


Note: the slides (including speaker notes) are available on  
GitHub:

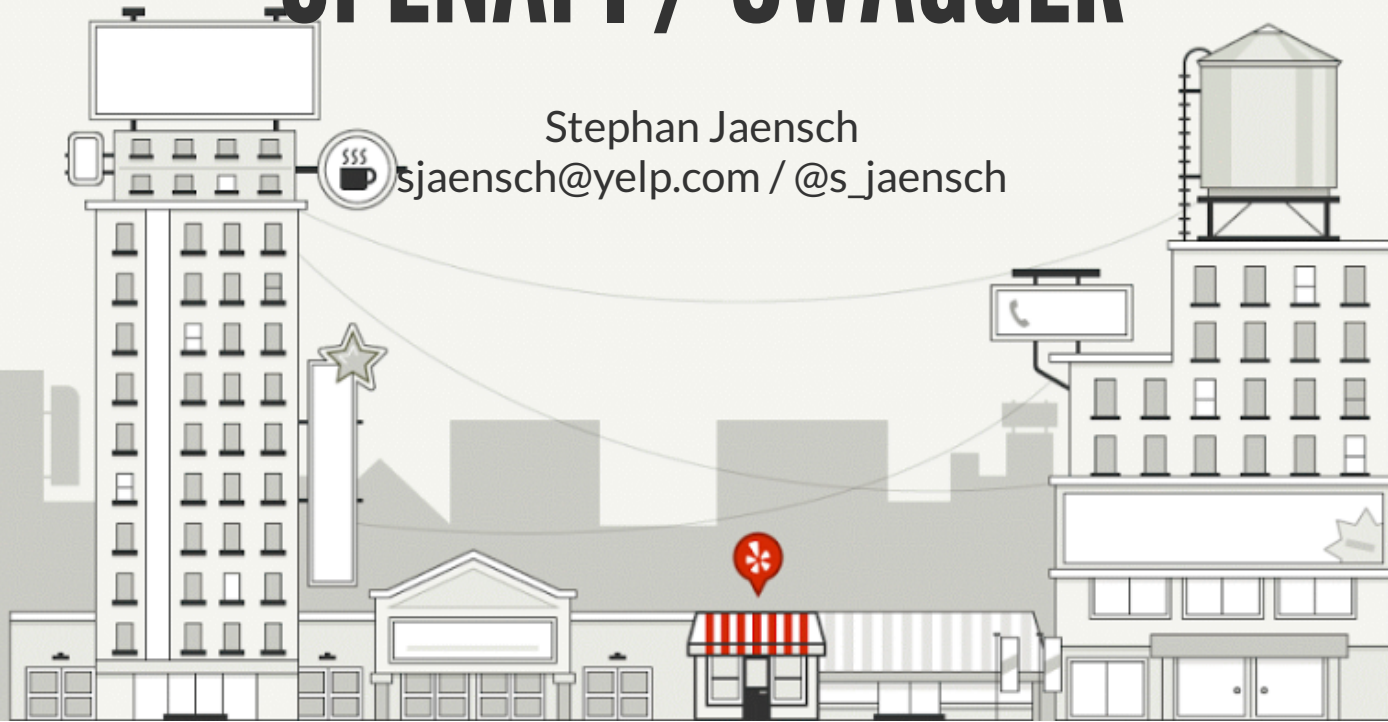
[github.com/sjaensch/swagger\\_talk](https://github.com/sjaensch/swagger_talk)



# BUILDING SERVICE INTERFACES WITH OPENAPI / SWAGGER

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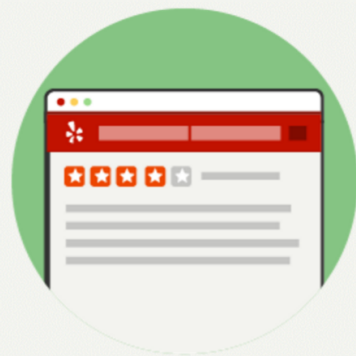




