Slim

a micro framework for PHP

Rob Allen, March 2020


The C in MVC
Rob Allen ~ @akrabat

Slim Framework

- Created by Josh Lockhart (phptherightway.com)
- PSR-7 `Request` and `Response` objects
- PSR-15 Middleware and Request Handlers
- PSR-11 DI container support

PHP-FIG

Hello world

```php
use ...

$app = AppFactory::create();

$app->get(
  '/ping',
  function (Request $request, Response $response) {
    $response->getBody()->write(json_encode(['ack' => time()]));
    return $response->withHeader('Content-Type', 'application/json');
});

$app->run();
```

Hello world

```
use ...

$app = AppFactory::create();                                    // Init

$app->get(
  '/ping',
  function (Request $request, Response $response) {
    $response->getBody()->write(json_encode(['ack' => time()]));
    return $response->withHeader('Content-Type', 'application/json');
});

$app->run();                                                    // Run
```

Hello world

```
use ...

$app = AppFactory::create();

$app->get(                                                  // Method
  '/ping',
  function (Request $request, Response $response) {
    $response->getBody()->write(json_encode(['ack' => time()]));
    return $response->withHeader('Content-Type', 'application/json');
});

$app->run();
```

Hello world

```
use ...

$app = AppFactory::create();

$app->get(
  '/ping',                                                  // Pattern
  function (Request $request, Response $response) {
    $response->getBody()->write(json_encode(['ack' => time()]));
    return $response->withHeader('Content-Type', 'application/json');
});

$app->run();
```

Hello world

```
use ...

$app = AppFactory::create();

$app->get(
  '/ping',
  function (Request $request, Response $response) {  // Handler
    $response->getBody()->write(json_encode(['ack' => time()]));
    return $response->withHeader('Content-Type', 'application/json');
});

$app->run();
```

Hello world

```
$ curl -i http://localhost:8888/ping
HTTP/1.1 200 OK
Host: localhost:8888
Connection: close
Content-Type: application/json

{
  "ack":1570046120
}
```


PSR-7 is the foundation

It's all about HTTP

Request:

```
{METHOD} {URI} HTTP/1.1
Header: value1,value2
Another-Header: value

Message body
```

It's all about HTTP

Response:

```
HTTP/1.1 {STATUS_CODE} {REASON_PHRASE}
Header: value

Message body
```

PSR 7

OO interfaces to model HTTP

- `RequestInterface` (& `ServerRequestInterface`)
- `ResponseInterface`
- `UriInterface`
- `UploadedFileInterface`

