Building really fast apps

Tobias Nyholm

@tobiasnyholm

Why?

Tobias Nyholm

- Creating good stuff at Eneba.com
- Certified Symfony developer
- Symfony core member
- Symfony CARE
- PHP-Stockholm
- Open source

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eneba

Open source

Assert

NewRelicBundle

Neo4j

FriendsOfApi/boilerplate

Guzzle

Buzz

Backup-manager/symfony

nyholm/effective-interest-rate

Puli

Swap

LinkedIn API client

NSA

php-http/discovery

PHP-cache

PHP-Translation

PSR7

CacheBundle

league/geotools

Mailgun

KNP Github API

happyr/normal-distribution-bundle

HTTPlug

Stampie

SymfonyBundleTest

php-http/httplug-bundle

MailgunBundle

php-http/multipart-stream

SimpleBus integrations

PHP-Geocoder

BazingaGeocoderBundle

PSR HTTP clients

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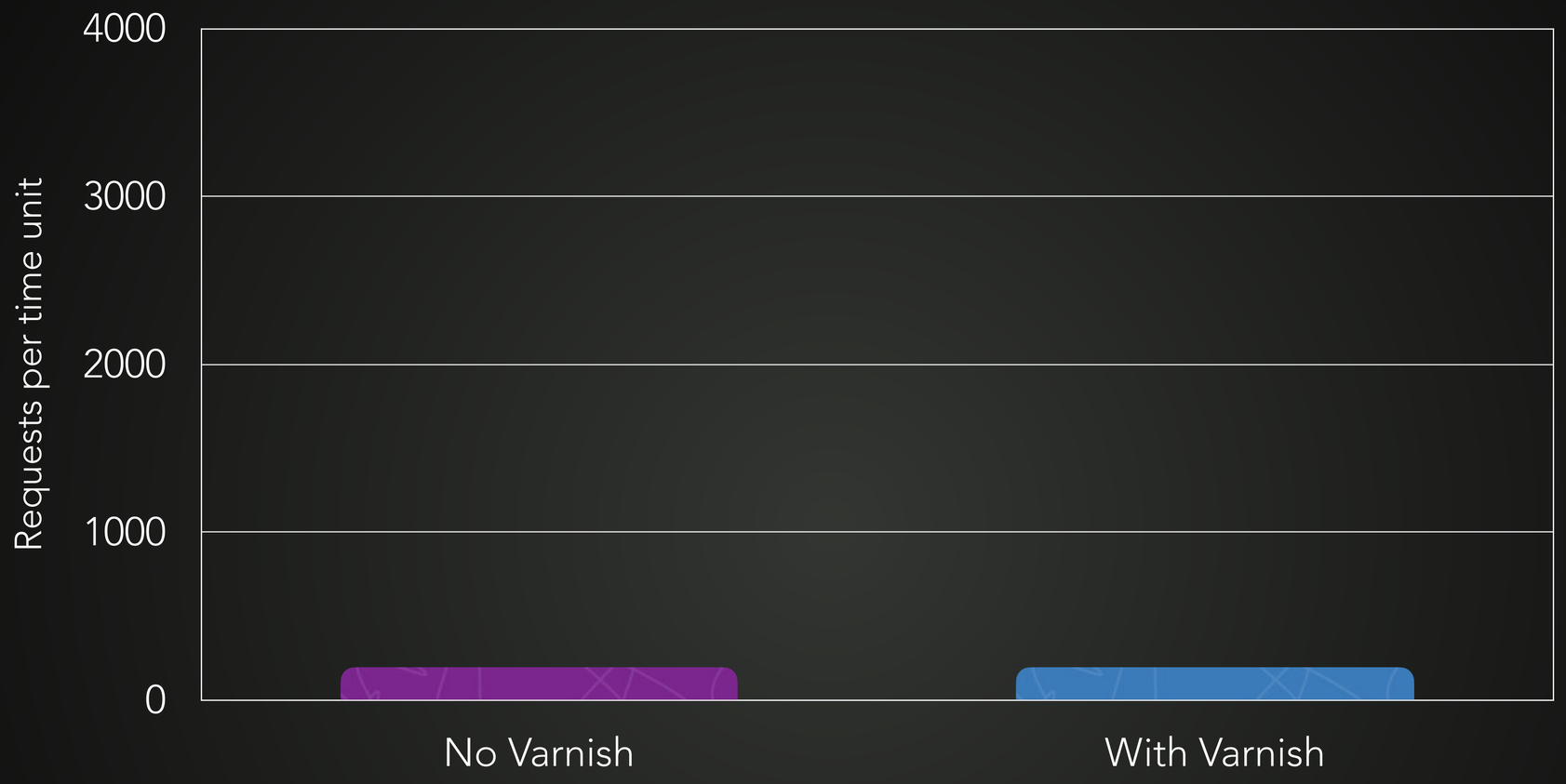
“Frameworks are slow”

What is a framework?

Let’s talk about performance

Rule 1: Buy a better server

Rule 2: Use Varnish


4000
3000
2000
1000
0
Requests per time unit
No Varnish
With Varnish

Rule 3: Run less code

```
section    .text
    global _start            ; must be declared for linker (ld)

_start:                      ; tell linker entry point

    mov    edx,len           ; message length
    mov    ecx,msg           ; message to write
    mov    ebx,1             ; file descriptor (stdout)
    mov    eax,4             ; system call number (sys_write)
    int    0x80              ; call kernel

    mov    eax,1             ; system call number (sys_exit)
    int    0x80              ; call kernel

section    .data

msg    db    'Hello, world!',0xa    ; our dear string
len    equ    $ - msg                ; length of our dear string
```

More code = More “ticks”

Hello world

Version	Lines of code	Lines executed	Function calls	Memory	Time
Symfony 1.4	**172 000**	**2 401**	**10 588**	**1 200 Kb**	**198 ms**
Symfony 2.8	**415 700**	**1 928**	**5 051**	**1 600 Kb**	**100 ms**
Symfony 3.4	**433 600**	**2 649**	**4 004**	**1 600 Kb**	**82 ms**
Symfony 4.1	**136 000**	**1 029**	**1 421**	**500 Kb**	**31 ms**
Symfony 4.4	**117 000**	**1 409**	**1 767**	**568 Kb**	**16 ms**

Hello world

Version	Lines of code	Lines executed	Function calls	Memory	Time
Symfony 4.4	**117 000**	**1 409**	**1 767**	**568 Kb**	**16 ms**
Symfony 5.4	**123 000**	**1 411**	**1 620**	**520 Kb**	**16 ms**
Symfony 6.4	**133 000**	**1 584**	**1 839**	**579 Kb**	**16 ms**
Symfony 7.1	**144 000**	**1 562**	**1 855**	**583 Kb**	**16 ms**

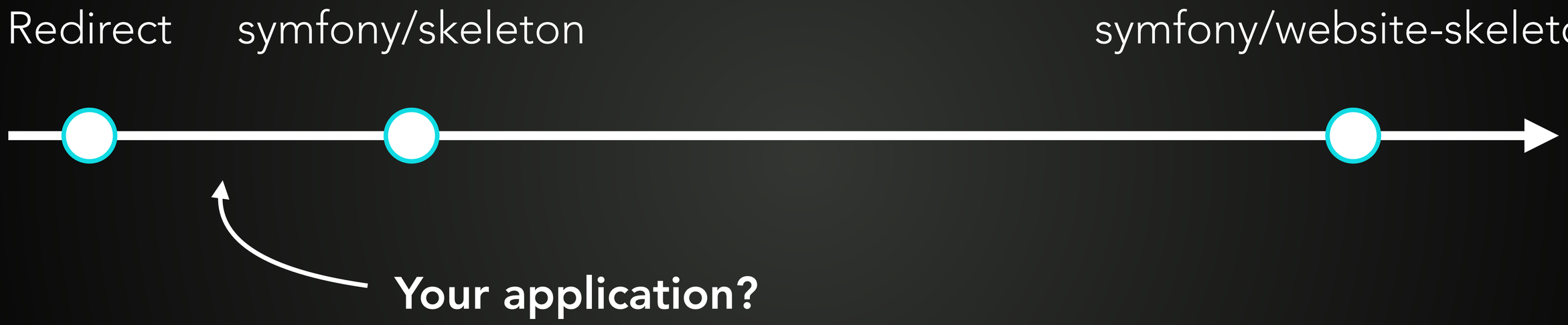
Fastest application

```php
<?php // index.php

if (isset($_GET['page']) && $_GET['page'] === 'foo') {
    echo "Foo page <br>";
} else {
    echo "Welcome to index! <br>";
}
```

What is your application doing?

```php
<?php

$uri = $_SERVER['REQUEST_URI'];
$base = 'https://happyr.com';

if (substr($uri, 0, 1) !== 'j') {
    redirect($base);
}

redirect(sprintf('%s/x/job/%d-x_x', $base, substr($uri, 1)));

function redirect($url)
{
    header('Location: '.$url);
    exit(0);
}
```

Complexity



Do you need this?