# YELP STATS (Q1 2016)



90M



102M



70%



32





# WHAT THIS TALK IS ABOUT

- What is OpenAPI / Swagger
- Short introduction of some of the available libraries
- The things the tutorials typically don't talk about





# WHY OPENAPI / SWAGGER

- RESTful API specification and tooling
- Solves several problems when faced with building services





# PYTHON SUPPORT

- bravado
- swaggerpy
- pyramid\_swagger
- connexion
- django-rest-swagger



```
---
swagger: "2.0"
info:
  version: "1.0.0"
  title: "User service"
host: "user-service.com"
basePath: "/api"
schemes:
  - "http"
consumes:
  - "application/json"
produces:
  - "application/json"
paths:
  /users:
    get:
      summary: List users by IDs
      operationId: list_users
      tags:
        - user
      parameters:
        - name: "user_ids"
          in: "query"
          description: "IDs for which to return user objects"
          required: true
          type: "array"
          items:
            type: "integer"
```





```
responses:
  "200":
    description: "A list of users"
    schema:
      type: "array"
      items:
        $ref: "#/definitions/User"
    default:
      description: unexpected error
      schema:
        $ref: "#/definitions/Error"
definitions:
  User:
    type: "object"
    required:
      - "id"
      - "username"
    properties:
      id:
        type: "integer"
      username:
        type: "string"
      business_id:
        type: "integer"
```



File Preferences Generate Server Generate Client Help Processed with no error

```
1 # this is an example of the Uber API
2 # as a demonstration of an API spec in YAML
3 swagger: '2.0'
4 info:
5   title: Uber API
6   description: Move your app forward with the Uber API
7   version: "1.0.0"
8 # the domain of the service
9 host: api.uber.com
10 # array of all schemes that your API supports
11 schemes:
12 - https
13 # will be prefixed to all paths
14 basePath: /v1
15 produces:
16 - application/json
17 paths:
18 /products:
19   get:
20     summary: Product Types
21     description: |
22       The Products endpoint returns information about the
23       *Uber* products
24       offered at a given location. The response includes the
25       display name
26       and other details about each product, and lists the
27       products in the
28       proper display order.
29     parameters:
30     - name: latitude
31       in: query
32       description: Latitude component of location.
33       required: true
34       type: number
35       format: double
36     - name: longitude
37       in: query
38       description: Longitude component of location.
39       required: true
40       type: number
41       format: double
42     tags:
```

## Uber API

Move your app forward with the Uber API

Version 1.0.0

Filter operations by a tag:

Products Estimates User

### Paths

/products

GET /products

Products

#### Summary

Product Types

#### Description

The Products endpoint returns information about the *Uber* products offered at a given location. The response includes the display name and other details about each product, and lists the products in the proper display order.

#### Parameters

Name	Located in	Description	Required	Schema
latitude	query	Latitude component of location.	Yes	↔ number (double)

editor.swagger.io



# Business Owner App backend API

## account : Management of the biz user's account

Show/Hide | List Operations | Expand Operations

## business

Show/Hide | List Operations | Expand Operations

**GET** /business/{business\_id}/ad\_stats/delivery/v1 ( getAdStatsDelivery ) Returns delivery information for the business' ad campaigns

**GET** /business/{business\_id}/ad\_stats/historical\_metrics/v1  
( getAdStatsHistoricalMetrics ) Returns historical metrics for the business' ad campaigns

**GET** /business/{business\_id}/ad\_stats/historical\_metrics/v2  
( getAdStatsHistoricalMetricsV2 ) Returns historical metrics for the business' ad campaigns