Key feature 1: Immutability

`Request`, `Response`, `Uri` & `UploadFile` are *immutable*

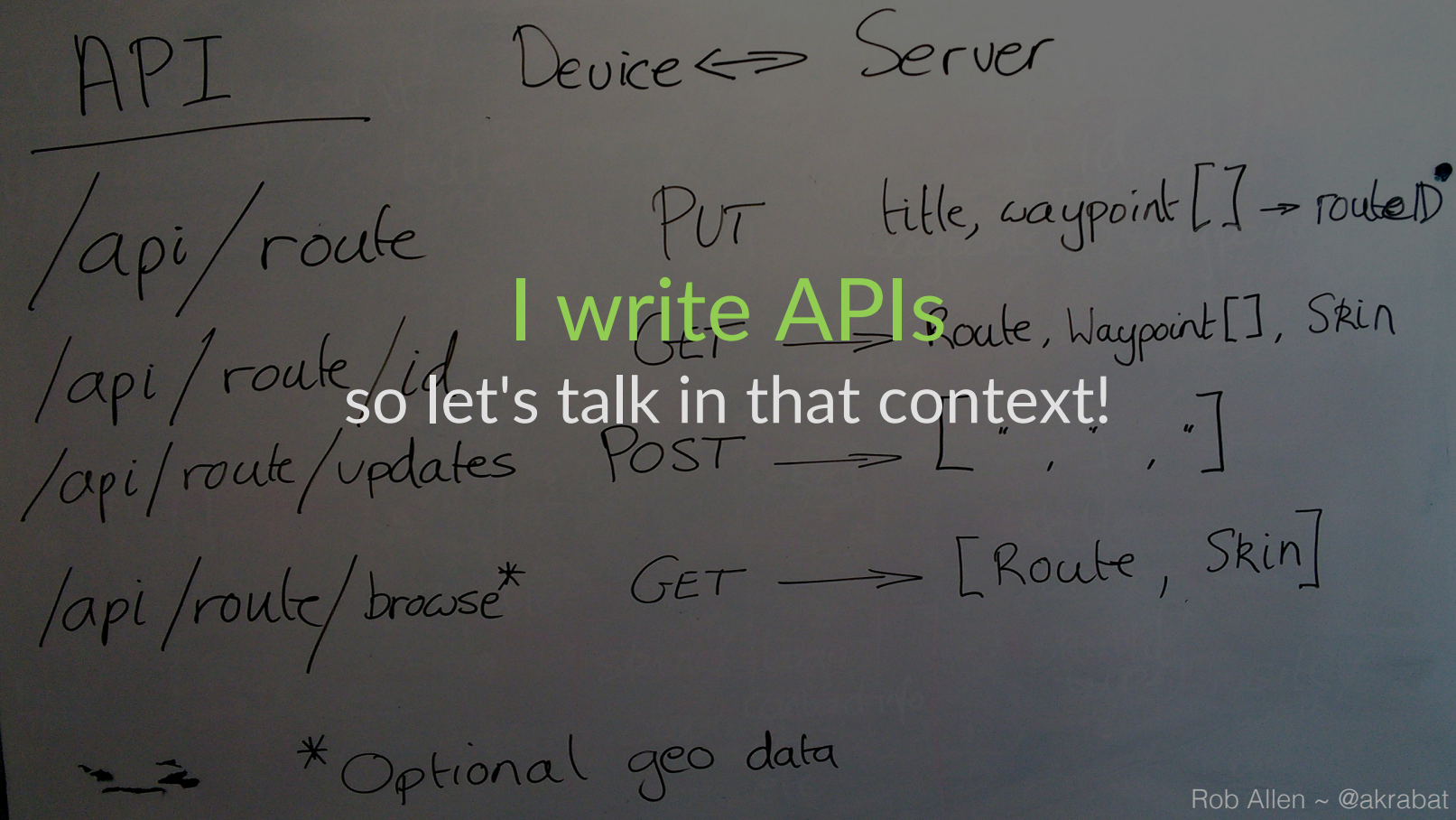
```
$uri = new Uri('https://api.joind.in/v2.1/events');
$uri2 = $uri->withQuery('?filter=upcoming');
$uri3 = $uri->withQuery('?filter=cfp');
```

Key feature 2: Streams

Message bodies are *streams*

```
$body = new Stream();
$body->write('<p>Hello');
$body->write('World</p>');

$response = (new Response())
    ->withStatus(200, 'OK')
    ->withHeader('Content-Type', 'application/header')
    ->withBody($body);
```