Yaml

Translation

Security

Serializer

Validation

Forms

Finder

Debug

Do you need this?

Router

Event dispatcher

Dependency injection

HTTP Foundation

HTTP Kernel

Do we need HTTP?

HTTP Foundation

vs

$_SERVER[‘REQUEST_URI’]

Messenger component?

Doctrine or just PDO?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Well tested libraries

Takes care of all edge cases

Nice APIs

More code

vs

You write code yourself

Think about your edge cases

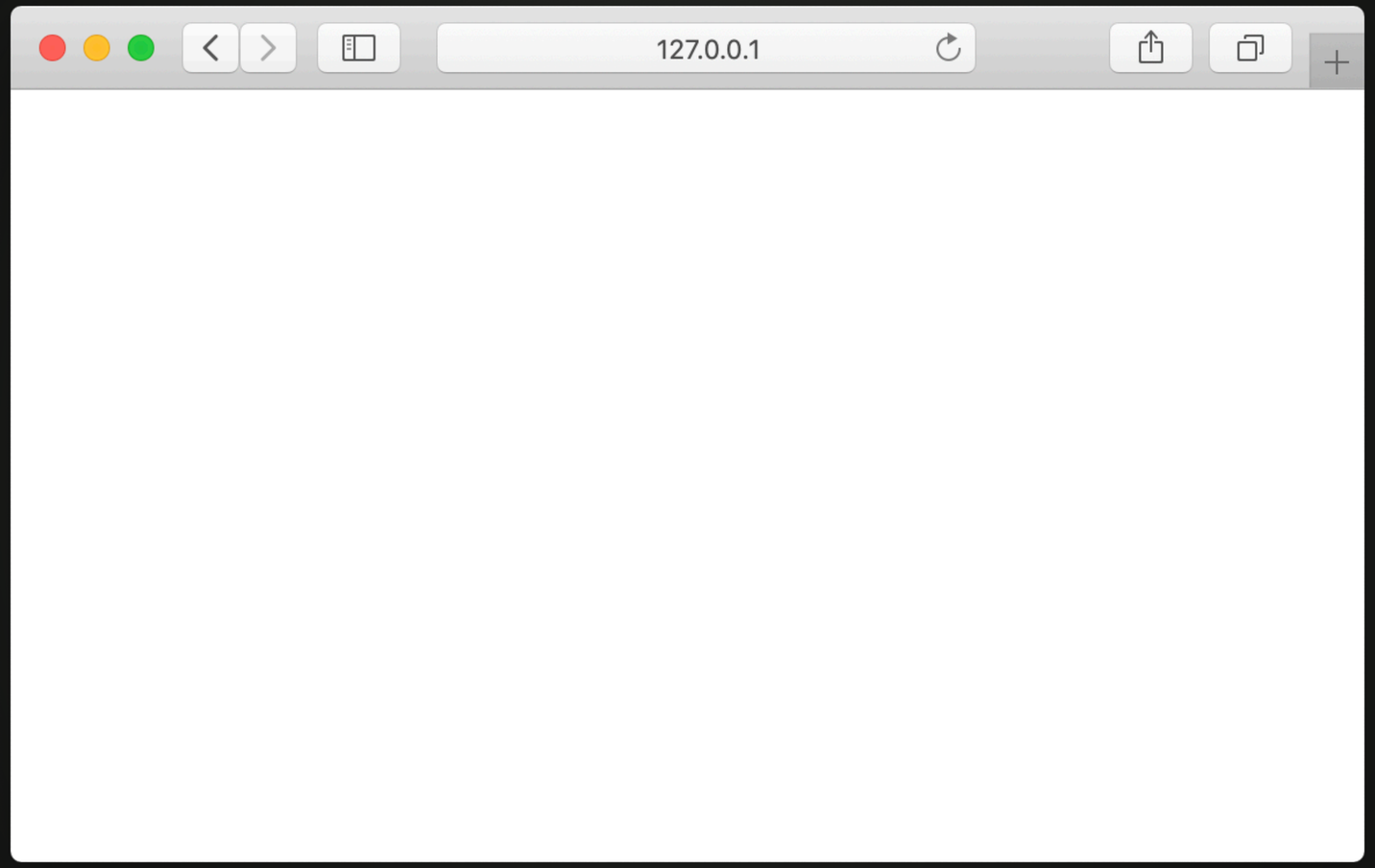
Sometimes tricky APIs

Less code

Building a small application

Middleware pattern

```php
use Symfony\Component\HttpFoundation\Response;
use Symfony\Component\HttpFoundation\Request;
use App\Runner;

require __DIR__.'/../vendor/autoload.php';

$request = Request::createFromGlobals();
$response = new Response();









// Send response
echo $response->getBody();
```

