

@petricek

ticketmaster[®]



Fans just wanna have fun!

ticketmaster®



Every year:
hundreds of millions tickets sold
worth **Billions of Dollars**

ticketmaster®





SOMEWHERE IN THE WORLD
EVERY 20 MINUTES
IS A LIVE NATION EVENT



ticketmaster®





LIVE NATION

ENTERTAINMENT®



Recommendations



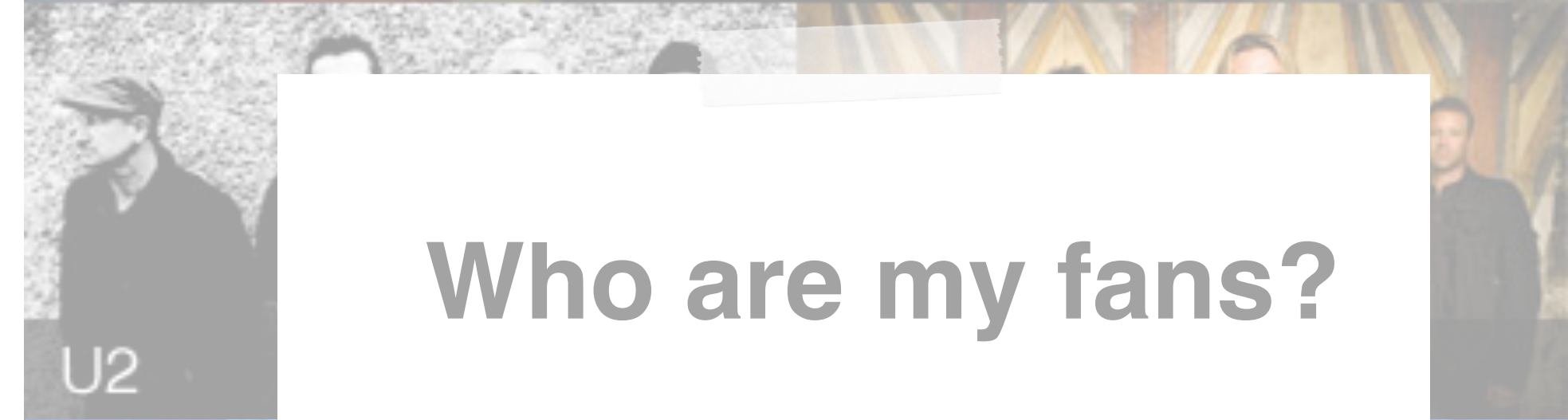
Tickets to the Fans (not scalpers)



Madonna

Jay-Z

Shakira



U2

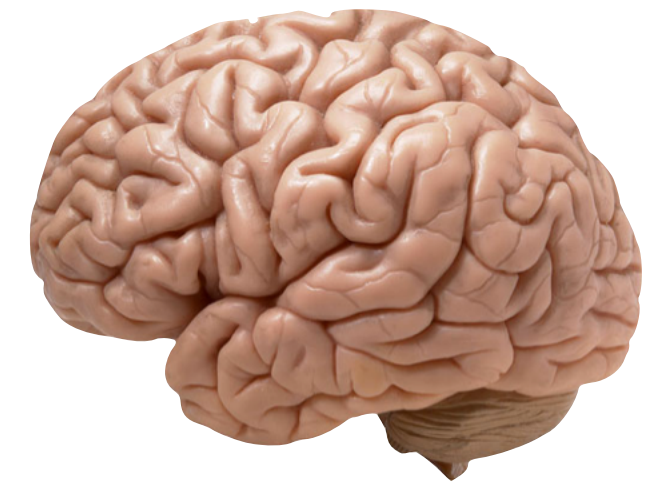
Who are my fans?