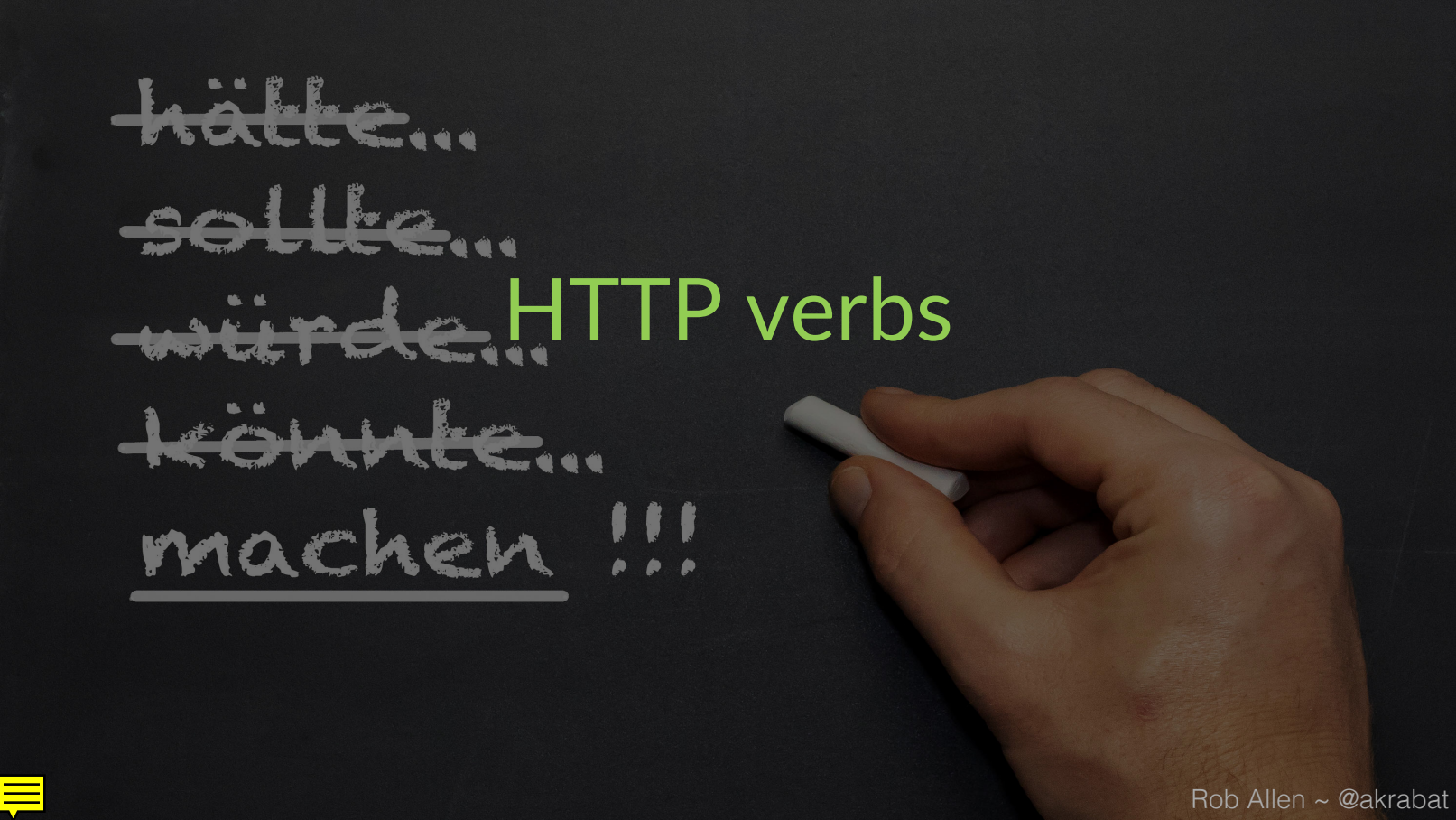


I write APIs

so let's talk in that context!

A good ~~API~~ framework

- Understands HTTP methods
- Can receive data in various formats
- Has useful error reporting


~~hätte...~~
~~sollte...~~
~~würde...~~
~~könnte...~~
machen !!!
HTTP verbs

HTTP methods

Method	Used for	Idempotent?
GET	Retrieve data	Yes
PUT	Change data	Yes
DELETE	Delete data	Yes
POST	Change data	No
PATCH	Update data	No

Routing HTTP methods in Slim

```php
// specific HTTP methods map to methods on $app
$app->get('/games', ListGamesHandler::class);
$app->post('/games', CreateGameHandler::class);

// routing multiple HTTP methods
$app->any('/games', GamesHandler::class);
$app->map(['GET', 'POST'], '/games', GamesHandler::class);
```

Dynamic routes

```
$app->get('/games/{id}',
  function($request, $response) {
    $id = $request->getAttribute('id');
    $games = $this->gameRepository->loadById($id);

    $body = json_encode(['game' => $game]);
    $response->getBody()->write($body);

    $response = $response->withHeader(
          'Content-Type', 'application/json');
    return $response;
});
```

It's just Regex

```
// numbers only
$app->get('/games/{id:\d+}', $callable);

// optional segments
$app->get('/games[/{id:\d+}]', $callable);
$app->get('/news[/{y:\d{4}}[/{m:\d{2}}]]', $callable);
```

Invalid HTTP request methods

If the *HTTP method* is not supported, return the `405` status code

```
$ http --json PUT http://localhost:8888/ping
HTTP/1.1 405 Method Not Allowed
Allow: GET
Connection: close
Content-Length: 53
Content-type: application/json
Host: localhost:8888

{
    "message": "Method not allowed. Must be one of: GET"
}
```