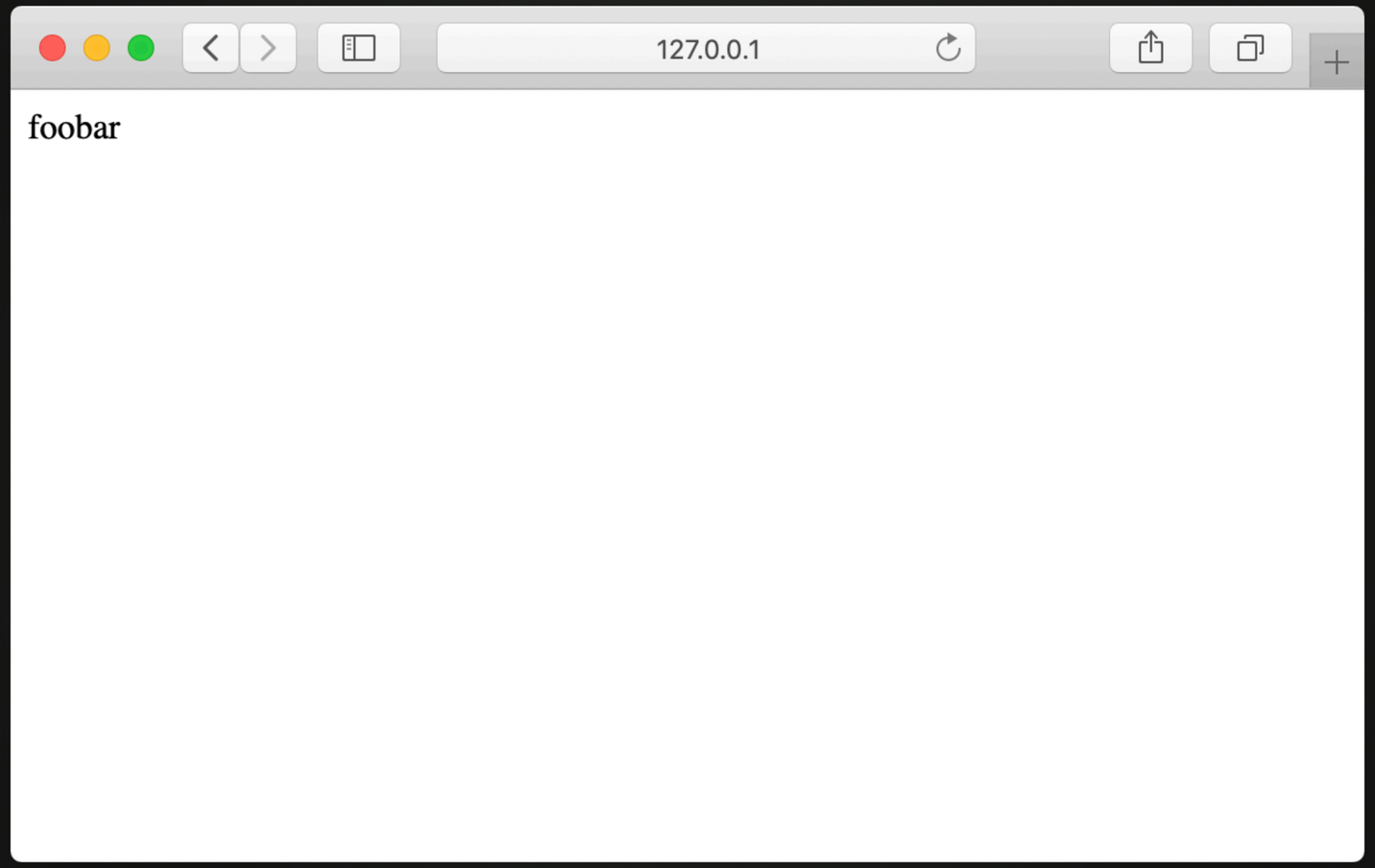

127.0.0.1

```php
use Symfony\Component\HttpFoundation\Response;
use Symfony\Component\HttpFoundation\Request;
use App\Runner;

require __DIR__.'/../vendor/autoload.php';

$request = Request::createFromGlobals();
$response = new Response();









// Send response
echo $response->getBody();
```

```php
use Symfony\Component\HttpFoundation\Response;
use Symfony\Component\HttpFoundation\Request;
use App\Runner;

require __DIR__.'/../vendor/autoload.php';

$request = Request::createFromGlobals();
$response = new Response();

$middleware[] = function(Request $request, Response $response, callable $next) {
    if ($request->getMethod() !== 'GET') {
        return new Response('Method not allowed', 405);
    }
    return $next($request, $response);
};

// Send response
echo $response->getBody();
```

```php
use Symfony\Component\HttpFoundation\Response;
use Symfony\Component\HttpFoundation\Request;
use App\Runner;

require __DIR__.'/../vendor/autoload.php';

$request = Request::createFromGlobals();
$response = new Response();

$middleware[] = function(Request $request, Response $response, callable $next) {
    if ($request->getMethod() !== 'GET') {
        return new Response('Method not allowed', 405);
    }
    return $next($request, $response);
};

$middleware[] = function(Request $request, Response $response, callable $next) {
    $response->setContent('foobar');
    return $next($response, $response);
};



// Send response
echo $response->getBody();
```

```php
use Symfony\Component\HttpFoundation\Response;
use Symfony\Component\HttpFoundation\Request;
use App\Runner;

require __DIR__.'/../vendor/autoload.php';

$request = Request::createFromGlobals();
$response = new Response();

$middleware[] = function(Request $request, Response $response, callable $next) {
    if ($request->getMethod() !== 'GET') {
        return new Response('Method not allowed', 405);
    }
    return $next($request, $response);
};

$middleware[] = function(Request $request, Response $response, callable $next) {
    $response->setContent('foobar');
    return $next($response, $response);
};

$runner = new Runner($middleware);
$response = $runner($request, $response);

// Send response
echo $response->getBody();
```


127.0.0.1
foobar

```php
use Symfony\Component\HttpFoundation\Response;
use Symfony\Component\HttpFoundation\Request;
use App\Runner;

require __DIR__.'/../vendor/autoload.php';

$request = Request::createFromGlobals();
$response = new Response();

$middleware[] = function(Request $request, Response $response, callable $next) {
    if ($request->getMethod() !== 'GET') {
        return new Response('Method not allowed', 405);
    }
    return $next($request, $response);
};

$middleware[] = function(Request $request, Response $response, callable $next) {
    $response->setContent('foobar');
    return $next($response, $response);
};

$runner = new Runner($middleware);
$response = $runner($request, $response);

// Send response
echo $response->getBody();
```

```php
namespace App;

use Symfony\Component\HttpFoundation\Response;
use Symfony\Component\HttpFoundation\Request;

class Runner
{
    /** @var callable[] */
    private $queue;

    public function __construct(array $queue)
    {
        $this->queue = $queue;
    }

    public function __invoke(Request $request, Response $response)
    {
        $middleware = array_shift($this->queue);
        if (null === $middleware) {
           return $response;
        }

        return $middleware($request, $response, $this);
    }
}
```

```php
<?php

namespace App\Middleware;

use Symfony\Component\HttpFoundation\Response;
use Symfony\Component\HttpFoundation\Request;

interface MiddlewareInterface
{
    public function __invoke(Request $request, Response $response, callable $next);
}
```

```php
<?php

use Symfony\Component\HttpFoundation\Response;
use Symfony\Component\HttpFoundation\Request;
use App\Runner;

require __DIR__.'/../vendor/autoload.php';

$request = Request::createFromGlobals();
$response = new Response();

$middleware[] = new Cache;
$middleware[] = new NewRelic;
$middleware[] = new Security;
$middleware[] = new Router;

$runner = new Runner($middleware);
$response = $runner($request, $response);

// Send response
echo $response->getBody();
```

```php
class Router implements MiddlewareInterface
{
    private $geocoderController;
    private $ipController;
    public function __construct(GeocoderController $geocoderController, IpController $ipController)
        $this->geocoderController = $geocoderController;
        $this->ipController = $ipController;
    }
    public function __invoke(ServerRequestInterface $request, ResponseInterface $response, callable
        $uri = $request->getUri()->getPath();

        switch ($uri) {
            case '/':
                $response = $this->geocoderController->geocodeAction($request, $response);
                break;
            case '/locale':
                $response = $this->ipController->localeAction($request, $response);
                break;
            case '/from-ip':
                $response = $this->ipController->ipAction($request, $response);
                break;
            default:
                $response = $response->withStatus(404);
                $response->getBody()->write('Not Found');
                break;
        }
       return $next($request, $response);
    }
}
```

```php
<?php

use Symfony\Component\HttpFoundation\Response;
use Symfony\Component\HttpFoundation\Request;
use App\Runner;

require __DIR__.'/../vendor/autoload.php';

$request = Request::createFromGlobals();
$response = new Response();

$middleware[] = new Cache;
$middleware[] = new NewRelic;
$middleware[] = new Security;
$middleware[] = new Router;

$runner = new Runner($middleware);
$response = $runner($request, $response);

// Send response
echo $response->getBody();
```

Custom kernel

```php
class Kernel
{
    private $booted = false;
    private $debug;
    private $env;

    /** @var Container */
    private $container;

    public function __construct(string $env, bool $debug = false)
    {
        $this->debug = $debug;
        $this->env = $env;
    }

    /**
     * Handle a Request and turn it in to a response.
     */
    public function handle(Request $request): Response
    {
        $this->boot();

        $middleware[] = $this->container->get(Cache::class);
        $middleware[] = $this->container->get(NewRelic::class);
        $middleware[] = $this->container->get(Security::class);
        $middleware[] = $this->container->get(Router::class);

        $runner = new Runner($middleware);
```

```yaml
# services.yaml
services:
  _defaults:
    autowire: true
    public: false

  App\:
    resource: '../src/*'
    exclude: '../src/{Entity,Tests,Kernel.php}'

  App\Controller\:
    resource: '../src/Controller'
    public: true
    tags: ['controller.service_arguments']

  App\Security\:
    resource: '../src/Security'
    tags: ['security.voter']
```

```
        $container = new \CachedContainer();
    } else {
        $container = new ContainerBuilder();
        $container->setParameter('kernel.project_dir', $this->getProjectDir());
        $container->setParameter('kernel.environment', $this->env);

        $container->registerForAutoconfiguration(EventSubscriberInterface::class)
            ->addTag('kernel.event_subscriber');

        $container->registerForAutoconfiguration(Command::class)
            ->addTag('console.command');

        $container->addCompilerPass(new AddConsoleCommandPass());
        $container->addCompilerPass(
            new RegisterListenersPass(EventDispatcherInterface::class),
            PassConfig::TYPE_BEFORE_REMOVING
        );

        $fileLocator = new FileLocator($this->getProjectDir().'/config');
        $loader = new YamlFileLoader($container, $fileLocator);
        try {
            $loader->load('services.yaml');
            $loader->load('services_'.$this->env.'.yaml');
        } catch (FileLocatorFileNotFoundException $e) {
        }

        $container->compile();

        //dump the container
```

Too much boilerplate?

Use the FrameworkBundle

Improve performance

Improve performance

#1: Buy a better server

#2: Use Varnish

#3: Run less code

Improve performance

#1: Buy a better computer

#2: Use cache

#3: Run less code

Tip count

1. Choose AMI | 2. Choose Instance Type | 3. Configure Instance | 4. Add Storage | 5. Add Tags | 6. Configure Security Group | 7. Review

Step 2: Choose an Instance Type

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. Learn more about instance types and how they can meet your computing needs.

