API-First Architecture Transformation at Etsy

Stefanie Schirmer

@linse

Clothing & Accessories   Jewelry   Craft Supplies & Tools   Weddings   Entertainment   Home & Living   Kids & Baby   Vintage

Whoever you are, find whatever you're into

| What are you shopping for? | Search |

From the shop **BigStuffed**

Recently favorited

Handknitted lace shawl - rainbo...
KnittyStories   €69.00

Glow in the dark scale mail neck...
Silmarilclothing   Sold

Miniature Crystal Terrarium Nec...
JasmineDragonStudio   Sold

Raven Tshirt Grey Crow Bird Got...
celticfantasy   €22.65

Hedron Geometric Art Print
LuckySkye   €13.59

SIERPINSKI Double-Knitting Bab...
cooperativepress   €7.54

See more ›

Our picks for Stefanie

BLACK BUNNY COSTUME - Adul...
BlamoToys   €204.75

Plague Doctor mask in black lea...
TomBanwell   €194.78

SOCKY BALACLAVA - Black and ...
HeathenClothing   €58.89

wooden marionette tights
beadborg   €43.49

Black Pixie Hood. Cosplay Hat. L...
HandiCraftKate   €190.25

Metric Raven Hip, Holster, Waist...
JungleTribe   €316.18
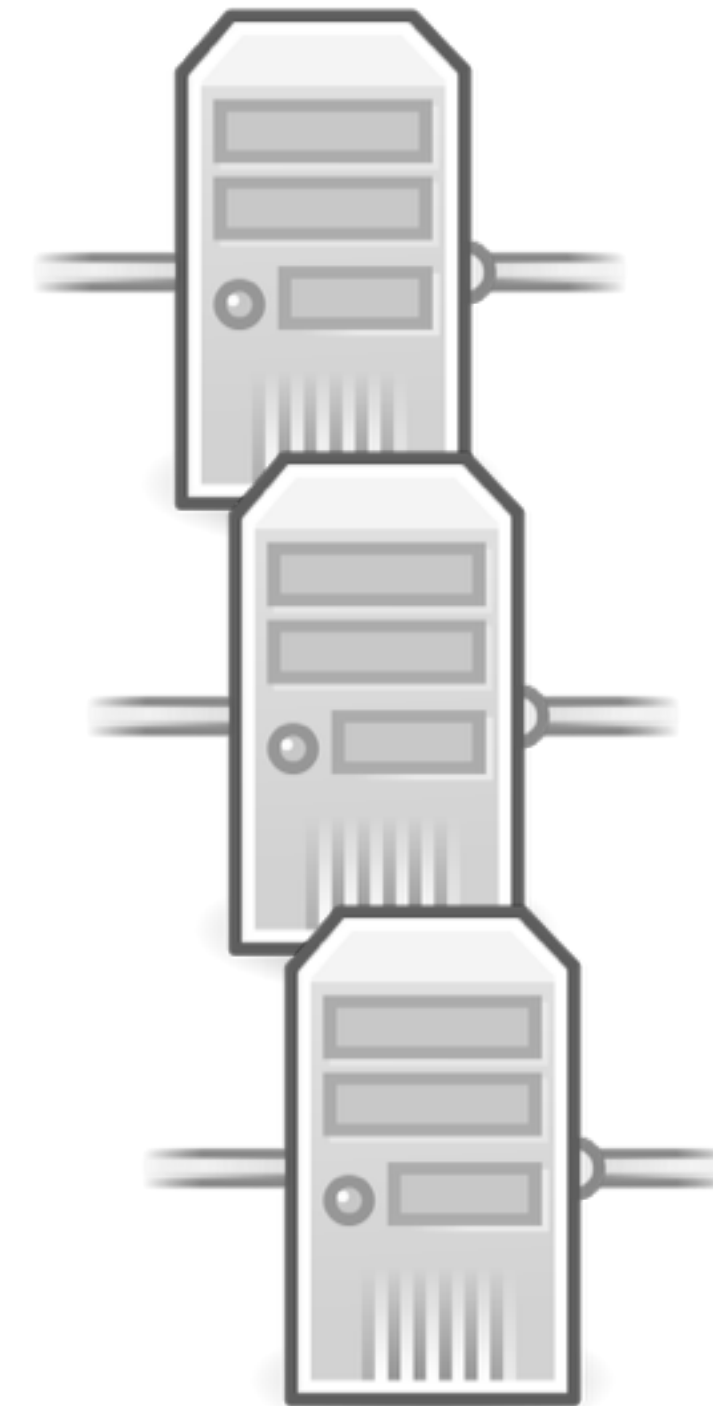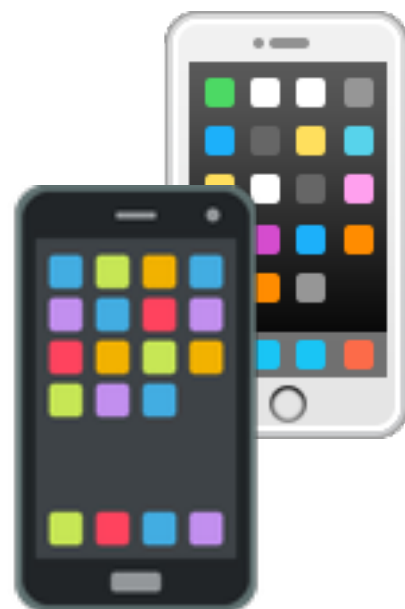
See more ›