Incoming data

Content-Type handling

The *Content-Type* header specifies the format of the incoming data

```
$ curl http://localhost:8888/games \
    -H "Content-Type: application/json" \
    -d '{"player1": "Rob", "player2": "Jon"}'
```

Read with getBody()

```
$app->post('/games',
  function ($request, $response) {
    $data = $request->getBody();
    $response->getBody()->write(print_r($data, true));
    return $response;
  }
);
```

Output:

```
'{"player1": "Rob", "player2": "Jon"}'
```

Read with getParsedBody()

Add Slim's body-parsing middleware to your app:

```
$app->addBodyParsingMiddleware();
```

Use in your handler:

```
$app->post('/games',
  function ($request, $response) {
    $data = $request->getParsedBody();
    return $response->write(print_r($data, true));
  }
);
```

Read with getParsedBody()

```
$ curl -H "Content-Type: application/json" \
  -H "Content-Type: application/json" \
  -d '{"player1": "Rob", "player2": "Jon"}'
```

Output:

```
Array
(
    [player1] => Rob,
    [player2] => Jon
)
```

This also works with XML

```
$ curl "http://localhost:8888/games" \
  -H "Content-Type: application/xml" \
  -d "<game><player1>Rob</player1><player2>Jon</player2></game>"
```

Output:

```
Array
(
    [player1] => Rob,
    [player2] => Jon
)
```

And form data

```
curl "http://localhost:8888/games" \
  -H "Content-Type: application/x-www-form-urlencoded" \
  -d "player1=Rob' -d 'player2=Jon"
```

Output:

```
Array
(
    [player1] => Rob,
    [player2] => Jon
)
```


addBodyParsingMiddleware() ?

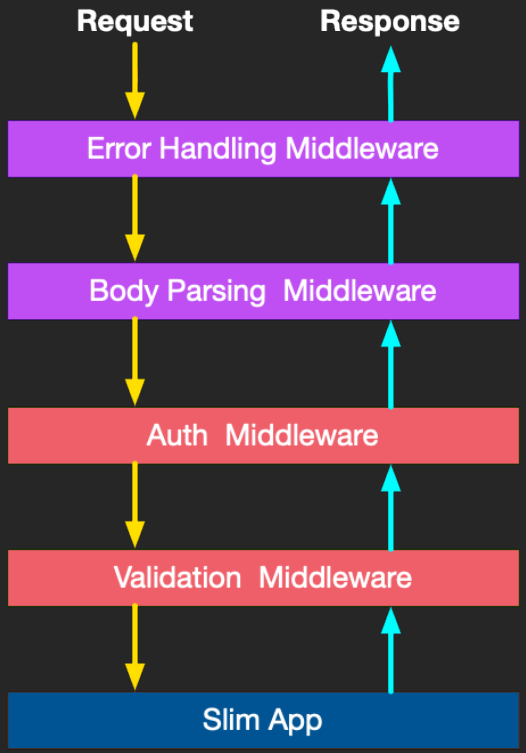
Middleware

Middleware is code that exists between the request and response, and which can take the incoming request, perform actions based on it, and either complete the response or pass delegation on to the next middleware in the queue.