Filter by: All instance types | Current generation | Show/Hide Columns

Currently selected: t2.micro (Variable ECUs, 1 vCPUs, 2.5 GHz, Intel Xeon Family, 1 GiB memory, EBS only)

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance	IPv6 Support
☐	General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
☑	General purpose	t2.micro Free tier eligible	1	1	EBS only	-	Low to Moderate	Yes
☐	General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes
☐	General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
☐	General purpose	t2.large	2	8	EBS only	-	Low to Moderate	Yes
☐	General purpose	t2.xlarge	4	16	EBS only	-	Moderate	Yes
☐	General purpose	t2.2xlarge	8	32	EBS only	-	Moderate	Yes
☐	General purpose	t3a.nano	2	0.5	EBS only	Yes	Up to 5 Gigabit	Yes
☐	General purpose	t3a.micro	2	1	EBS only	Yes	Up to 5 Gigabit	Yes
☐	General purpose	t3a.small	2	2	EBS only	Yes	Up to 5 Gigabit	Yes
☐	General purpose	t3a.medium	2	4	EBS only	Yes	Up to 5 Gigabit	Yes
☐	General purpose	t3a.large	2	8	EBS only	Yes	Up to 5 Gigabit	Yes
☐	General purpose	t3a.xlarge	4	16	EBS only	Yes	Up to 5 Gigabit	Yes
☐	General purpose	t3a.2xlarge	8	32	EBS only	Yes	Up to 5 Gigabit	Yes

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Tip count

Cache in Symfony

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Tip count

```yaml
# config/packages/cache.yaml
framework:
  cache:
    pools:
      app.redis_cache_chain:
        default_lifetime: 31536000  # One year
        adapters:
          - cache.adapter.array
          - cache.adapter.apcu
          - {name: cache.adapter.redis, provider: 'redis://user:password@example.com'}
```

Doctrine cache


```yaml
doctrine:
    orm:
        metadata_cache_driver:
            type: service
            id: doctrine.system_cache_provider
        query_cache_driver:
            type: service
            id: doctrine.system_cache_provider
        result_cache_driver:
            type: service
            id: doctrine.result_cache_provider

services:
    doctrine.result_cache_provider:
        class: Symfony\Component\Cache\DoctrineProvider
        public: false
        arguments:
            - '@app.redis_cache_chain'
    doctrine.system_cache_provider:
        class: Symfony\Component\Cache\DoctrineProvider
        public: false
        arguments:
            - '@app.file_cache_chain'
```

Result cache

3

Tip count

```
class PageRepository extends ServiceEntityRepository
{
    public function getContent(string $page)
    {
        return $this->createQueryBuilder('p')
            ->where('p.slug = :slug')
            ->setParameter('slug', $page)
            ->getQuery()
            ->useResultCache(true, 3600)
            ->getOneOrNullResult();
    }
}
```

Cache HTTP calls

```php
class TwitterClient
{
    private $client;
    private $logger;

    public function __construct(HttpClientInterface $client, LoggerInterface $logger)
    {
        $this->client = $client;
        $this->logger = $logger;
    }

    public function getTweets(): array
    {
        $response = $this->client->request('GET', 'https://api.twitter.com/latest-tweets');

        if (200 !== $response->getStatusCode()) {
            $this->logger->error('Could not get tweets from Twitter');
            return [];
        }

        return $response->toArray();
    }
}
```

Average time waiting on Twitter (math)

Measure window: **600 s**

Number of function calls: 2 calls/s * 600 s = **1200**

Twitter API: **0,5 s**

Total requests: **1200 req**

Total time: 0,5 * 1200 = **600 s**

Average time: 600 / 1200 = 0,5 s = **500 ms**

```php
use Psr\Log\LoggerInterface;
use Symfony\Component\HttpClient\HttpClient;
use Symfony\Contracts\Cache\CacheInterface;
use Symfony\Contracts\Cache\ItemInterface;
use Symfony\Contracts\HttpClient\HttpClientInterface;

class TwitterClient
{
    private $cache;
    private $client;
    private $logger;

    public function __construct(CacheInterface $cache, HttpClientInterface $client, LoggerInter
    {
        $this->cache = $cache;
        $this->client = $client;
        $this->logger = $logger;
    }

    public function getTweets(): array
    {
        $tweets = $this->cache->get(
            'latest-tweets',
            \Closure::fromCallable([$this, 'fetchLatestTweets'])
        );

        return $tweets;
    }
```

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Tip count

Average time waiting on Twitter (math)

4

Tip count

Measure window: **600 s**

Number of function calls: 2 calls/s * 600 s = **1200**

Twitter API: **0,5 s**

Total requests: **10 req** (we cache for 60s)

Total time: 0,5 * 10 = **5 s**

Average time: 5 / 1200 ≈ **4 ms**

4 ms < 500 ms

(Class) local cache

```php
class CircleArea
{

    public function compute(float $radius)
    {
        return $radius * $radius * $this->getPi();
    }

    private function getPi(): float
    {
        return 20 * atan(1/7) + 8 * atan(3/79);
    }
}
```

```php
class CircleArea
{
    private $pi;

    public function compute(float $radius)
    {
        return $radius * $radius * $this->getPi();
    }

    private function getPi(): float
    {
        if ($this->pi === null) {
            $this->pi = 20 * atan(1/7) + 8 * atan(3/79);
        }

        return $this->pi;
    }
}
```

Postpone work


```
framework:
    messenger:
        transports:
            async: amqp://guest:guest@localhost:5672/%2f/messages

        routing:
            'App\Message\YourMessage': async
```

Code generation

Lazy services

```php
class MyService
{
    private $logger;
    private $bar;
    private $client;
    private $foo;
    private $cache;
    private $other;

    public function __construct(
        LoggerInterface $logger,
        BarService $bar,
        HttpClientInterface $client,
        FooService $foo,
        CacheInterface $cache,
        MyOtherService $other
    )
    {
        $this->logger = $logger;
        $this->bar = $bar;
        $this->client = $client;
        $this->foo = $foo;
        $this->cache = $cache;
        $this->other = $other;
    }
}
```

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Tip count

$ composer require symfony/proxy-manager-bridge

```yaml
# config/services.yaml
services:
  App\MyService:
    lazy: true
```

```php
final class RequestListener implements EventSubscriberInterface
{
    // ... (Constructor with may dependencies)
    public static function getSubscribedEvents(): array
    {
        return [ KernelEvents::REQUEST => ['onRequest', 3] ];
    }

    /**
     * Verify accept header on the /api/ path.
     */
    public function onRequest(RequestEvent $event): void
    {
        if (!$event->isMasterRequest()) {
            return;
        }

        if (0 !== \mb_strpos($event->getRequest()->getPathInfo(), '/api/')) {
            return;
        }

        $request = $event->getRequest();

        // ...
        // Use all these dependencies
    }
}
```

“Lazy” is global :(

Service subscribers

```php
final class RequestListener implements EventSubscriberInterface, ServiceSubscriberInterface
{
    private $locator;
    public function __construct(ContainerInterface $locator)
    {
        $this->locator = $locator;
    }

    public static function getSubscribedServices()
    {
        return [
            FooService::class,
            BarService::class,
            BigDeperndency::class,
        ];
    }

    private function getService(string $name)
    {
        if (!$this->locator->has($name)) {
            throw new \LogicException('Service not defined');
        }

        return $this->locator->get($name);
    }

    // ...
}
```

```php
use App\Entity\User;
use Doctrine\ORM\EntityRepository;
use Symfony\Bridge\Doctrine\Form\Type\EntityType;
use Symfony\Component\Form\AbstractType;
use Symfony\Component\Form\FormBuilderInterface;

class UserForm extends AbstractType
{
    public function buildForm(FormBuilderInterface $builder, array $options)
    {
        $builder->add('user', EntityType::class, [
            'class' => User::class,
            'choice_label' => `email',
            'query_builder' => static function (EntityRepository $repo) {
                return $repo->createQueryBuilder('e')
                    ->where('e.createdAt > :date')
                    ->setParameter('date', new \DateTimeImmutable(`-1year'));

            },
        ]);
    }
}
```

```php
use App\Entity\User;
use Doctrine\ORM\EntityRepository;
use Symfony\Bridge\Doctrine\Form\Type\EntityType;
use Symfony\Component\Form\AbstractType;
use Symfony\Component\Form\FormBuilderInterface;

class UserForm extends AbstractType
{
    public function buildForm(FormBuilderInterface $builder, array $options)
    {
        $builder->add('user', EntityType::class, [
            'class' => User::class,
            'choice_label' => `email',
            'query_builder' => static function (EntityRepository $repo) {
                return $repo->createQueryBuilder('e')
                    ->where('e.createdAt > :date')
                    ->setParameter('date',
                            (new \DateTimeImmutable('-1year'))->setTime(0, 0, 0));
            },
        ]);
    }
}
```