Data collection




Recommendation Strategies



Quality evaluation



- Music** ▶
 - alt-J
 - U2
 - Sublime with Rome
 - Toby Keith
 - Smokey Robinson
 - Van Halen
 - [All Music »](#)
- Sports** ▶
 - Anaheim Ducks
 - Los Angeles Angels
 - International Champions Cup North America pre...
 - Los Angeles Lakers
 - Nitro Circus Live
 - Inland Empire 66ers
 - [All Sports »](#)
- Arts & Theater** ▶
 - The Phantom of the Opera (Touring)
 - Motown the Musical (Touring)
 - Los Angeles Philharmonic
 - Adrian Uribe
 - Gabriel Iglesias
 - Monty Python's Spamalot
 - [All Arts & Theater »](#)
- Family** ▶
 - Ringling Bros. and Barnum & Bailey: Circus Xt...
 - Sound of Music Sing-A-Long
 - Bugs Bunny At the Symphony
 - E.T. the Extra-Terrestrial
 - Sesame Street Live: Let's



U2: Coming Soon



Live at The Forum on the INNOCENCE + eXPERIENCE Tour. The first few shows are May 26 & 27 and May 30 & 31.

[Find Tickets](#)

1 2 3 4 ◀ ▶

myTICKETMASTER





Hello Vaclav. 2 of your favorites have local events.

-  [Imagine Dragons](#)
-  [Madonna](#)

[Update your favorites »](#)

 **AMERICAN EXPRESS® CARD MEMBERS**
Get Exclusive Access & Benefits [»](#)

Recommended For You

-  [Los Angeles Angels](#) ♥
-  [International Champions Cup...](#) ★★★★★ ♥
-  [Motown the Musical \(Touring\)](#) ★★★★★ ♥
-  [The Phantom Opera \(Tou...](#) ♥

Improve this list by [updating your favorites.](#)

[Hot Tickets](#) [Just Announced](#)

Date	Event	See Tickets
MAY 28 THU	Motown the Musical (Touring) Hollywood Pantages Theatre More Dates	See Tickets
MAY 29 FRI	Bette Midler Divine Intervention Honda Center	See Tickets
JUL 12 SUN	LA Kiss Honda Center More Dates	See Tickets

You could win a trip! Your choice of concert. Any Live Nation venue in the U.S.:



[ENTER NOW](#)