Matthew Weier O'Phinney

Middleware

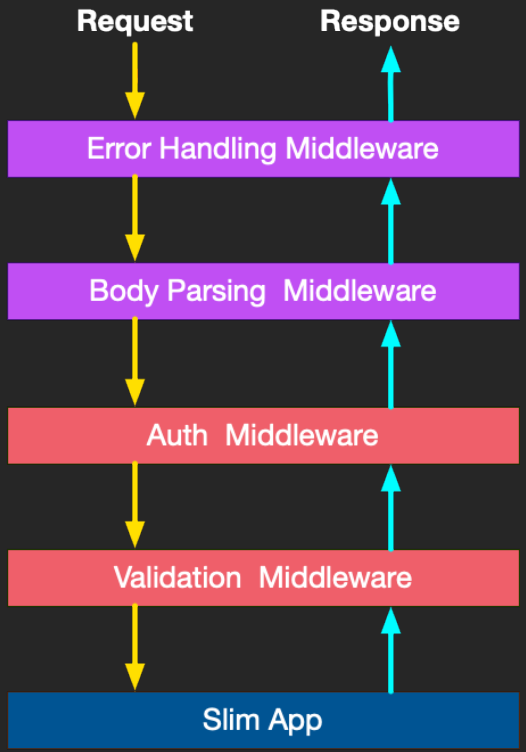
Take a request, return a response



Middleware

LIFO stack:

```
$app->add(ValidationMiddleware::class);
$app->add(AuthMiddleware::class);
$app->add(AuthMiddleware::class);
$app->addBodyParsingMiddleware();
$app->addErrorMiddleware(true, true, true);
```



PSR-15 MiddlewareInterface

```php
namespace Psr\Http\Server;

use Psr\Http\Message\ResponseInterface;
use Psr\Http\Message\ServerRequestInterface;

interface MiddlewareInterface
{
    public function process(
        ServerRequestInterface $request,
        RequestHandlerInterface $handler
    ) : ResponseInterface;
}
```

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        ServerRequestInterface $request,
        RequestHandlerInterface $handler
    ) : ResponseInterface;
}
```

TimerMiddleware

```php
class TimerMiddleware implements MiddlewareInterface
{
    public function process($request, $handler)
    {
        $start = microtime(true);

        $response = $handler->handle($request);

        $taken = microtime(true) - $start;

        return $response->withHeader('Time-Taken', $taken);
    }
}
```

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        return $response->withHeader('Time-Taken', $taken);
    }
}
```

Route Handlers

The other half of PSR-15!

Route Handlers

Any callable!

```
$app->add('/', function ($request, $response) { ... });
$app->add('/', ['RootController', 'aStaticFunction']);
$app->add('/', [new RootController(), 'aFunction']);
$app->add('/', RootController::class.':pingAction');
$app->add('/', RootHander::class);
```

Use this one

```
$app->add('/', RootHandler::class);
```

PSR-15 RouteHandlerInterface

```php
namespace Psr\Http\Server;

use Psr\Http\Message\ResponseInterface;
use Psr\Http\Message\ServerRequestInterface;

interface RequestHandlerInterface
{
    public function handle(
        ServerRequestInterface $request
    ): ResponseInterface;
}
```

PSR-15 RouteHandlerInterface

```
namespace Psr\Http\Server;

use Psr\Http\Message\ResponseInterface;
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{
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}
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interface RequestHandlerInterface
{
    public function handle(
        ServerRequestInterface $request
    ): ResponseInterface;
}
```

RootHandler

```php
use Psr\Http\Message\ResponseInterface;
use Psr\Http\Message\ServerRequestInterface as Request;
use Psr\Http\Server\RequestHandlerInterface;
use Slim\Psr7\Response;

class RootHandler implements RequestHandlerInterface
{
  public function handle(Request $request): ResponseInterface
  {
    $response = new Response();
    $response->getBody()->write(json_encode(['msg' => 'hello world']);
    return $response;
  }
}
```