### Response Class (Status 200)

Returns historical metrics for the business' ad campaigns

Model | Example Value

#### AdStatsHistoricalMetricsV2Response {

**metrics** (Array[HistoricalMetric]),  
**available\_months** (Array[integer]): The month timestamps for which metrics are available,  
**time\_period** (string): Term that defines for which period data is returned = ['30\_DAYS', '12\_MONTHS', 'MONTH'],  
**month\_timestamp** (object, optional): Denotes the month and year for which the metrics are returned. Only returned if time\_period is MONTH.,  
**currency\_code** (string): ISO currency code for amount based metrics

}

#### HistoricalMetric {

**data** (Array[HistoricalMetricData]): List of metric data points (timestamp - value pairs),  
**display\_name** (string): Localized name of the metric.

swagger.io/swagger-ui/





# USING BRAVADO

```
from bravado.client import SwaggerClient
from bravado.fido_client import FidoClient

user_client = SwaggerClient.from_url(
    'http://service_host:port/swagger.yaml',
    http_client=FidoClient(),
)

user_future = client.user.list_users(user_ids=[1])
business_future = client.business.list_bizs(business_ids=[1])

user = user_future.result(timeout=DEFAULT_TIMEOUT)
business = business_future.result(timeout=DEFAULT_TIMEOUT)
```



446.713ms	: get /business/-7zbguxwlcwcvhj71bmsrq/mtb/e6nh5hged7dwlya-iytphg/v1	.	.
8.000ms	: get /token/normal/jofxiozgtihfqjlbfsv0bu650yzvw	.	.
63.000ms	: get /biz_user/598564/business_ids	.	.
37.791ms	: get /message_to_business/v1/4271192	.	.
24.000ms	: get /message_to_business/v1/4271192	.	.
63.000ms	: get /user/v1/condensed	.	.
30.718ms	: get /user_stat/v1/user_stats_by_ids	.	.
86.183ms	: get /message_to_business/v1/4271192/permissions	.	.
29.000ms	: get /private_message/v1/co	.	.
47.366ms	: get /flag/is_	.	.

	76.830ms	153.661ms	230.491ms
384.152ms	: get /account/info/v1	.	.
6.000ms	: get /token/normal/cstncbfmzthluzwu1bczunsgblxvw	.	.
67.901ms	: get /biz_user/932516/business_ids	.	.
37.873ms	: get /business/business_fields/v2	.	.
167.000ms	: get /business/features/v1	.	.
82.000ms	: get /private_message/biz_user/932516/inbox_count/v2	.	.
33.109ms	: get /business/v4_list_businesses_by_ids	.	.
30.000ms	: get /business/12956346/is_advertiser/v1	.	.
30.000ms	: get /business/12956346/is_advertiser/v1	.	.
26.183ms	: get /photo_uris/v2/biz	.	.





# "WAR STORIES"





# 1. DEALING WITH NETWORK ISSUES

```
@retry(tries=3, exceptions=[fido.exceptions.HTTPTimeoutError])
def retry_result(future):
    return future.result(timeout=2)

future = client.user.list_users(user_ids=[1])
# redo the request in case of network failure... right?
result = retry_result(future)
```





## 2. NULL VALUES FOR OPTIONAL FIELDS

```
{  
  "id": 1,  
  "username": "john",  
  "business_id": null  
}
```

```
client = SwaggerClient.from_url(  
    'http://service_host:port/swagger.yaml',  
    config={'validate_responses': False},  
)
```