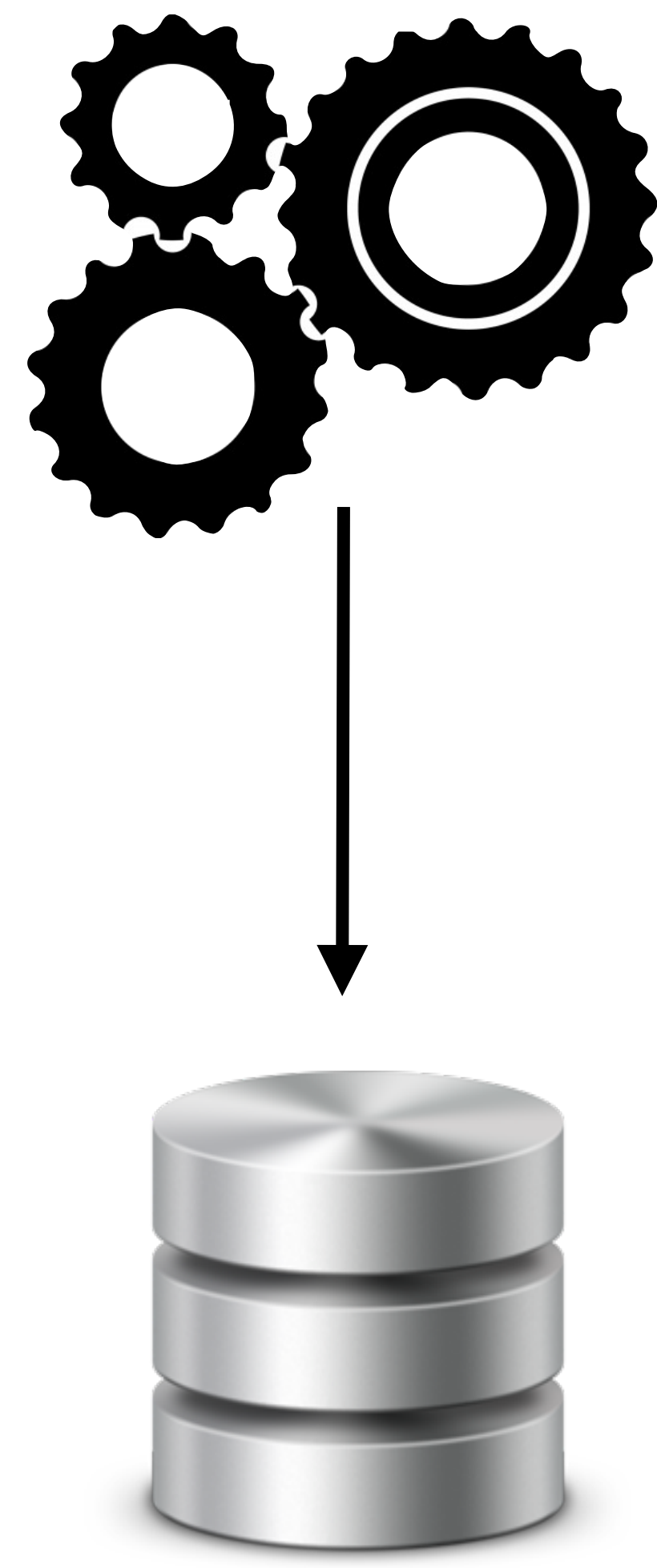
  

NO PURCH REQ. U.S. 18+. Ends 5/31/2015. Click <http://bit.ly/1GtZBla> for Official Rules & alternative method of entry. Void where prohibited. *Live Nation concert at an owned & operated venue in the U.S. Tickets subject to availability.

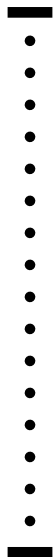
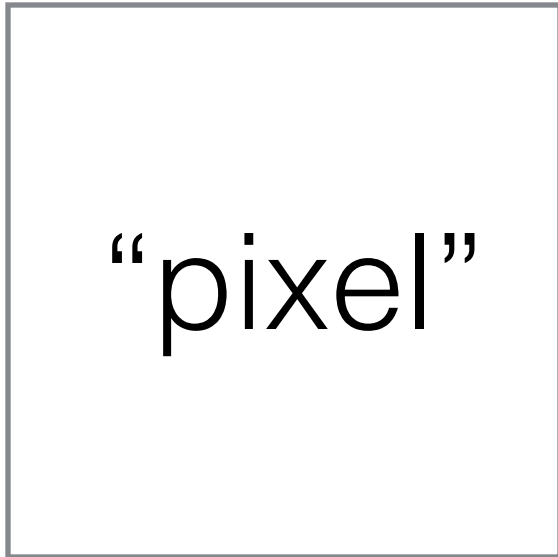
Friends on Ticketmaster

Everyone Friends

-  **HARD Summer Music Festival - 2-Day Pass** **1667** RSVPs
Fairplex At Pomona
Aug 01, 2015 11:00 AM
-  **International Champions Cup: FC Barcelona v LA** **331** RSVPs



Of Monsters and Men



1px

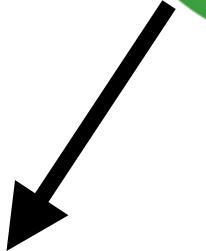
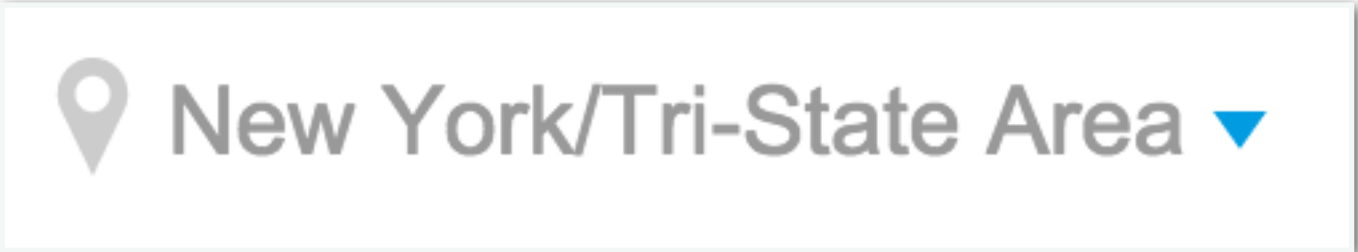