RootHandler

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RootHandler

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class RootHandler implements RequestHandlerInterface
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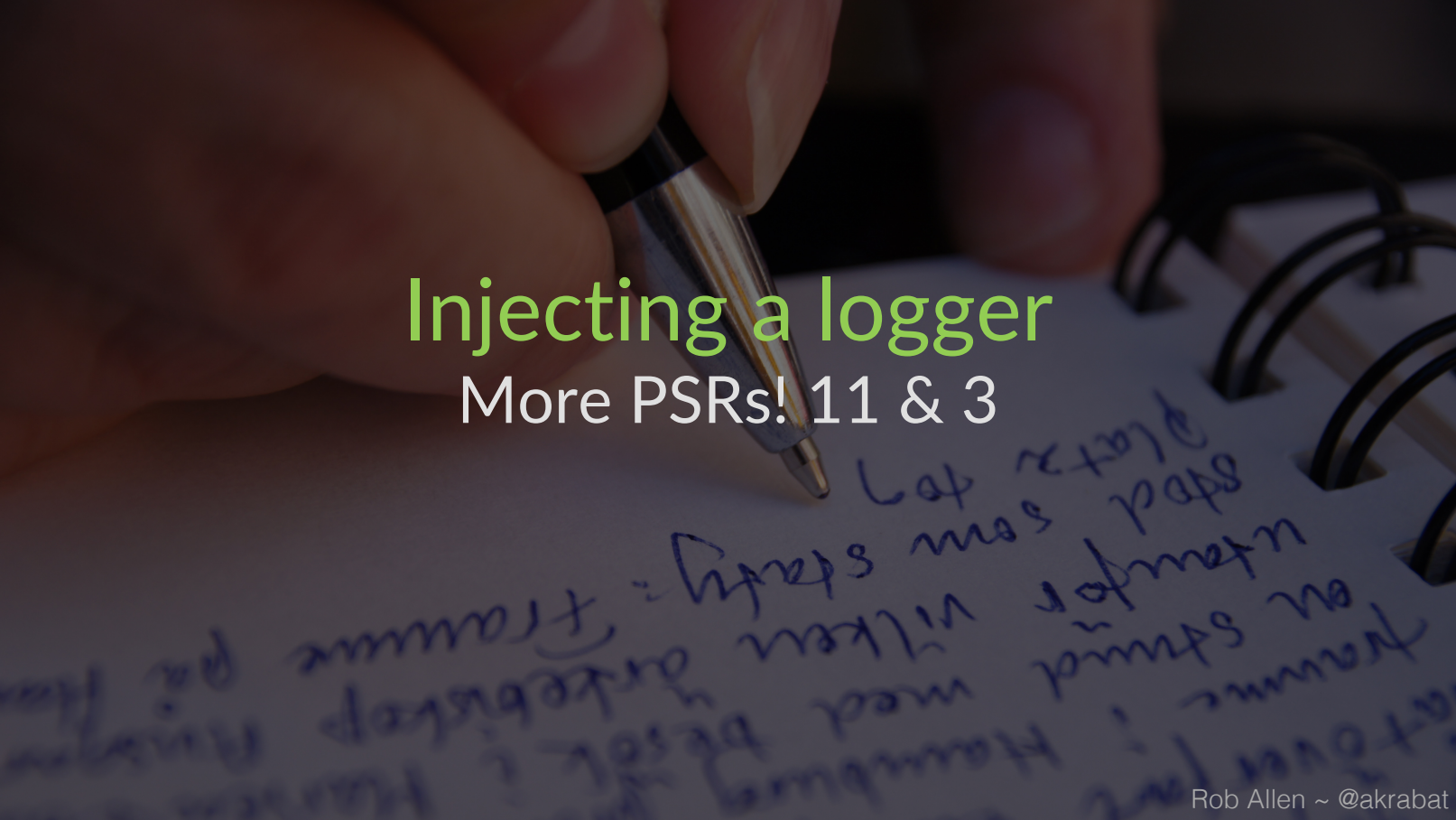
  public function handle(Request $request): ResponseInterface
  {
    $response = new Response();
    $response->getBody()->write(json_encode(['msg' => 'hello world']);
    return $response;
  }
}
```

When things go wrong

Error handling

- Internal logging
- Rendering for output



Injecting a logger

More PSRs! 11 & 3

Configure PHP-DI

```php
$containerBuilder = new ContainerBuilder();

$containerBuilder->addDefinitions([
  // Factory for a PSR-3 logger
  LoggerInterface::class => function (ContainerInterface $c) {
      $logger = new Logger($settings['name']);
      $logger->pushHandler(new ErrorLogHandler());
      return $logger;
    },
]);

AppFactory::setContainer($containerBuilder->build());
$app = AppFactory::create();
```

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      return $logger;
    },
]);

AppFactory::setContainer($containerBuilder->build());
$app = AppFactory::create();
```

PHP-DI autowiring

Just type-hint your constructor!