First problem

Consumers

public web: PHP & JavaScript

administrative apps

infrastructure

mobile apps

... emerging trend in ca. 2013:

API first

development

Second problem

Performance

time to device

non-concurrent PHP

Shaping our
mental model

Ideas we kept

keep it REST (as in v2)

services

declaration of endpoints in code

input validation

New ideas

decouple endpoints from framework

auto-**generate** routes, clients: PHP, JS

meta-endpoints that consume our API

New ideas

decouple endpoints from framework

auto-generate routes, clients: PHP, JS

meta-endpoints that consume our API

cURL

✕

Paul Wright
@wrighty

👤⁺ Follow

curl_multi_info_read() is my new event loop.

RETWEETS	LIKES
3	**3**

7:54 AM - 17 May 2013

↩   ⇄ 3   ♥ 3   •••

Paul Wright
@wrighty

Infrastructure a
Englishman in Brooklyn. Finder of links.

🗓 Joined March 2007

NAME

curl_multi_info_read - read multi stack informationals

SYNOPSIS

```
#include <curl/curl.h>

CURLMsg *curl_multi_info_read( CURLM *multi_handle,
                               int *msgs_in_queue);
```

DESCRIPTION

Ask the multi handle if there are any messages/informationals from the
individual transfers. Messages may include informationals such as an
error code from the transfer or just the fact that a transfer is com-
pleted. More details on these should be written down as well.

```php
public static function desc() {
    return 'Endpoint for SellOnEtsy app shop home.';
}

public static function route() {
    return "GET /home";
}

...

public static function handle(Api_Client $client, Api_Input $input, Api_Response $response) {
    $proxies = [
        'shop_about' => $client->shop->aboutGet(),
        'faq' => $client->shop->fAQGet(),
        'seller_details' => $client->shop->sellerDetailsGet(),
    ];

    return Curl_Callback_Orchestrator::runAndExtract($proxies, __CLASS__);
}
}
```
~
~
~
"phplib/Api/BespokeEtsyApps/Shop/Home.php" 25L, 697C written   25,1   Bot

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}
}
~
~
~
```

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}
}
```
~
~
~