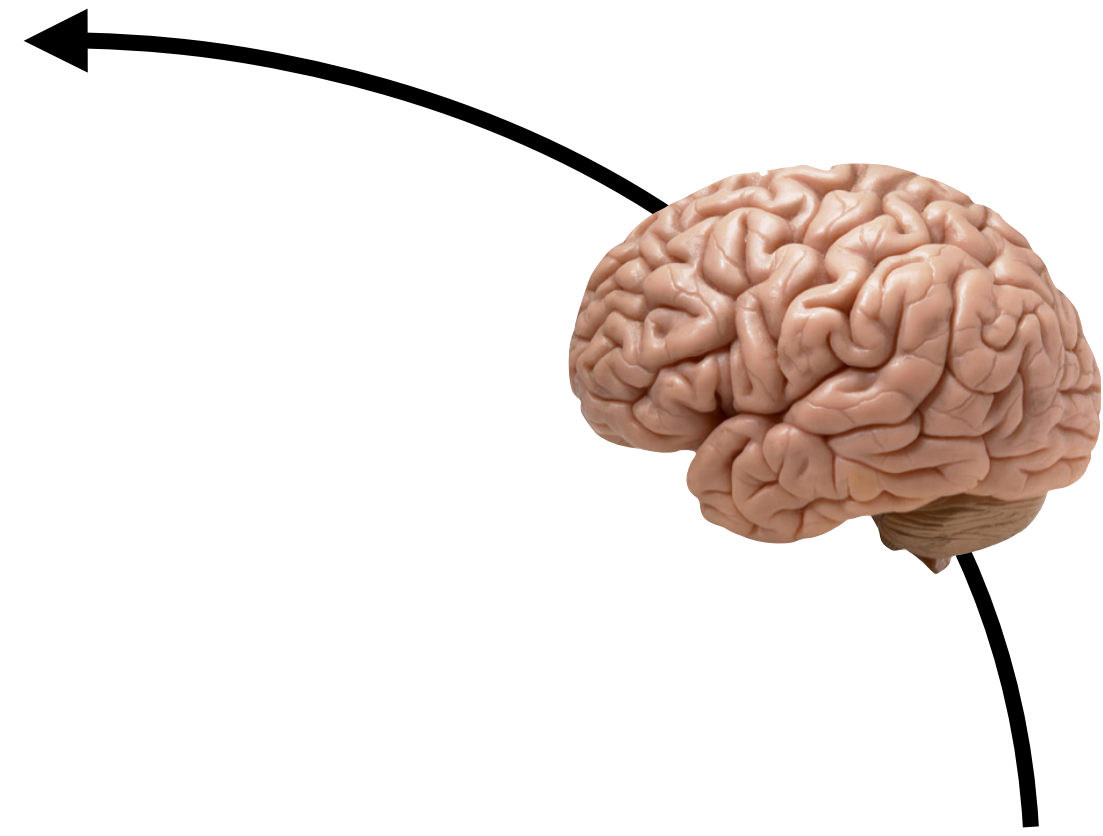