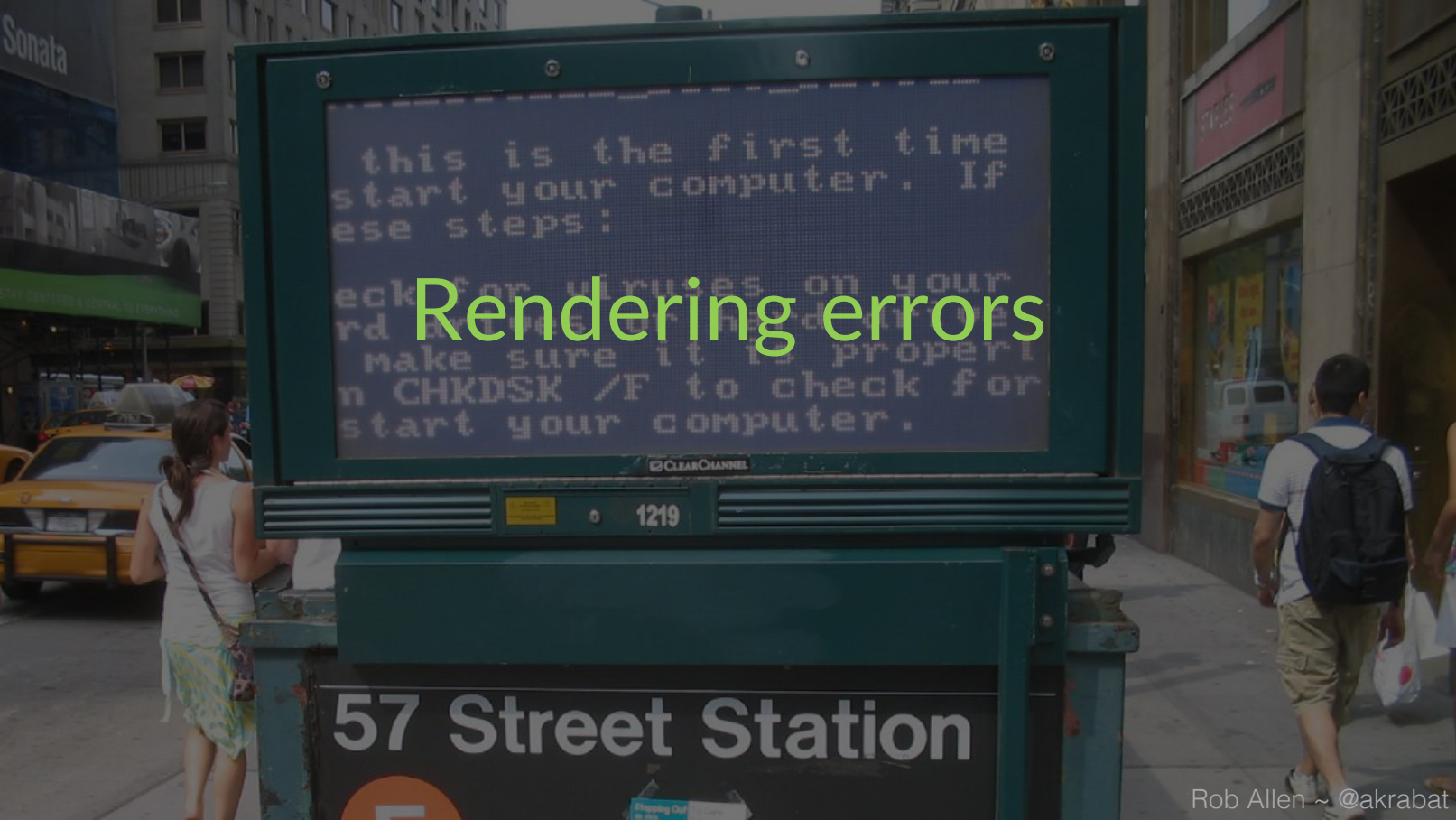
```
class GetGameHandler implements RequestHandlerInterface
{
    private $logger;

    public function __construct(LoggerInterface $logger)
    {
        $this->logger = $logger;
    }
    ...
```

Logging

```
class GetGameHandler implements RequestHandlerInterface
{
  public function handle(Request $request): ResponseInterface
  this->logger->info("Fetching game", ['id' => $id]);

  try {
      $games = $this->gameRepository->loadById($id);
  } catch (NotFoundException $e) {
      throw new HttpNotFoundException($request, 'Game not found', $e);
  }
  ...
```



Rendering errors

Slim's error handling

Add Slim's error handling middleware to render exceptions

```
$displayDetails = true;
$logErrors = true;
$logErrorDetails = true;

$app->addErrorMiddleware($displayDetails, $logErrors, $logErrorDetails);
```