### 3. CREATING THE CLIENT MAY KILL PERFORMANCE

```
import time
from bravado.client import SwaggerClient

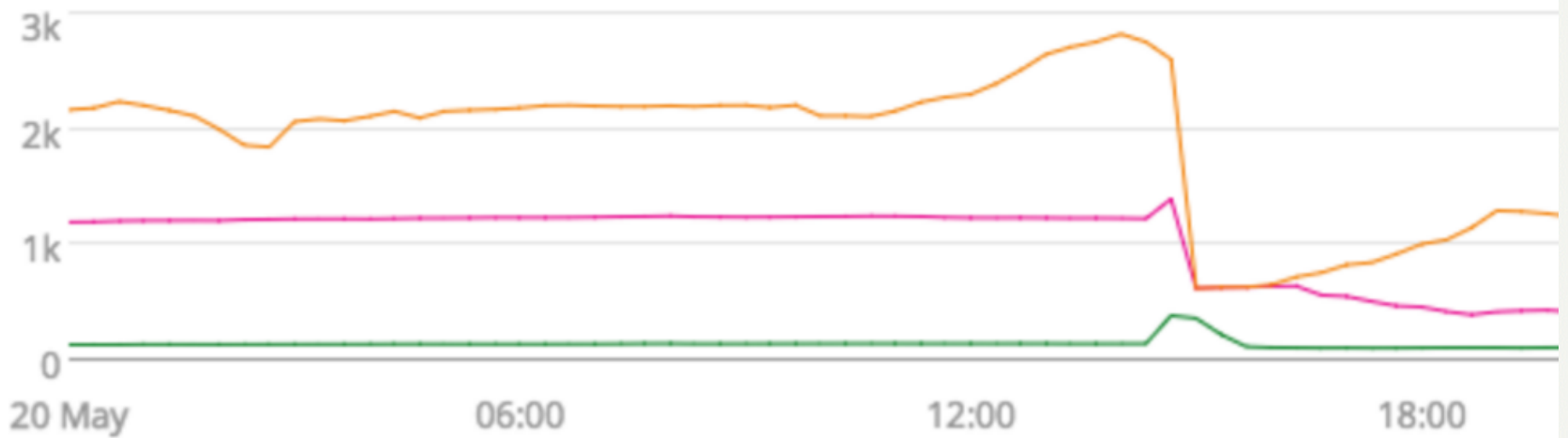
time_start = time.time()
client = SwaggerClient.from_url(
    'http://169.254.255.254:20666/swagger.json',
)
print(round(time.time() - time_start, 2))

>>> 1.60
```