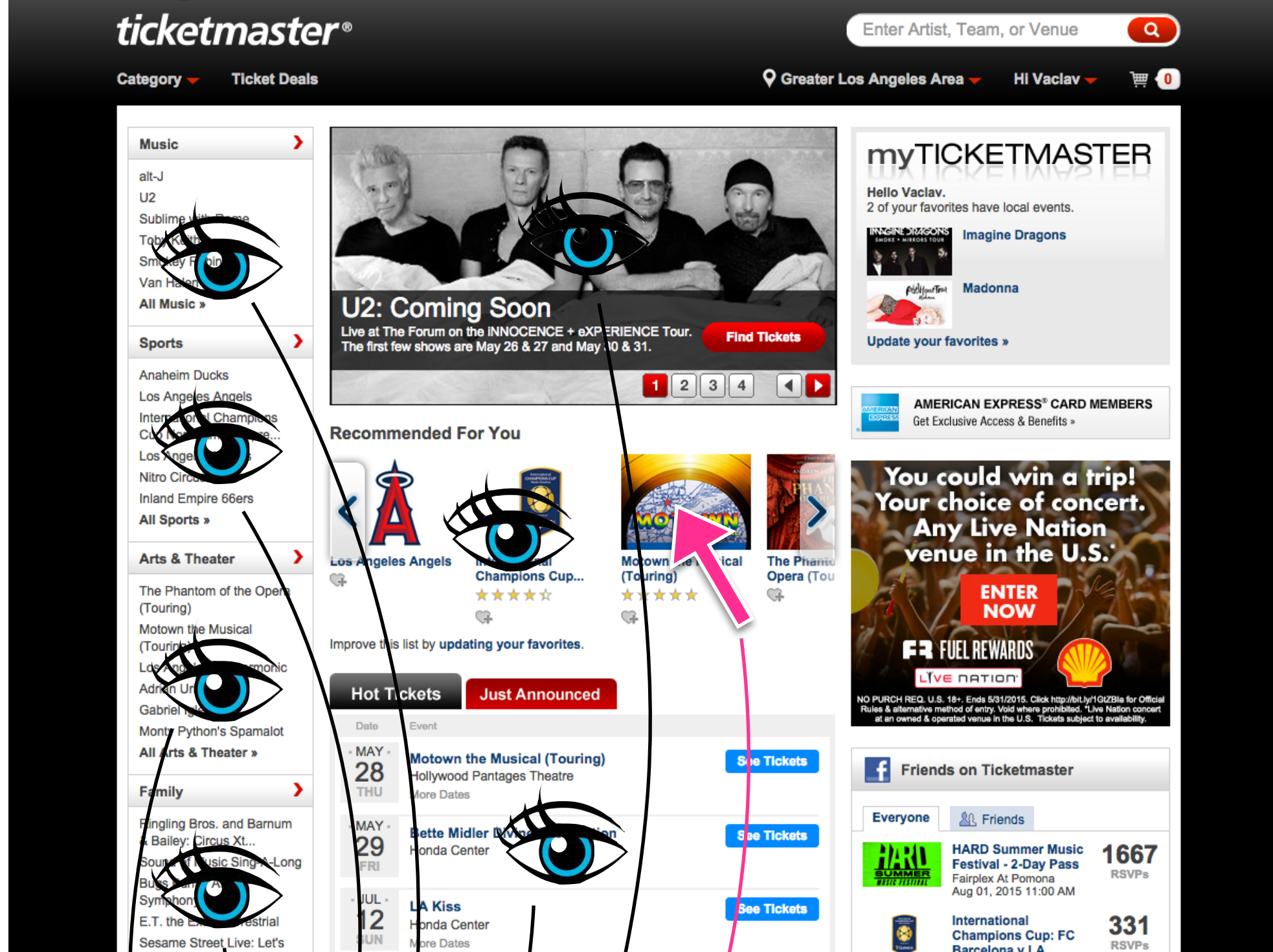
1px