215.55 ms

```
SELECT u0_.id AS id_0, u0_.uuid AS uuid_1, u0_.email AS email_2, u0_.type AS type_4, u0_.locale AS locale_5, u0_.enabled AS enabled_10, u0_.loginAt AS loginAt_11, u0_.roles AS roles_12, u0_.banned AS banned_13, u0_.createdAt AS createdAt_16, u0_.updatedAt AS updatedAt_17, u0_.company_id AS company_id_18    FROM User u0_ WHERE u0_.createdAt > ?
```

Parameters:

```
[ ▼
  "2019-10-09 00:00:00"
]
```

Hide formatted query View runnable query Explain query

```
SELECT
  u0_.id AS id_0,
  u0_.uuid AS uuid_1,
  u0_.email AS email_2,
  u0_.type AS type_4,
  u0_.locale AS locale_5,
  u0_.enabled AS enabled_10,
  u0_.loginAt AS loginAt_11,
  u0_.roles AS roles_12,
  u0_.banned AS banned_13,
  u0_.createdAt AS createdAt_16,
  u0_.updatedAt AS updatedAt_17,
  u0_.company_id AS company_id_18,
FROM
  User u0_
WHERE
  u0_.createdAt > ?
```

215.55 ms

```
SELECT u0_.id AS id_0, u0_.uuid AS uuid_1, u0_.email AS email_2, u0_.type AS type_4, u0_.locale AS locale_5,
u0_.enabled AS enabled_10, u0_.loginAt AS loginAt_11, u0_.roles AS roles_12, u0_.banned AS banned_13, u0_.createdAt
AS createdAt_16, u0_.updatedAt AS updatedAt_17, u0_.company_id AS company_id_18    FROM User u0_ WHERE u0_.create-
dAt > ?
```

Parameters:

```
[
  "2019-10-09 00:00:00"
]
```

View formatted query View runnable query Hide query explanation

id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
1	SIMPLE	u0_		ALL					292230	33.33	Using where

CREATE INDEX my_idx ON User (createdAt)

215.55 ms

```
SELECT u0_.id AS id_0, u0_.uuid AS uuid_1, u0_.email AS email_2, u0_.type AS type_4, u0_.locale AS locale_5,
u0_.enabled AS enabled_10, u0_.loginAt AS loginAt_11, u0_.roles AS roles_12, u0_.banned AS banned_13, u0_.createdAt
AS createdAt_16, u0_.updatedAt AS updatedAt_17, u0_.company_id AS company_id_18    FROM User u0_ WHERE u0_.create-
dAt > ?
```

Parameters:

```
[
  "2019-10-09 00:00:00"
]
```

View formatted query View runnable query Hide query explanation

id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
1	SIMPLE	u0_		ALL					292230	33.33	Using where

0.88 ms

```
SELECT u0_.id AS id_0, u0_.uuid AS uuid_1, u0_.email AS email_2, u0_.type AS type_4, u0_.locale AS locale_5,
u0_.enabled AS enabled_10, u0_.loginAt AS loginAt_11, u0_.roles AS roles_12, u0_.banned AS banned_13, u0_.createdAt
AS createdAt_16, u0_.updatedAt AS updatedAt_17, u0_.company_id AS company_id_18    FROM User u0_ WHERE u0_.create-
dAt > ?
```

Parameters:

```
[
  "2019-10-09 00:00:00"
]
```

View formatted query View runnable query Hide query explanation

id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
1	SIMPLE	u0_		range	my_idx	my_idx	5		1	100.00	Using index condition

```php
use App\Entity\User;
use Doctrine\ORM\EntityRepository;
use Symfony\Bridge\Doctrine\Form\Type\EntityType;
use Symfony\Component\Form\AbstractType;
use Symfony\Component\Form\FormBuilderInterface;

class UserForm extends AbstractType
{
    public function buildForm(FormBuilderInterface $builder, array $options)
    {
        $builder->add('user', EntityType::class, [
            'class' => User::class,
            'choice_label' => `email',
            'query_builder' => static function (EntityRepository $repo) {
                return $repo->createQueryBuilder('e')
                    ->where('e.createdAt > :date')
                    ->setParameter('date',
                            (new \DateTimeImmutable('-1year'))->setTime(0, 0, 0));
            },
        ]);
    }
}
```

```php
use App\Entity\User;
use Doctrine\ORM\EntityRepository;
use Symfony\Bridge\Doctrine\Form\Type\EntityType;
use Symfony\Component\Form\AbstractType;
use Symfony\Component\Form\Extension\Core\Type\ChoiceType;
use Symfony\Component\Form\FormBuilderInterface;

class UserForm extends AbstractType
{
    /** @var EntityRepository */
    private $userRepo;
    // ...
    public function buildForm(FormBuilderInterface $builder, array $options)
    {
        $rows = $this->userRepo->createQueryBuilder('e')
            ->select('e.id', 'e.email')
            ->where('e.createdAt > :date')
            ->setParameter('date', (new \DateTimeImmutable('-1year'))->setTime(0, 0, 0))
            ->getQuery()
            ->getArrayResult();

        $choices = [];
        foreach ($rows as $row) {
            $choices[$row['email']] = $row['id'];
        }

        $builder->add('user', ChoiceType::class, [
            'choices' => $choices,
```

n + 1 problem


```php
class Manager
{
    public function getProductsForCountry(string $country): array
    {
        $webshop = $this->webshopRepository->createQueryBuilder('e')
            ->where('e.country = :country')
            ->setParameter('country', $country)
            ->getQuery()
            ->getOneOrNullResult();

        return $webshop->getPoducts();
    }
}

$products = $manager->getProductsForCountry('sv');
foreach ($products as $p) {
    echo $p->getName();
}
```

n + 1 problem


```php
class Manager
{
    public function getProductsForCountry(string $country): array
    {
        $webshop = $this->webshopRepository->createQueryBuilder('e')
            ->select('e', 'product')
            ->join('e.products', 'product')
            ->where('e.country = :country')
            ->setParameter('country', $country)
            ->getQuery()
            ->getOneOrNullResult();

        return $webshop->getPoducts();
    }
}

$products = $manager->getProductsForCountry('sv');
foreach ($products as $p) {
    echo $p->getName();
}
```

n + 1 problem


```php
class Manager
{
    public function getProductsForCountry(string $country): array
    {
        $products = $this->productRepository->createQueryBuilder('p')
            ->join('p.webshop', 'e')
            ->where('e.country = :country')
            ->setParameter('country', $country)
            ->getQuery()
            ->getOneOrNullResult();

        return $products;
    }
}
```

Data transfer


```php
class Product
{
    // ...
    /**
     * @var string
     * @ORM\Column(type="string", length=255)
     */
    private $name;

    /**
     * 1000+ characters
     * @var string
     * @ORM\Column(type="text")
     */
    private $description;

    /**
     * Binary image stored in database
     * @ORM\Column(type="binary")
     */
    private $image;

    // ...
}
```

Data transfer


```php
class Product
{
    // ...
    /**
     * @var string
     * @ORM\Column(type="string", length=255)
     */
    private $name;

    /**
     * @var ProductMetadata
     * @ORM\OneToOne(targetEntity="ProductMetadata", inversedBy="product")
     */
    private $metadata;

    // ...
}
```

