Note: the slides (including speaker notes) are available on GitHub:
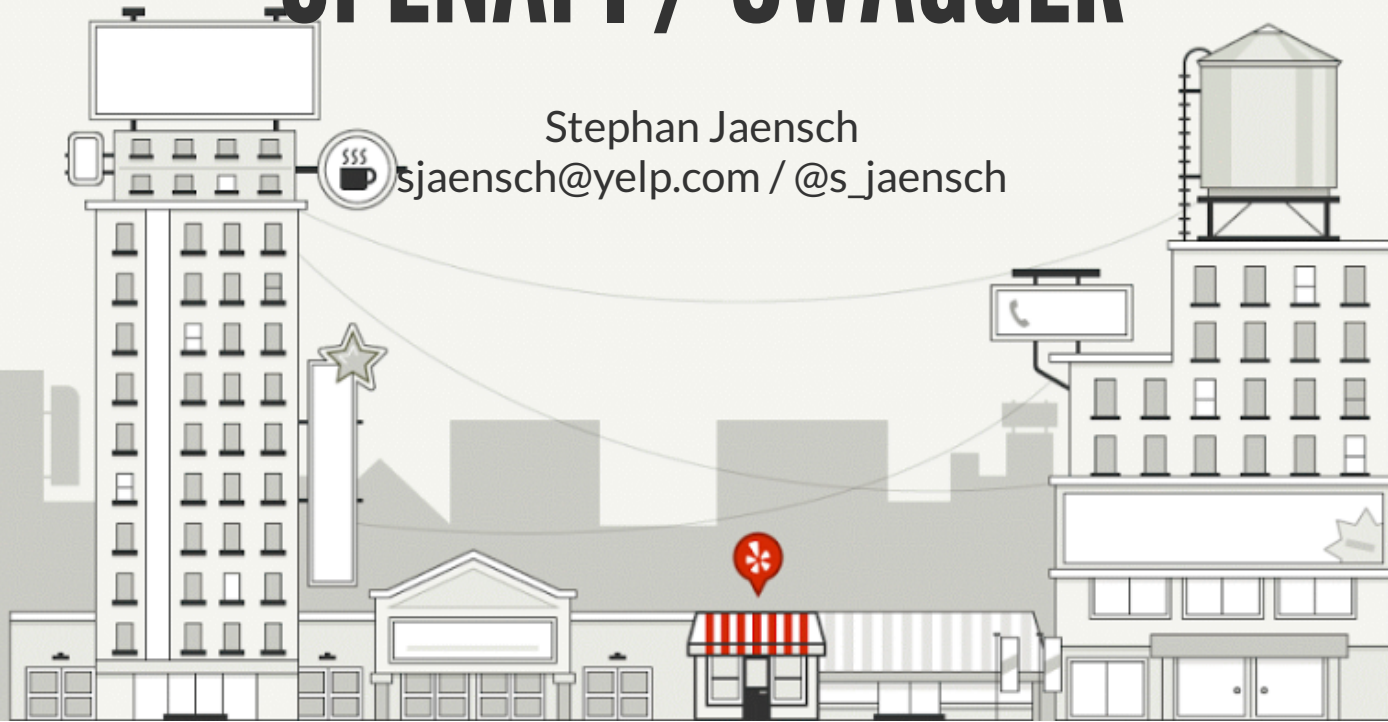
github.com/sjaensch/swagger_talk

BUILDING SERVICE INTERFACES WITH OPENAPI / SWAGGER

Stephan Jaensch
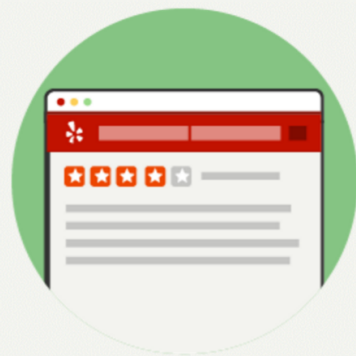
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YELP STATS (Q1 2016)

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

```yaml
---
  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"
```

```yaml
      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"
```

editor.swagger.io

Business Owner App backend API

business

| 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

```python
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/jofxiozgtihfqkjlbfsv0bu650yzvw

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/cstncbfmnzthluzwu1bczunsgblxvw			
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