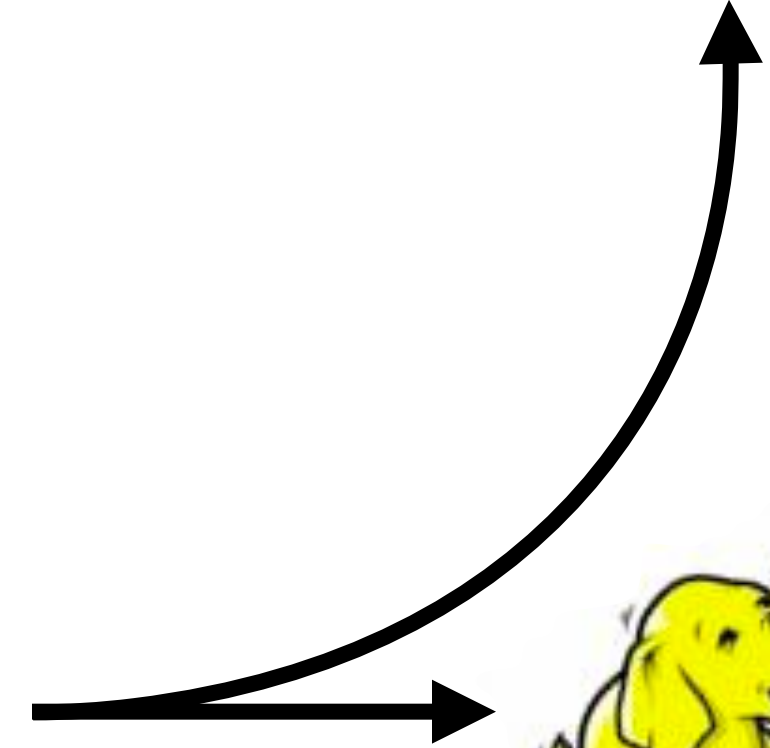
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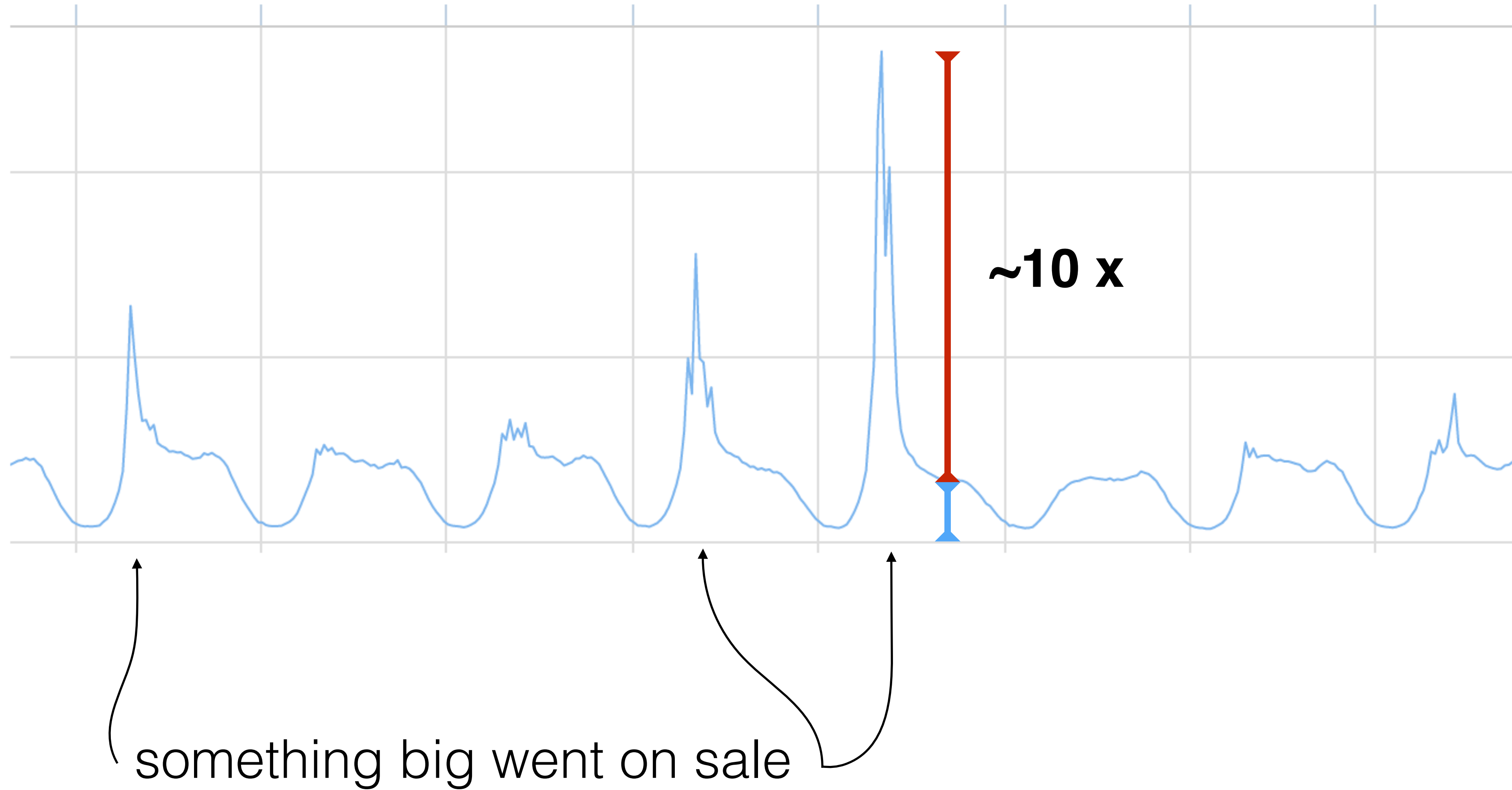