Data transfer


```
class ProductMetadata
{
    // ...
    /**
     * @var Product
     * @ORM\OneToOne(targetEntity="Product", mappedBy="metadata")
     */
    private $product;

    /**
     * 1000+ characters
     * @var string
     * @ORM\Column(type="text")
     */
    private $description;

    /**
     * Binary image stored in database
     * @ORM\Column(type="binary")
     */
    private $image;

    // ...
}
```

doctrine/orm 2.4: NEW

```php
class Product
{
    // ...
    /**
     * @var string
     * @ORM\Column(type="string", length=255)
     */
    private $name;

    /**
     * 1000+ characters
     * @var string
     * @ORM\Column(type="text")
     */
    private $description;

    /**
     * Binary image stored in database
     * @ORM\Column(type="binary")
     */
    private $image;

    // ...
}
```

```php
class SimpleProduct
{
    private $name;
    private $category;

    public function __construct($name, $category)
    {
        $this->name = $name;
        $this->category = $category;
    }

    // ...
}
```

```php
class ProductRepository extends EntityRepository
{
    /**
     * @return SimpleProduct[]
     */
    public function getSimpleProducts() : array
    {
        $queryBuilder = $this->createQueryBuilder('p');

        $queryBuilder
            ->select(
                sprintf('NEW %s(p.name, p.category)', SimpleProduct::class)
            )
            ->where('p.featured = :true')
            ->setParameter('true', true);

        return $queryBuilder->getQuery()->getResult();
    }
}
```

Your PHP.ini

```
apc.enable_cli = 1
date.timezone = UTC
session.auto_start = Off
short_open_tag = Off

opcache.interned_strings_buffer = 16
opcache.max_accelerated_files = 20000
opcache.memory_consumption = 256
opcache.validate_timestamps = 0
realpath_cache_size = 4096K
realpath_cache_ttl = 600
```

https://symfony.com/doc/current/performance.html

Frontend?

Run less code in frontend

Frontend optimisations

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Tip count

- Small HTML pages, limited cookies
- Only include JS and CSS that are used
- <link rel="preconnect dns-prefetch" href=“fonts.googleapis.com">
- <script **async** src=“script.js"></script>
- HTTP2 & brotli/gzip responses
- font-display: swap;
- Optimise & lazy load images, Use CDN
- cache-control: max-age=31449600,immutable