```python
@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

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

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

3. CREATING THE CLIENT MAY KILL PERFORMANCE

```python
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
```
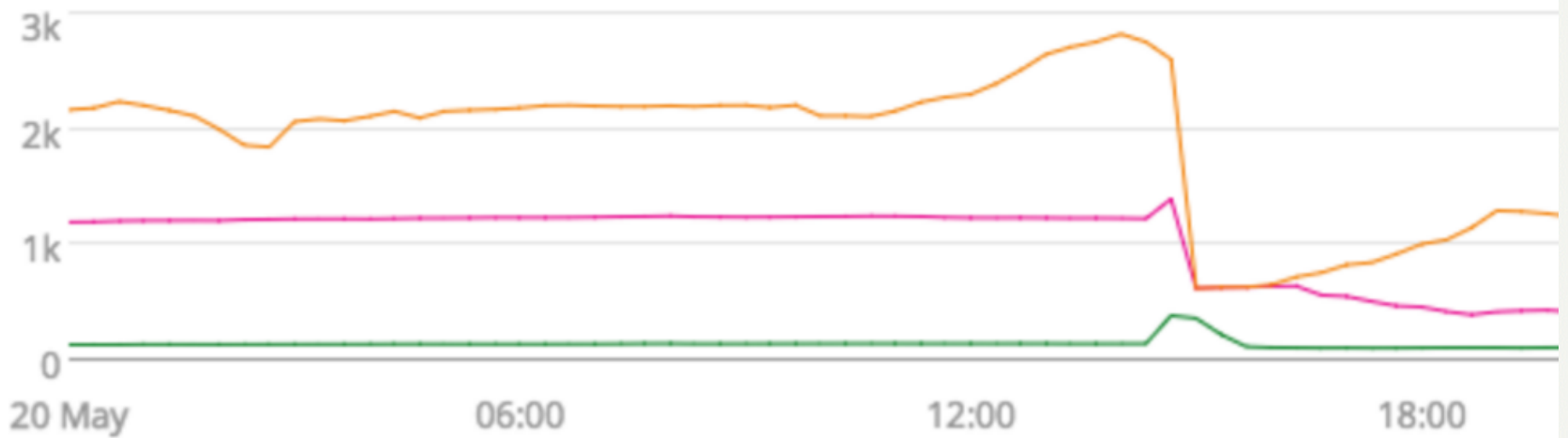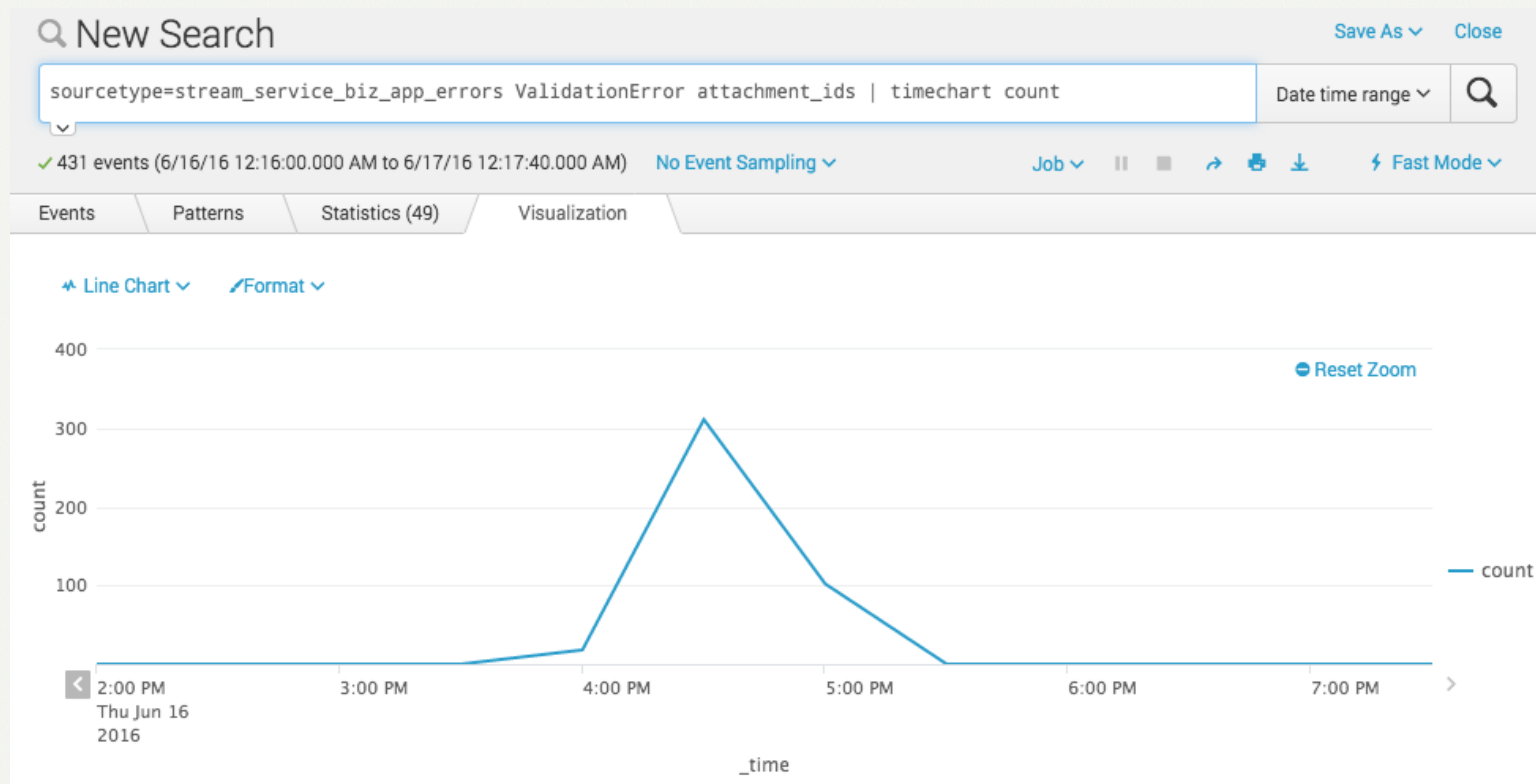
get_yelp_sorted 50/95/99

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 [blurred] 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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