How we built it
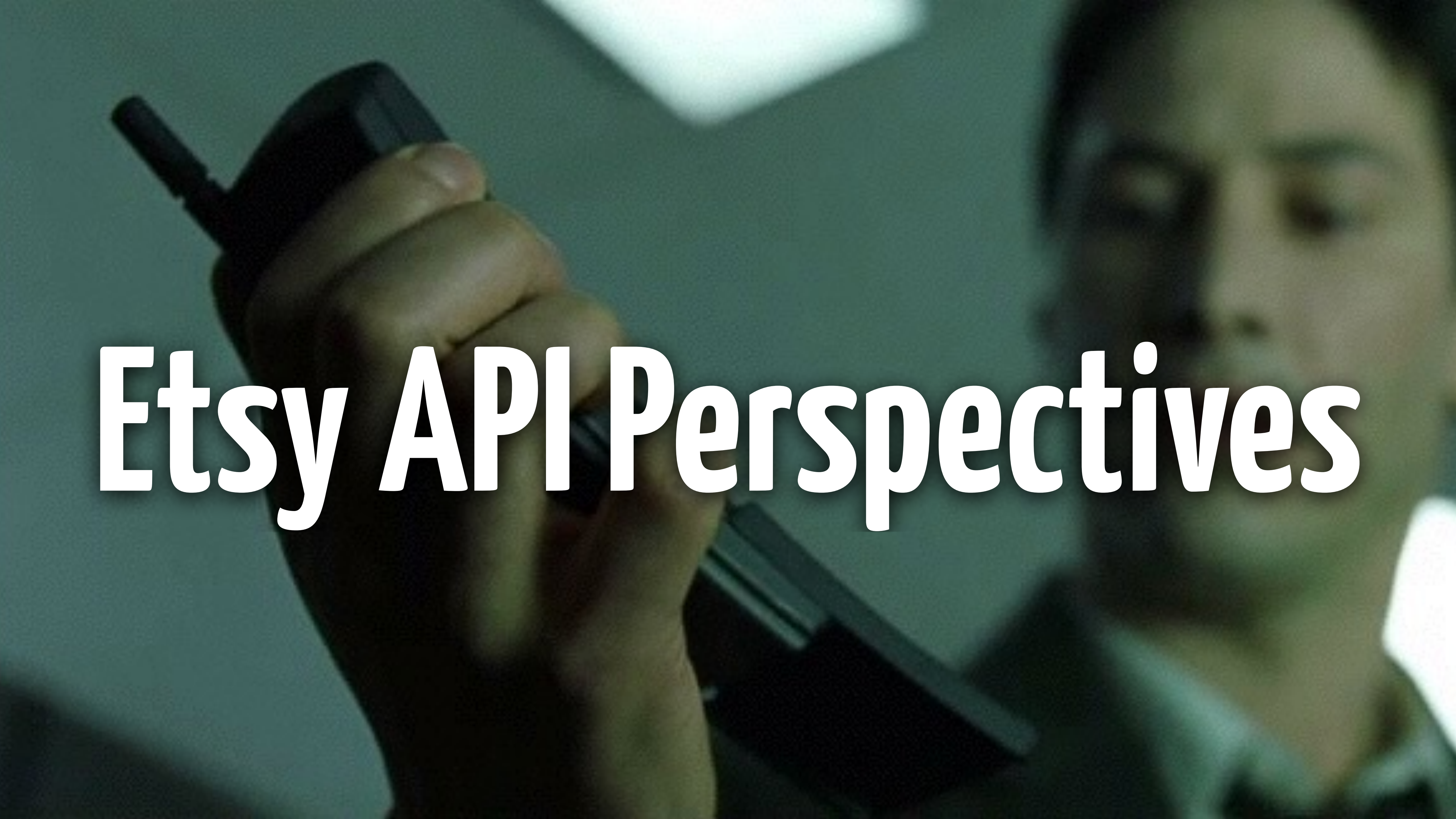
Etsy API Perspectives

https://www.etsy.com/api/v3/ajax**/public/**teams
/member/
/shop/
/admin/
/infrastructure/
/application/

Etsy API Services

Ajax
Atlas
Internal
EtsyApps
OpenAPI
DataFeeds
...

Example request

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See more ›

Clothing & Accessories   Jewelry   Craft Supplies & Tools   Weddings   Entertainment   Home & Living   Kids & Baby   Vintage

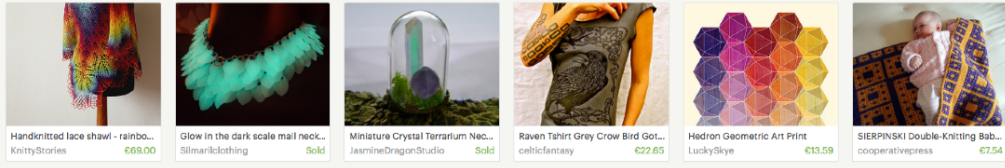# Whoever you are, find whatever you're into

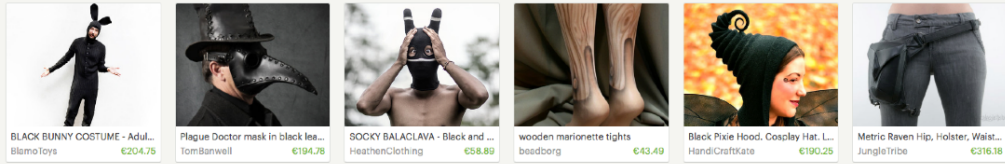| What are you shopping for? | Search |

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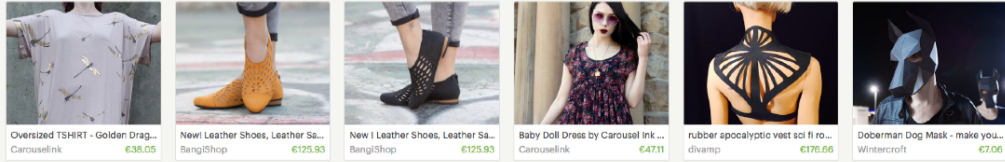
See more ›

Our picks for Stefanie

See more ›

New from your favorite shops

See more ›

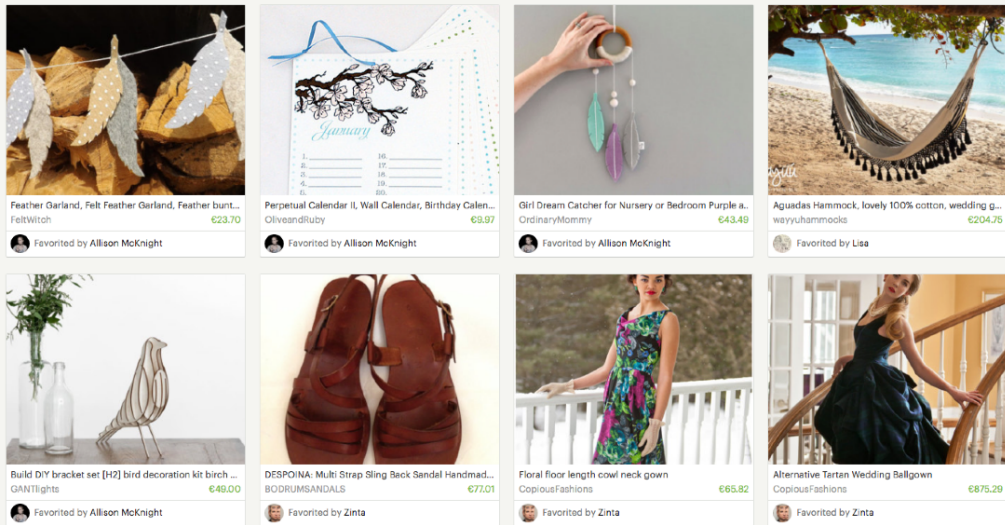## Updates from shops you like

| Carrouselink | 3 days | Wintercroft | 4 days | Wintercroft | 4 days | TheCoinLaundry | 5 days |

Come visit us this weekend! Our dressing ro...   VOTE NOW: http://etsyawards.com/uk/f inal...   We have a new jewellery store stocked with...   Flowers and plants emit electrical fields tha...