Webpack encore

Chrome's Lighthouse

21
Tip count

@tobiasnyholm

eneba

Improve performance

21
Tip count

#1: Buy a better computer

#2: Use cache

#3: Run less code

Improve performance

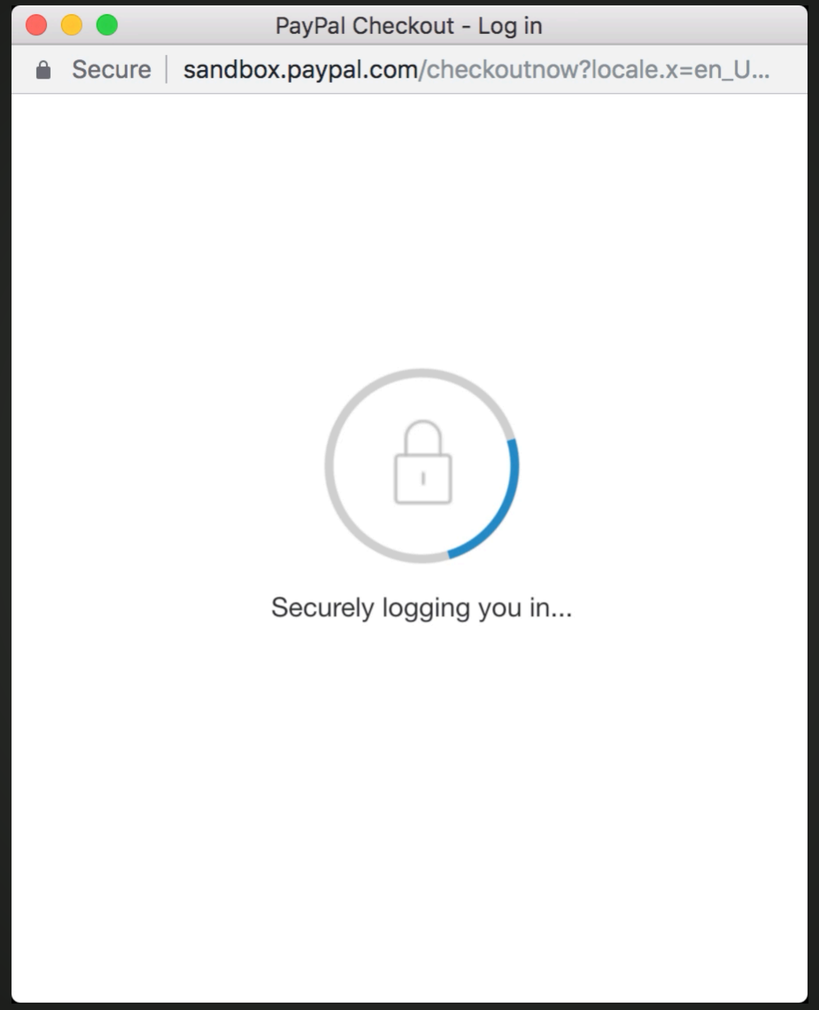
47
Tip count

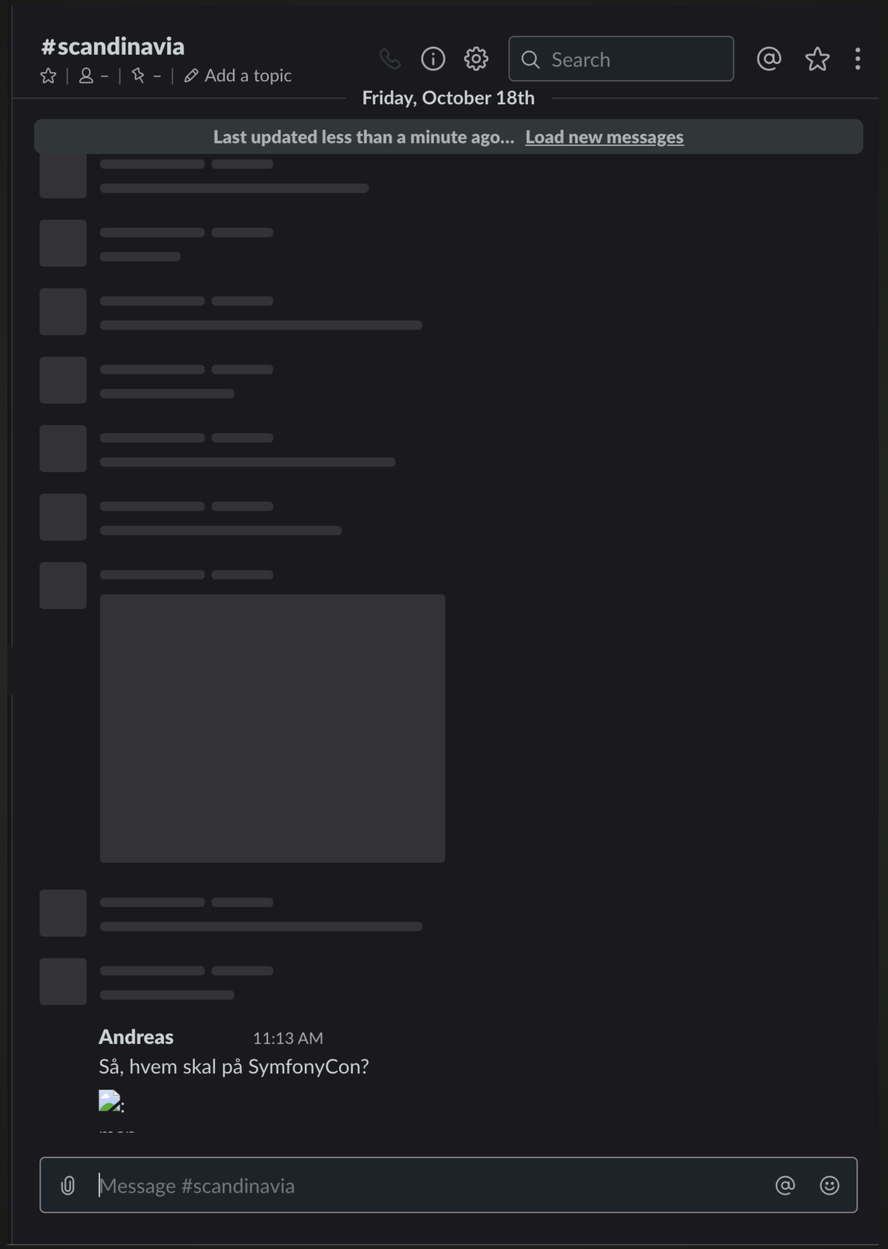
#1: Buy a better computer

#2: Use cache

#3: Run less code

#4: Lie and cheat

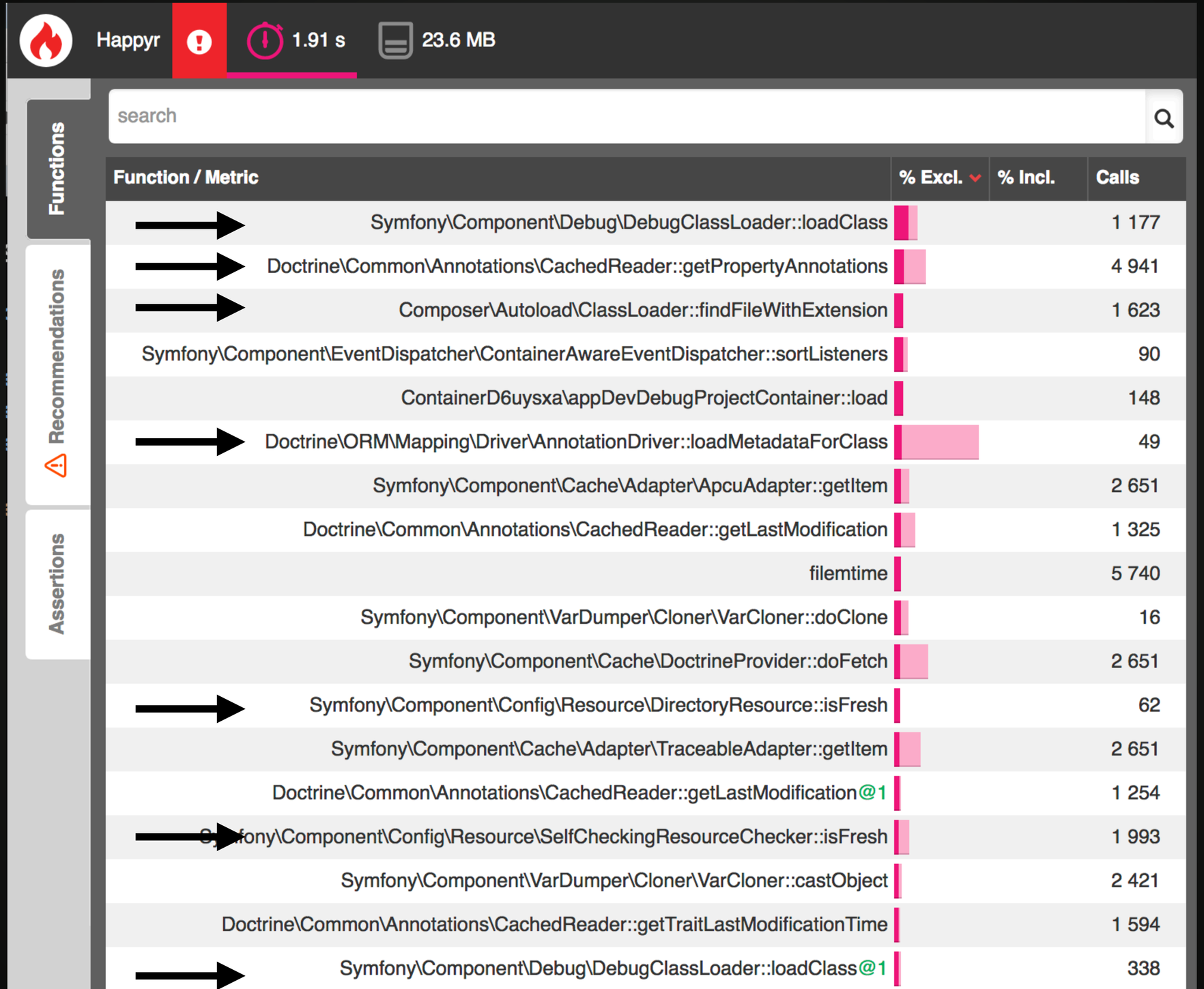

PayPal Checkout - Log in
Secure
sandbox.paypal.com/checkoutnow?locale.x=en_U...
Securely logging you in...


#scandinavia
Add a topic
Search
Friday, October 18th
Last updated less than a minute ago... Load new messages
Andreas 11:13 AM
Så, hvem skal på SymfonyCon?
Message #scandinavia

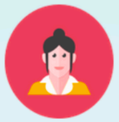
49

Tip count

Profile your application


Happyr
1.91 s
23.6 MB
Functions
Recommendations
Assertions
search
Function / Metric
% Excl.
% Incl.
Calls
Symfony\Component\Debug\DebugClassLoader::loadClass 1 177
Doctrine\Common\Annotations\CachedReader::getPropertyAnnotations 4 941
Composer\Autoload\ClassLoader::findFileWithExtension 1 623
Symfony\Component\EventDispatcher\ContainerAwareEventDispatcher::sortListeners 90
ContainerD6uysxa\appDevDebugProjectContainer::load 148
Doctrine\ORM\Mapping\Driver\AnnotationDriver::loadMetadataForClass 49
Symfony\Component\Cache\Adapter\ApcuAdapter::getItem 2 651
Doctrine\Common\Annotations\CachedReader::getLastModification 1 325
filemtime 5 740
Symfony\Component\VarDumper\Cloner\VarCloner::doClone 16
Symfony\Component\Cache\DoctrineProvider::doFetch 2 651
Symfony\Component\Config\Resource\DirectoryResource::isFresh 62
Symfony\Component\Cache\Adapter\TraceableAdapter::getItem 2 651
Doctrine\Common\Annotations\CachedReader::getLastModification@1 1 254
ony\Component\Config\Resource\SelfCheckingResourceChecker::isFresh 1 993
Symfony\Component\VarDumper\Cloner\VarCloner::castObject 2 421
Doctrine\Common\Annotations\CachedReader::getTraitLastModificationTime 1 594
Symfony\Component\Debug\DebugClassLoader::loadClass@1 338

HTTP Pipeline - as a Restaurant

Client		Customer
Server		Restaurant
Request		Order
Response		Food
Application		Chef
HTTP Daemon		Waiter/Waitress