## get\_yelp\_sorted 50/95/99



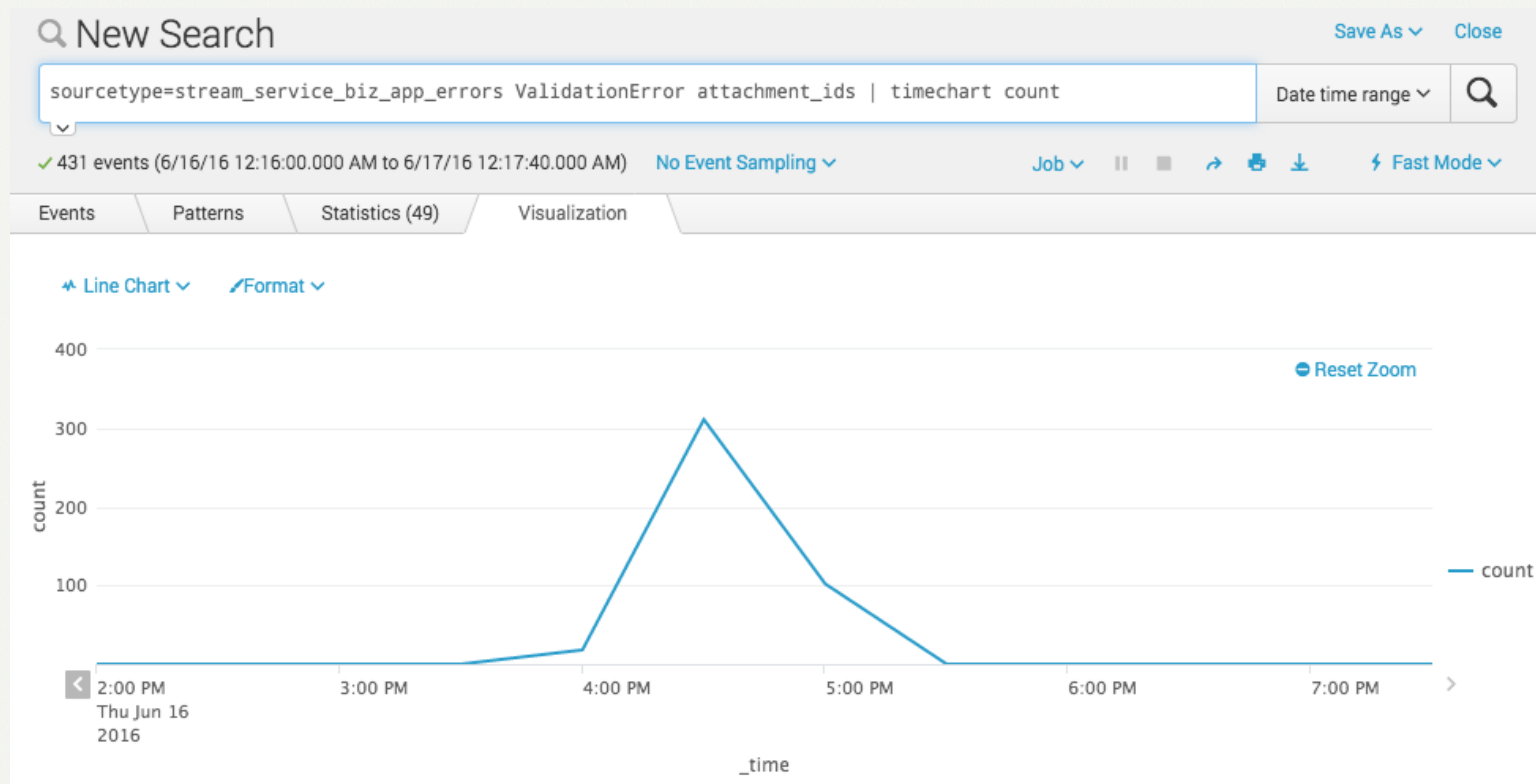
# 4. ISSUES WITH DEPLOYMENT AT SCALE





# 4.1 ADDING A NON-OPTIONAL FIELD TO THE RESPONSE

1. Add it as optional to the spec, ship implementation
2. Change the spec to mark it as required



## 4.2 REMOVING A REQUIRED FIELD FROM THE RESPONSE

1. Remove it from the spec
2. Ship implementation

(Don't do that)





## 4.2 REMOVING A REQUIRED FIELD FROM THE RESPONSE

to postmortem ▾

### Summary

A [change](#) was made to an internalapi endpoint which caused many bizapp errors until the bizapp service was restarted. Even though █████ attempted to push it in a forwards-compatible way, he failed to do so because bizapp didn't restart in between the 2 pushes.





## 4.3 ADDING A REFERENCE TO A NEW SPEC FILE

1. Add the file
2. Add the reference to it

Or let `pyramid_swagger` combine the spec for you





# 5. CHANGING THE TAG OF AN ENDPOINT

```
future = client.user.list_users(user_ids=[1])  
tag --^      ^-- operationId
```

## Summary

The tag parameter in some of yelp-main's internal API swagger files were changed, causing some services using those swagger files to throw errors, as changing the tags also changes the method name to call the internal API endpoint



# CONCLUSION

1. When in doubt: version it
2. Deal with the network
  - "Graceful Degradation when Services Fail" by Daniel Riti @PyCon 2016
3. Rolling forward and backward is not instantaneous
4. Be mindful of the differences between swaggerpy and bravado
5. Don't do services if you don't have to





## OTHER TALKS BY YELPERS

"Asynchronous network requests in a web application"  
by Lauris Jullien; Thursday, 10:30, A1

Watch the video for "Protect your users with circuit  
breakers"  
by Scott Triglia; Tuesday, 14:00, A2





# QUESTIONS?

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