See more ›

Shops worth exploring

DaveeworkshopP   ★★★★★ (14 reviews)   ♥
📍 Idaho, United States

glaciermilk   ★★★★★ (38 reviews)   ♥
📍 Victoria, Canada

KURT.it   ★★★★★ (365 reviews)   ♥
📍 Barcelona, Spain

From people you follow

Feather Garland, Felt Feather Garland, Feather bunt...	Perpetual Calendar & Wall Calendar, Birthday Calen...	Girl Dream Catcher for nursery or Bedroom Purple a...	Aguadas Hammock, lovely 100% cotton, wedding g...
fabfable €22.75	OhwandBusy €0.00	OrdinaryMommy €43.80	wavsvtumwoods €204.76
Favorited by Allison McKnight	Favorited by Allison McKnight	Favorited by Allison McKnight	Favorited by Lisa

Build DIY bracket set [HD] bird decoration kit birch ...	DESPONdA: Multi Strap Sling Back Sandal Handmad...	Floral floor length cowl neck gown	Alternative Tartan Wedding Ballgown
GANTlights €46.00	BCORUMSANDALS €77.03	CopixusFashions €65.82	CopixusFashions €875.20
Favorited by Allison McKnight	Favorited by Zinta	Favorited by Zinta	Favorited by Zinta

See more activity ›

Fresh from the blog

Etsy

Home | Favorites | Your shop ▾ | My ▾ | Cart

Clothing & Accessories   Jewelry   Craft Supplies & Tools   Weddings   Entertainment   Home & Living   Kids & Baby   Vintage
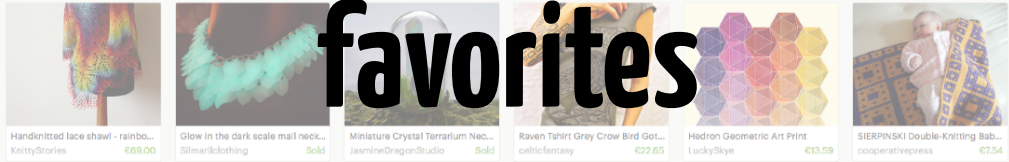
Whoever you are, find whatever you're into

What are you shopping for?   [Search]

Recently favorited

favorites

Our picks for Stefanie

picks for you

See more ›

New from your favorite shops
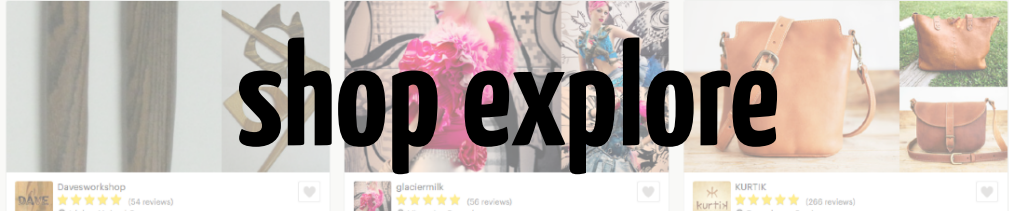
favorite shops

Updates from shops you like

shop updates

Shops worth exploring

shop explore

friends activity

See more activity ›

Fresh from the blog

from blog

favorites

picks for you

favorite shops

shop updates

shop explore

friends activity

from blog

favorites — listing card / listing card / listing card

favorite shops — shop card / shop card

...

friends activity — story card / story card

from blog — featured shop

Web

favorites
picks for you
favorite shops
shop explore
friends activity
from blog

API

favorites
- listing card
- listing card
- listing card

favorite shops
- shop card
- shop card

...

friends activity
- story card
- story card

from blog
- featured shop

Three tiers

bespoke homepage

favorites
- listing card
- listing card
- listing card

favorite shops
- shop card
- shop card
- ...

friends activity
- story card
- story card

from blog
- featured shop

bespoke

- favorites
  - listing card
  - listing card
  - listing card
- favorite shops
  - shop card
  - shop card
  - ...
- friends activity
  - story card
  - story card
- from blog
  - featured shop

bespoke | concurrent | component

listing card
listing card
listing card

favorites

favorite shops

shop card

bespoke homepage

...

friends activity

story card
story card

from blog

featured shop

route()

desc()

resultType()

handle($client, $input, $response)

required

declareInput($input)

includedServices()

cacheTtlSeconds()

optional

Validation of input

Tooling:
Route compiler &
Auto-client generation

https://www.etsy.com/listing/192043815/1880s-vintage-toolbox-full-of-tools

Operations: Architecture implications

PHP:
short lived
single threaded
shared nothing

pain point of shared nothing:

bootstrap

Problem:

PHP **time to request**

Experiment:
HHVM
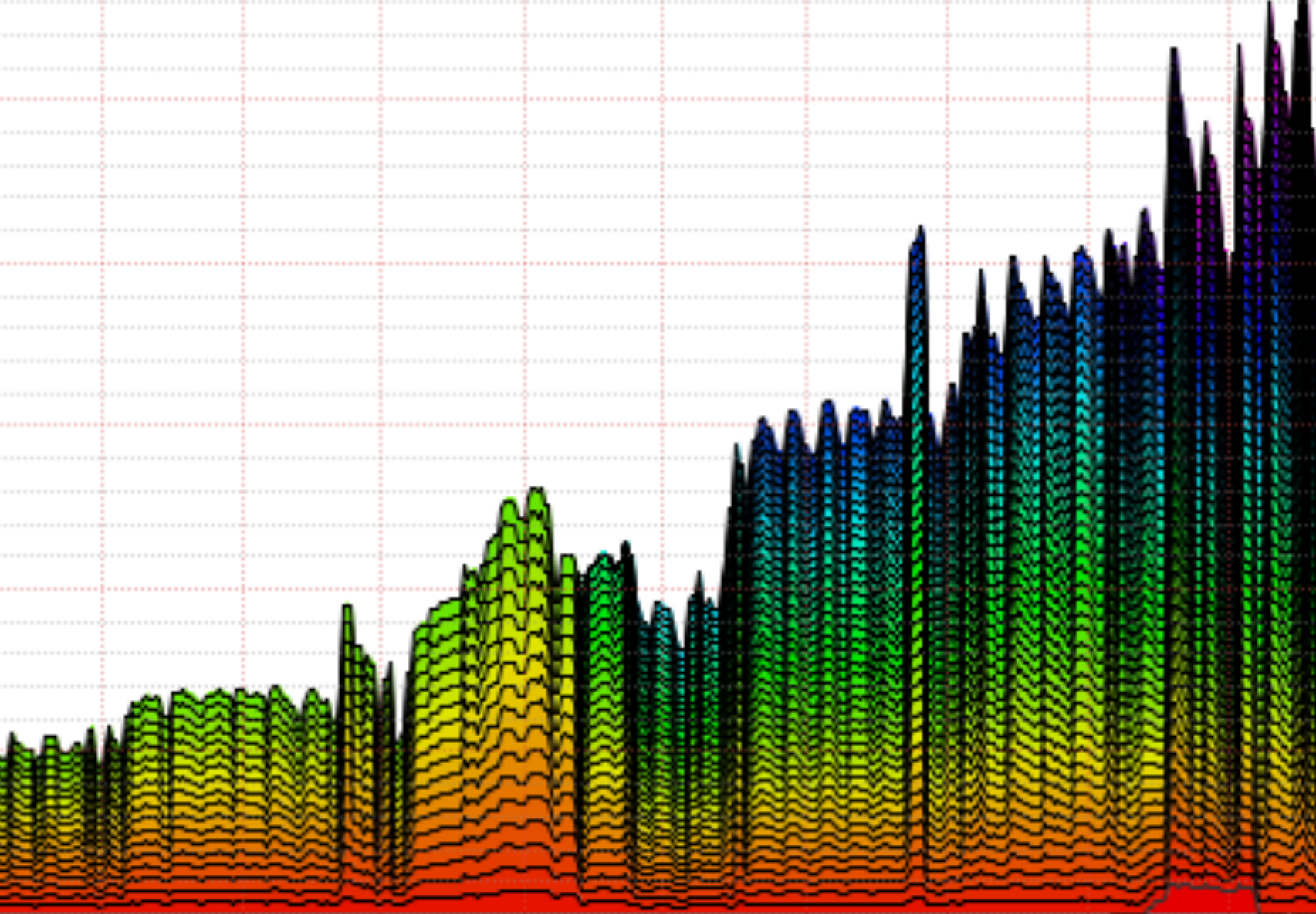
API aggregated load_one last week
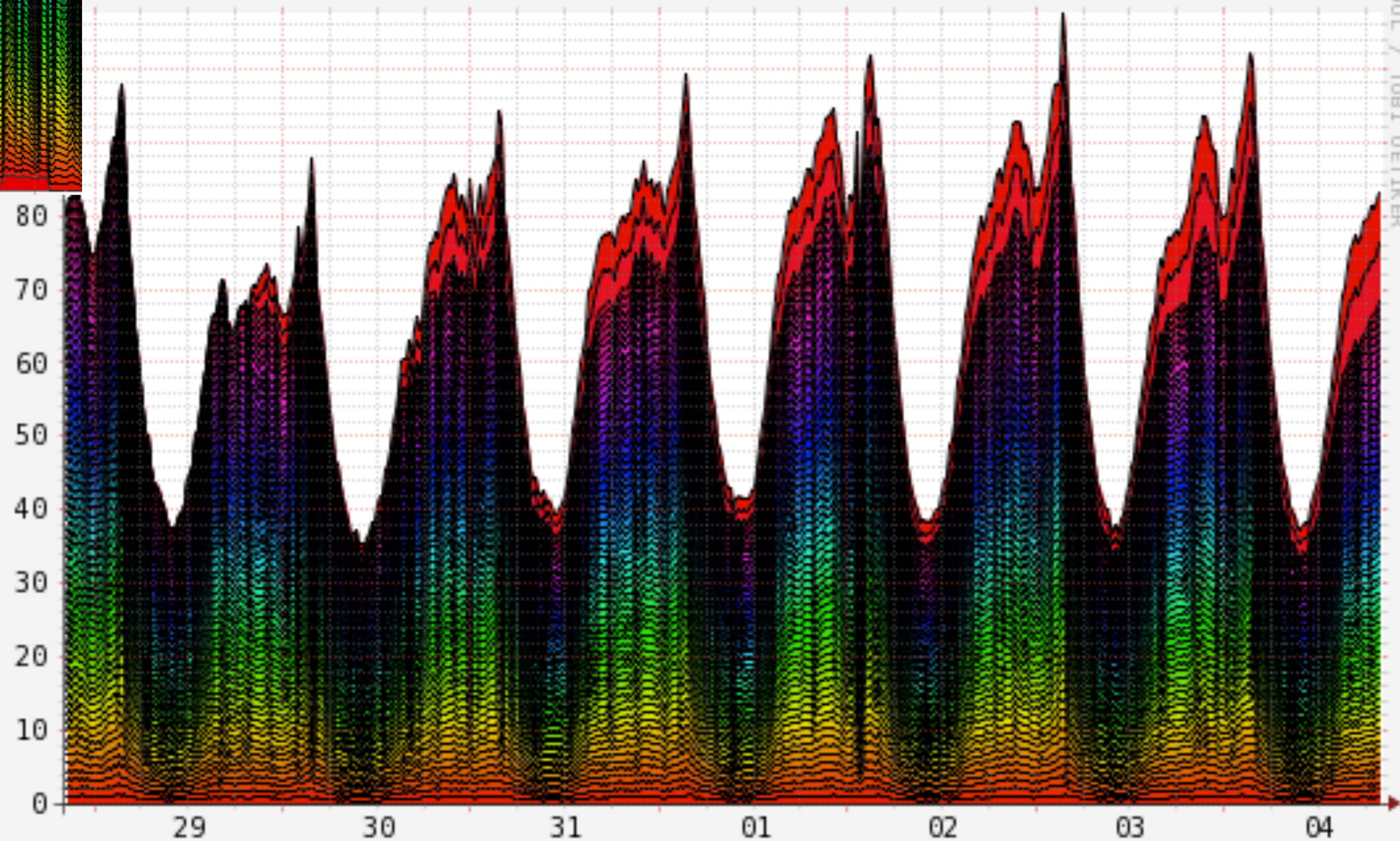
PHP 5 / Zend
Average Response Time
12 Hour