Restaurant PHP


Customer enters restaurant



Waitress takes order



Waitress **creates chef** and gives order



Chef makes food

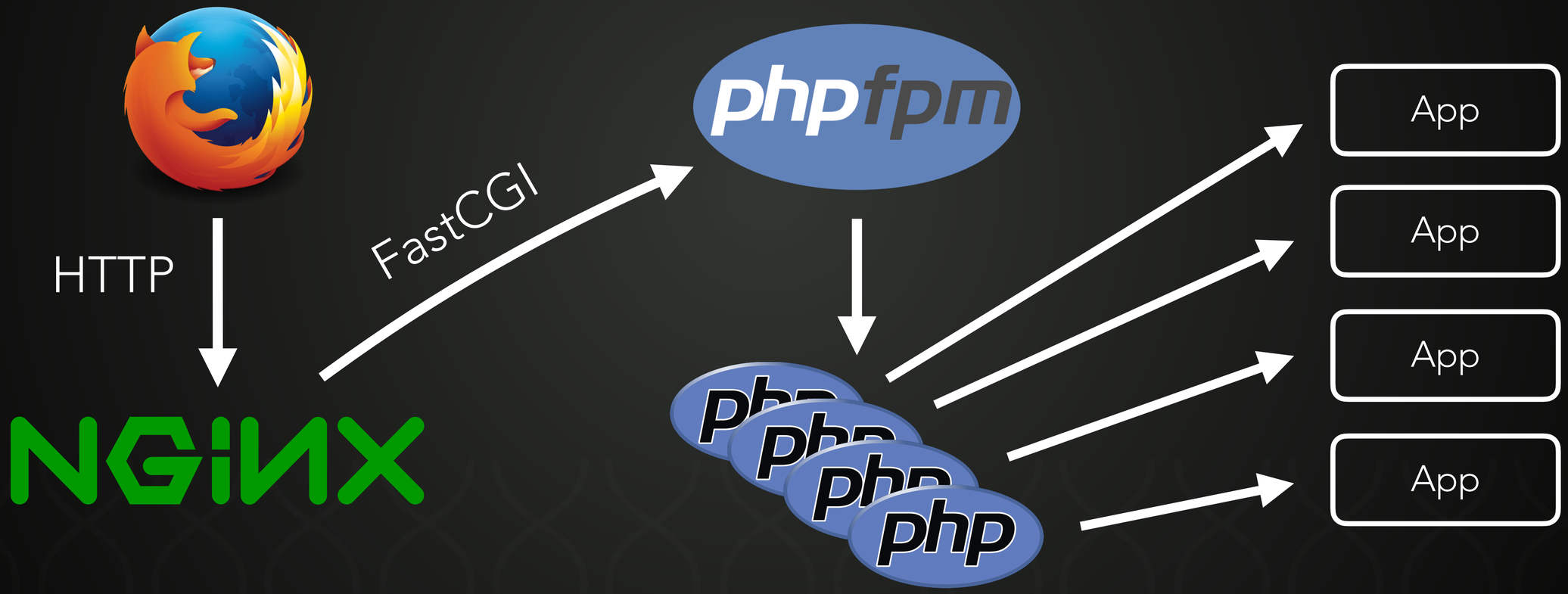


Waitress gives food to customer

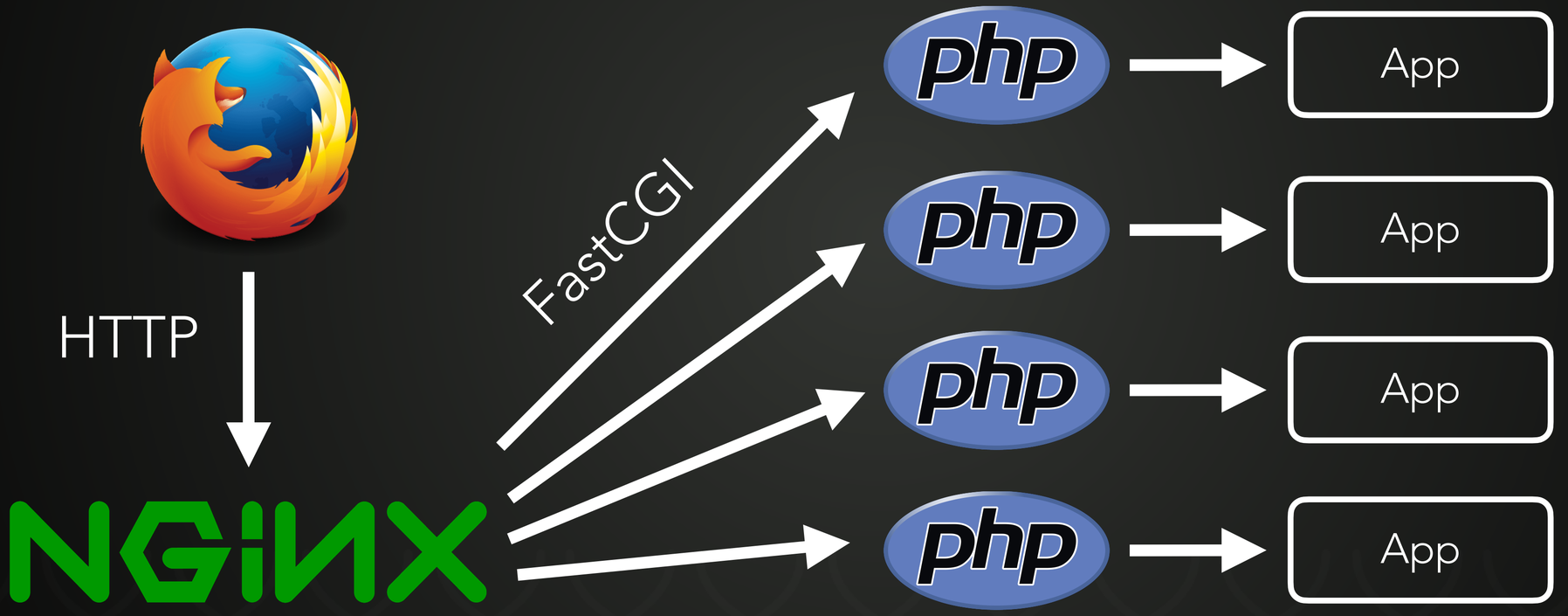


Waitress **brutally murders** chef


“Normal” PHP-FPM



Dont kill the chef



eneba

```php
<?php

require_once dirname(__FILE__) . '/../vendor/autoload_runtime.php';

use App\Kernel;

return function (array $context) {
    return new Kernel($context['APP_ENV'], (bool) $context['APP_DEBUG']);
};
```

https://github.com/php-runtime/runtime


FRANKEN
PHP

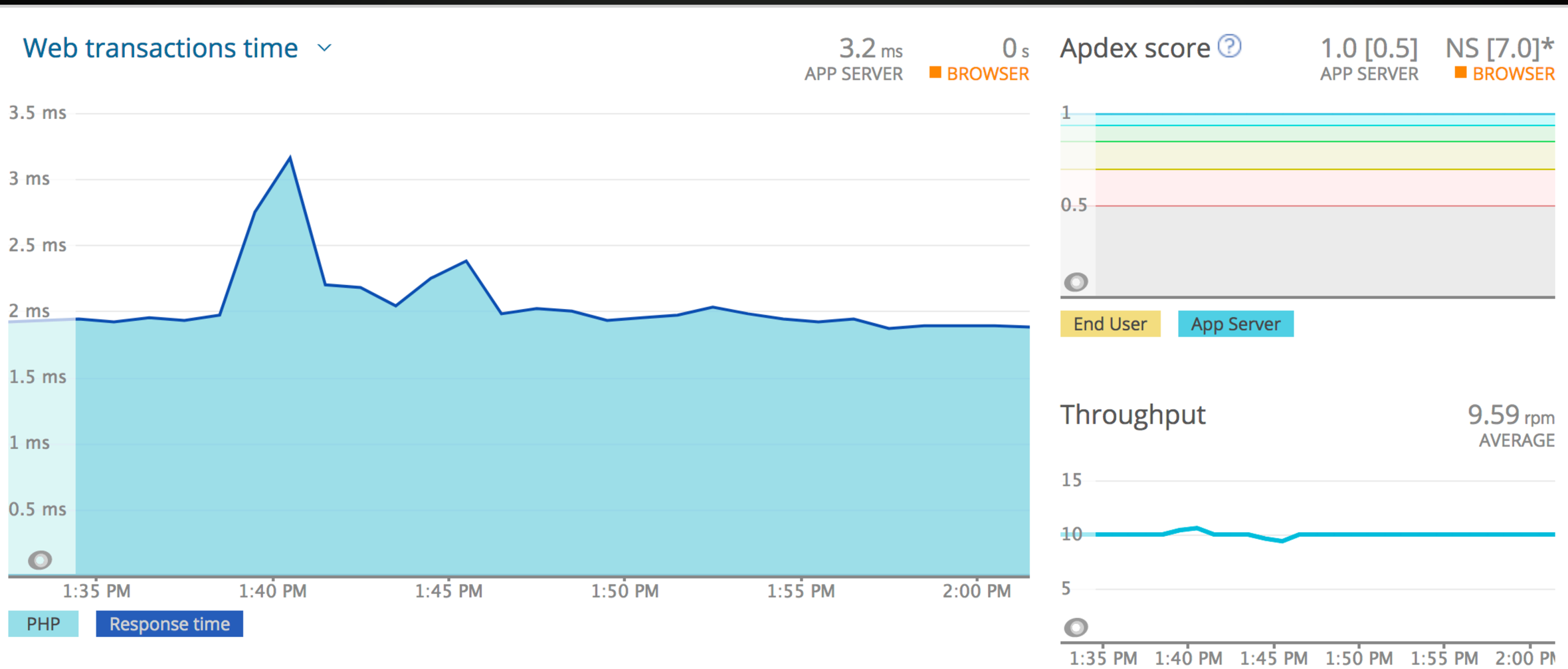
Memory leaks

PHP 7.4 Preloading?

```
; PHP.ini
opcache.preload=“/var/task/app/config/preload.php”
```

< 10ms

< 5ms


Web transactions time
3.2 ms
APP SERVER
0 s
BROWSER
3.5 ms
3 ms
2.5 ms
2 ms
1.5 ms
1 ms
0.5 ms
1:35 PM
1:40 PM
1:45 PM
1:50 PM
1:55 PM
2:00 PM
PHP
Response time
Apdex score
1.0 [0.5]
APP SERVER
NS [7.0]*
BROWSER
1
0.5
End User
App Server
Throughput
9.59 rpm
AVERAGE
15
10
5
1:35 PM
1:40 PM
1:45 PM
1:50 PM
1:55 PM
2:00 PM

eneba