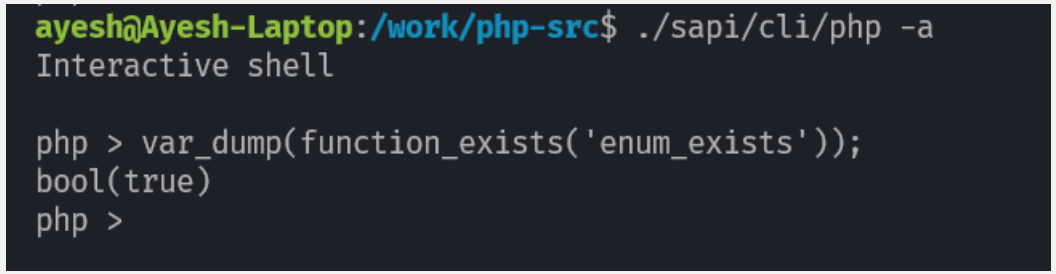
Apache 2.4.x OpenSSL 1.1.1 VS16
Built using C sources from the ASF and OpenSSL on Visual Studio 2019 (VS16).
Note: VS16 binaries do not run on Windows XP or Server 2003
See readme_first.html file for details.

Apache 2.4.49 with OpenSSL 1.1.1l, brotli 1.0.9, nghttp 1.44.0, Zlib 1.2.11, PCRE 8.45	httpd-2.4.49-o111l-x86-vs16.zip SHA1 Checksum	11.4 MB	Download Locations
Apache 2.4.49 x64 with OpenSSL 1.1.1l, brotli 1.0.9, nghttp 1.44.0, Zlib 1.2.11, PCRE 8.45	httpd-2.4.49-o111l-x64-vs16.zip SHA1 Checksum	12.5 MB	Download Locations

Trying out Enums today

Self-compile PHP from source

```
$  git clone git@github.com:php/php-src.git
$  ./buildconf
$  ./configure
$  make -j$(nproc)
$  ./sapi/cli/php -a
```



https://php.watch/articles/compile-php-ubuntu
https://php.watch/articles/compile-php-fedora-rhel-centos

Further Resources

- https://aye.sh/talk/php81-groningenphp
- https://php.watch/versions/8.1/enums
- https://php.watch/versions/8.1/fibers
- https://php.watch/versions/8.1/readonly
- https://php.watch/versions/8.1
- https://github.com/phpdaily/php
- https://3v4l.org/
- https://php.watch/articles/compile-php-ubuntu
- https://php.watch/articles/compile-php-fedora-rhel-centos

Questions?

No question is too small.

#groningenphp @Ayeshlive ayesh@php.watch

https://aye.sh/talk/php81-groningenphp


dziękuję
Ďakujem
tak
arigatô
paldies
mahalo
děkuji
kop khun
diolch
dankie
köszönöm
cảm ơn bạn
хвала
شكرا لك
tänan
a dank
gràcies
ngiyabonga
Баярлалаа
dhanyavād
Дякую
THANK YOU
Благодарам
ευχαριστώ
спасибо
благодаря
tack
grazie
Ǹh’gōi
Dank u
Благодаря ти
gracias
ස්තුතියි
mulţumesc
ačiū
நன்றி
תודה.
takk
danke
faleminderit
谢谢
teşekkür ederim
choukrane
obrigado
kiitos
Շնորհակալություն
terima kasih
hvala
grazzi

PHP 8.1
What's new and changed

Ayesh Karunaratne | https://aye.sh/talk/php81-groningenphp

#groningenphp