HHVM
Average Response Time
12 Hour

v3_apache_average_response_time

api-apache.ny4.etsy.com last custom   Now: 166.93   Min: 159.40   Avg: 176.77   Max: 191.67

v3_apache_average_response_time

api-hhvm.ny4.etsy.com last custom   Now: 84.15   Min: 78.76   Avg: 88.32   Max: 98.64
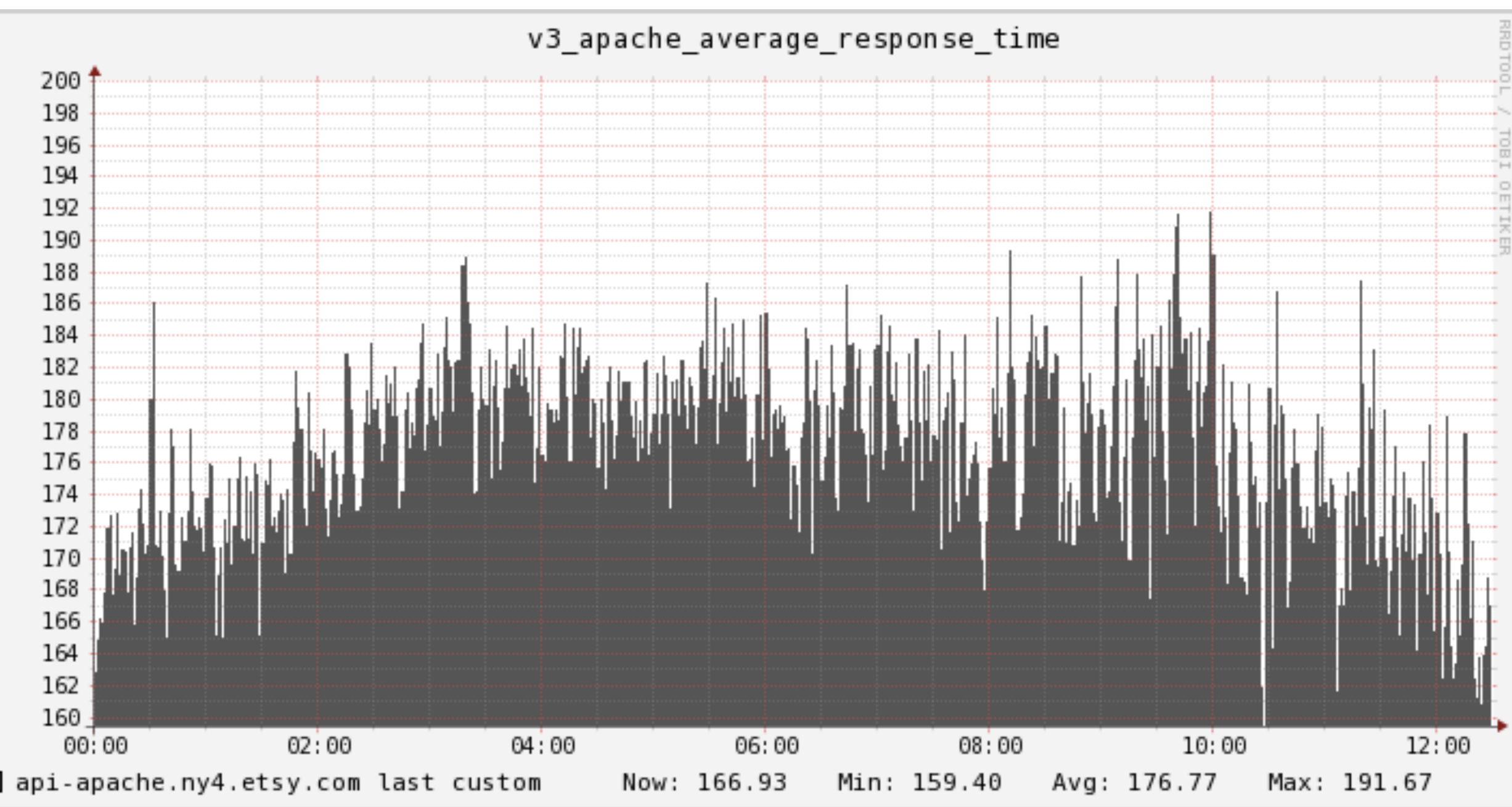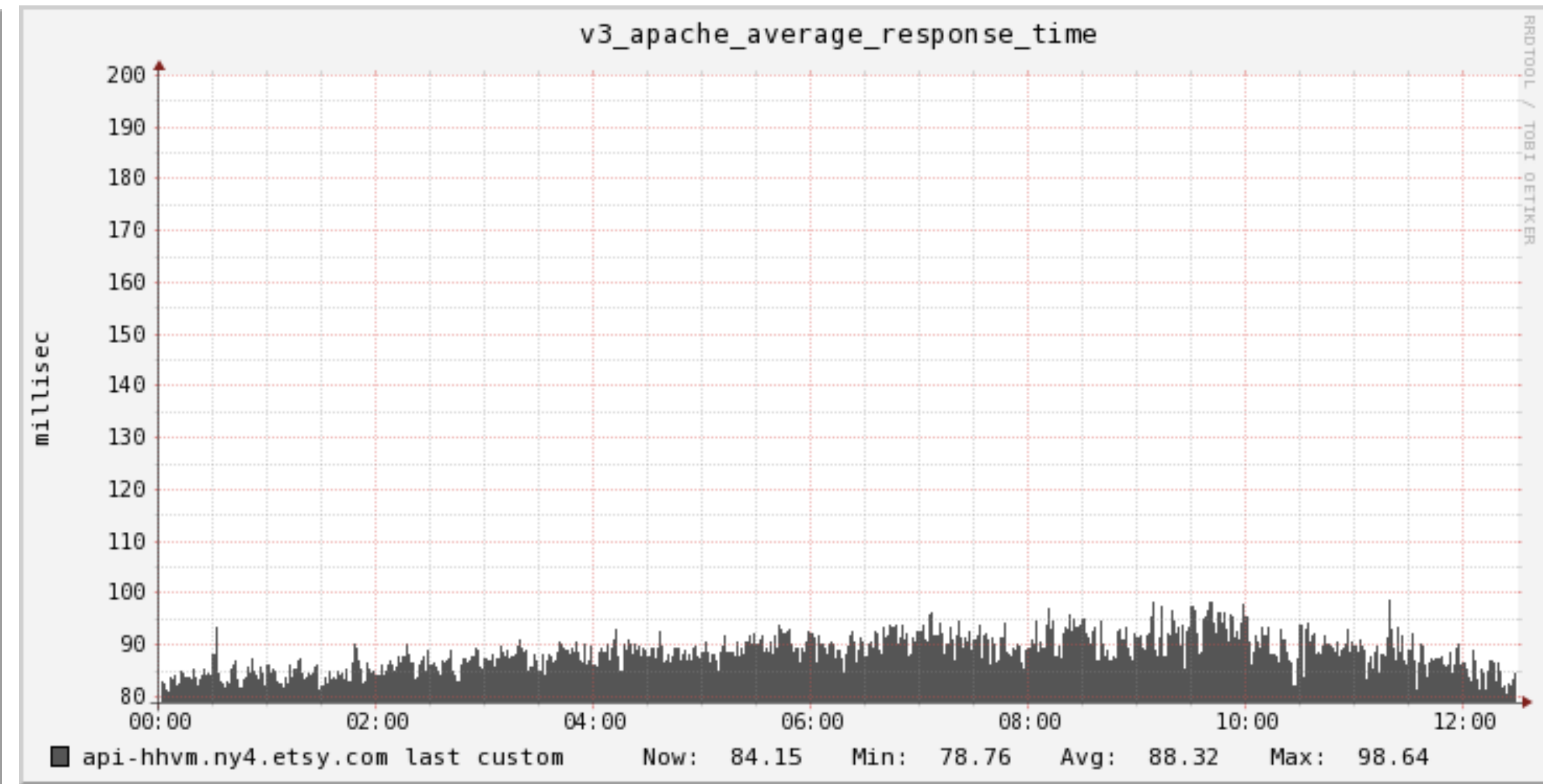
Problem:
Balancing load
on cluster

Where wouldn't this work?