Error rendering

```
$ http -j DELETE http://localhost:8888/game
HTTP/1.1 405 Method Not Allowed
Allow: GET
Content-type: application/json
{
    "exception": [
        {
            "code": 405,
            "file": ".../Slim/Middleware/RoutingMiddleware.php",
            "message": "Method not allowed: Must be one of: GET",
            "type": "Slim\\Exception\\HttpMethodNotAllowedException"
        }
    ],
    "message": "Method not allowed: Must be one of: GET"
}
```

Raise your own

```php
use App\Model\GameNotFoundException;
use Slim\Exception\HttpNotFoundException;
use Slim\Exception\HttpInternalServerErrorException;

public function handle(Request $request): ResponseInterface
{
    $id = $request->getAttribute('id');
    try {
        $game = $this->gameRepository->loadById($id);
    } catch (GameNotFoundException $e) {
        throw new HttpNotFoundException($request, 'Game not found', $e);
    } catch (\Exception $e) {
        throw new HttpInternalServerErrorException($request,
            'An unknown error occurred', $e);
    }
```

Not found error

```
use App\Model\GameNotFoundException;
use Slim\Exception\HttpNotFoundException;
use Slim\Exception\HttpInternalServerErrorException;

public function handle(Request $request): ResponseInterface
{
    $id = $request->getAttribute('id');
    try {
       $games = $this->gameRepository->loadById($id);
    } catch (GameNotFoundException $e) {
        throw new HttpNotFoundException($request, 'Game not found', $e);
    } catch (\Exception $e) {
        throw new HttpInternalServerErrorException($request,
            'An unknown error occurred', $e);
    }
```

Not found error

```
$ http -j http://localhost:8888/games/1234
HTTP/1.1 404 Not Found
Content-type: application/json

{
    "message": "Game not found"
}
```

(With `$displayDetails = false`)

Generic error

```
use App\Model\GameNotFoundException;
use Slim\Exception\HttpNotFoundException;
use Slim\Exception\HttpInternalServerErrorException;

public function handle(Request $request): ResponseInterface
{
    $id = $request->getAttribute('id');
    try {
       $games = $this->gameRepository->loadById($id);
    } catch (GameNotFoundException $e) {
        throw new HttpNotFoundException($request, 'Game not found', $e);
    } catch (\Exception $e) {
        throw new HttpInternalServerErrorException($request,
            'An unknown error occurred', $e);
    }
```

Generic error

```
$ http -j http://localhost:8888/games/abcd
HTTP/1.1 500 Internal Server Error
Content-type: application/json

{
    "exception": [
        {
            "code": 500,
            "file": ".../src/Handler/GetGameHandler.php",
            "line": 43,
            "message": "An unknown error occurred",
            "type": "Slim\\Exception\\HttpInternalServerErrorException"
        },
```

```
        {
            "code": 40,
            "file": ".../lib/Assert/Assertion.php",
            "line": 2752,
            "message": "Value \"abcd\" is not a valid integer.",
            "type": "Assert\\InvalidArgumentException"
        }
    ],
    "message": "An unknown error occurred"
}
```

(With `$displayDetails = true`)


To sum up

Resources

- http://slimframework.com
- https://akrabat.com/category/slim-framework/

- https://github.com/akrabat/slim4-rps-api
- https://github.com/akrabat/slim4-starter


Thank you!
Rob Allen - http://akrabat.com - @akrabat

Photo credits

- The Fat Controller: HiT Entertainment
- Foundation: https://www.flickr.com/photos/armchairbuilder/6196473431
- APIs: https://www.flickr.com/photos/ebothy/15723500675
- Verbs: https://www.flickr.com/photos/160866001@N07/45904136621/
- Incoming Data: https://www.flickr.com/photos/natspressoffice/13085089605
- Computer code: https://www.flickr.com/photos/n3wjack/3856456237/
- Road sign: https://www.flickr.com/photos/ell-r-brown/6804246004
- Car crash: EuroNCAP
- Writing: https://www.flickr.com/photos/froderik/9355085596/
- Error screen: https://www.flickr.com/photos/thirdrail/18126260
- Rocket launch: https://www.flickr.com/photos/gsfc/16495356966
- Stars: https://www.flickr.com/photos/gsfc/19125041621