Operations: Tooling

Tooling: CrossStitch

CrossStitch - Waterfall

Legend

- HTTP (17, 566.39ms)
- Memcached (216, 36.53ms)
- DB Query (38, 35.38ms)
- Thrift Query
- Gearman Job
- Redis
- Arizona

30.93ms HTTP req: http://▓▓▓▓▓▓▓.etsy.com:7087/v3/public/shops/11766811/about{
    "span_id": "cwBrWkhSJrb7Xbgg5R-IQGycbebD",
    "service": null,
    "binary_annotations": [
        {
            "curl.url": "http://▓▓▓▓▓▓▓.etsy.com:7087/v3/public/shops/11766811/about",
            "endpoint": "▓▓▓▓.etsy.com/10.96.81.23:80"
        },
        {

            "curl.method": "GET",
            "endpoint": "▓▓▓▓.etsy.com/10.96.81.23:80"

Download PNG | View Trace In Zipkin

227.18ms apache2handler HTTP req: /shop/9SeventyNineShoppe?ref=ks_wide
189.21ms neu.router.shop2_controller_home
71.32ms Api_BespokeAjax_Member_Shops_Home::handle()

30.93ms HTTP req: http://▓▓▓▓▓▓.etsy.com:7087/v3/public/shops/11766811/about

0	20ms	40ms	60ms	80ms	100ms	120ms	140ms	160ms	180ms	200ms	220ms

43.1ms   74.03ms

0	20ms	40ms	60ms	80ms	100ms	120ms	140ms	160ms	180ms	200ms	220ms

227.18ms apache2handler HTTP req: /shop/9SeventyNineShoppe?ref=ks_wide
189.21ms neu.router.shop2_controller_home
71.32ms Api_BespokeAjax_Member_Shops_Home::handle()

30.93ms HTTP req: http://███████.etsy.com:7087/v3/public/shops/11766811/about

Tooling: Fanout-Manager

https://www.etsy.com/listing/192043815/1880s-vintage-toolbox-full-of-tools

Tooling: datafindr

https://www.etsy.com/listing/192043815/1880s-vintage-toolbox-full-of-tools

ENDPOINTS

> Public
> Member
> Shop
> Application
> BespokeOpenApi
> AppUser
> BespokeEtsyApps
> Admin
> BespokeAjax
> BespokeAtlas
> Infrastructure
> BespokeCraftAjax

RESOURCES

> Public
> Shop
> Member
> ServerDrivenLayout
> Admin
> Search
> Staff
> Infrastructure

Public / Teams / List

Public

List of active teams.

GET `/api/v3/ajax/public/teams`

Arguments

name	type	required	default
keyword	String		

Resource

Returns resource: Public / Team

Quantity: one

name	type
group_id	ID
name	String
group_type	String
status	String
avatar_url	String
short_description	String
long_description	String
is_juried	Boolean
is_private	Boolean

Example Request

Locale: Country: United States   Language: English   Currency: USD

GET request parameters:

keyword:

⟳ curl /api/v3/ajax/public/teams

Example Response

```
[
  {
    "group_id": 29885,
    "name": "paranormal experiences",
    "group_type": "NORMAL",
    "status": "ACTIVE",
    "create_date": 1465830325,
    "avatar_url": "https://img0.etsystatic.com/123/0/29885/iga_170x100.4080
    "membership_count": 9,
    "active_thread_count": 2,
    "last_post_date_formatted": "6 hours ago",
    "last_poster_real_or_login_name": "amanda wood",
    "is_juried": false,
    "is_private": false,
    "is_closed": false,
    "url": "/teams/29885/paranormal-experiences",
    "new_thread_url": "/teams/29885/paranormal-experiences/discuss/new/",
    "active_member_count": 9,
    "short_description": "paranormal experiences\r\n what paranormal experi
    "long_description": "paranormal experiences\r\n\r\nwhat paranormal expe
```

Tooling: (wanted)
Identify unused endpoints

https://www.etsy.com/listing/192043815/1880s-vintage-toolbox-full-of-tools

Developer adoption

How did we "sell" it?

..too fast to keep up!

White space
gets filled with code

📝 Documentation!! 📚

https://www.etsy.com/listing/275337876/eclectic-elements-documentation-half

Pockets of patterns

Trust + Guidance

Versioning?

Edge?

Caching?

ACI?

3rd party?

Conclusion

What did we learn?

What did we learn?

Did we succeed?

"We desperately need to figure out a scheme for allowing concurrency or else we're going to have performance problems forever."
- Andrew Morrison (Etsy)

"We desperately need to figure out a scheme for allowing concurrency or else we're going to have performance problems forever."
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Where we are **now**:

Responsibility division between

device and **server**

Thank you <3

I'm Stefanie Schirmer

@linse