<http://pixelserver/api/pixel?...>



Number of requests over time



Data collection



Recommendation Strategies



Quality evaluation





Ticket Alert


All Tickets > Music Tickets > Rock & Pop > Imagine Dragons




Rock and Pop

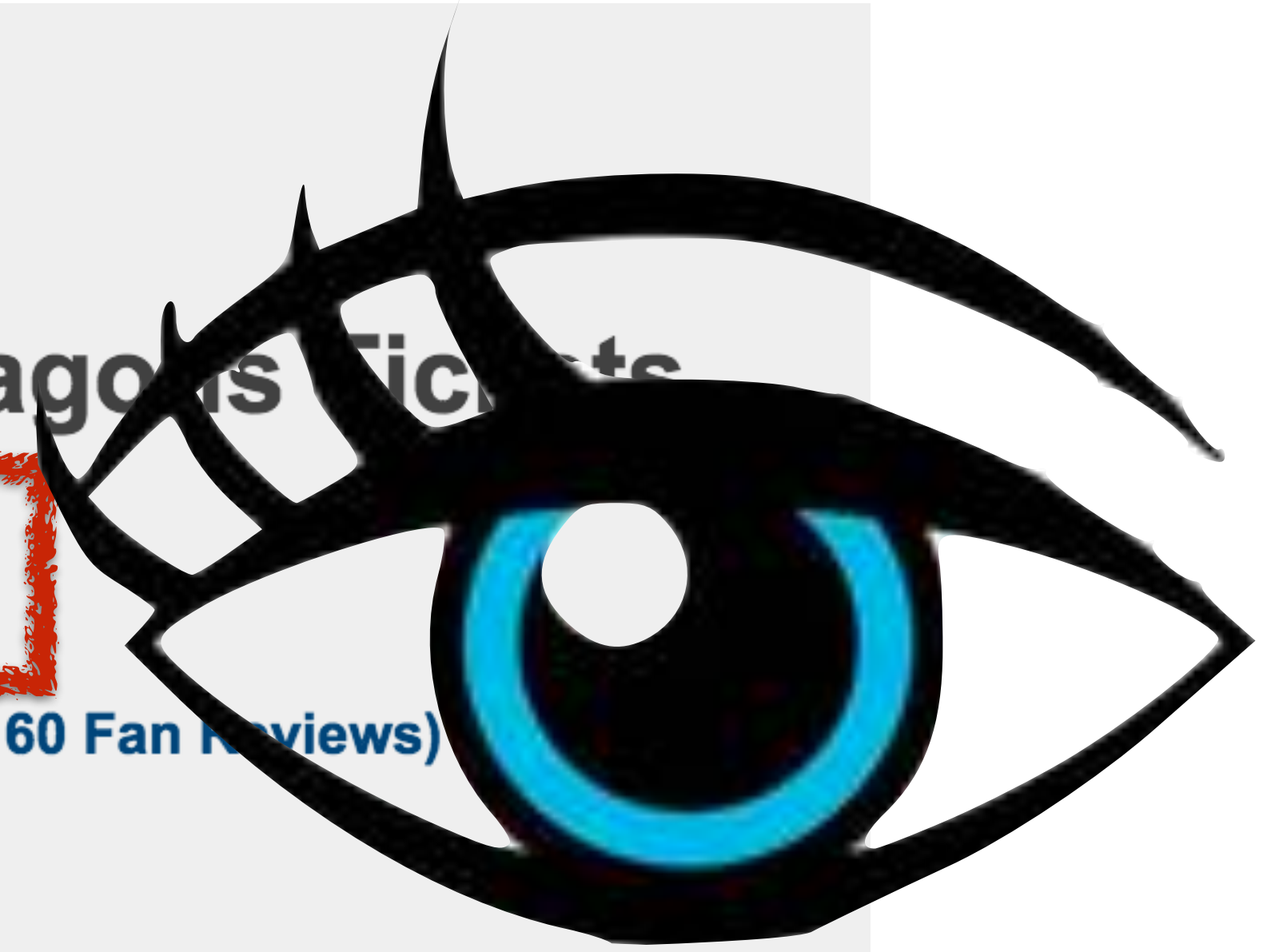
Imagine Dragons Tickets

 My Favorite

 (1,160 Fan Reviews)

 Tweet 999

 Like 34,919 people like this. Be the first of your friends.



FIND SEATS FOR ME

QTY

2

TICKET TYPE

Full Price Ticket

PRICE & SECTION

Best Available

Search Again

REQUEST ACCESSIBLE TICKETS

Per order delivery and/or processing fees are added when applicable.

Best Available from Venue

These tickets held for: 02:33

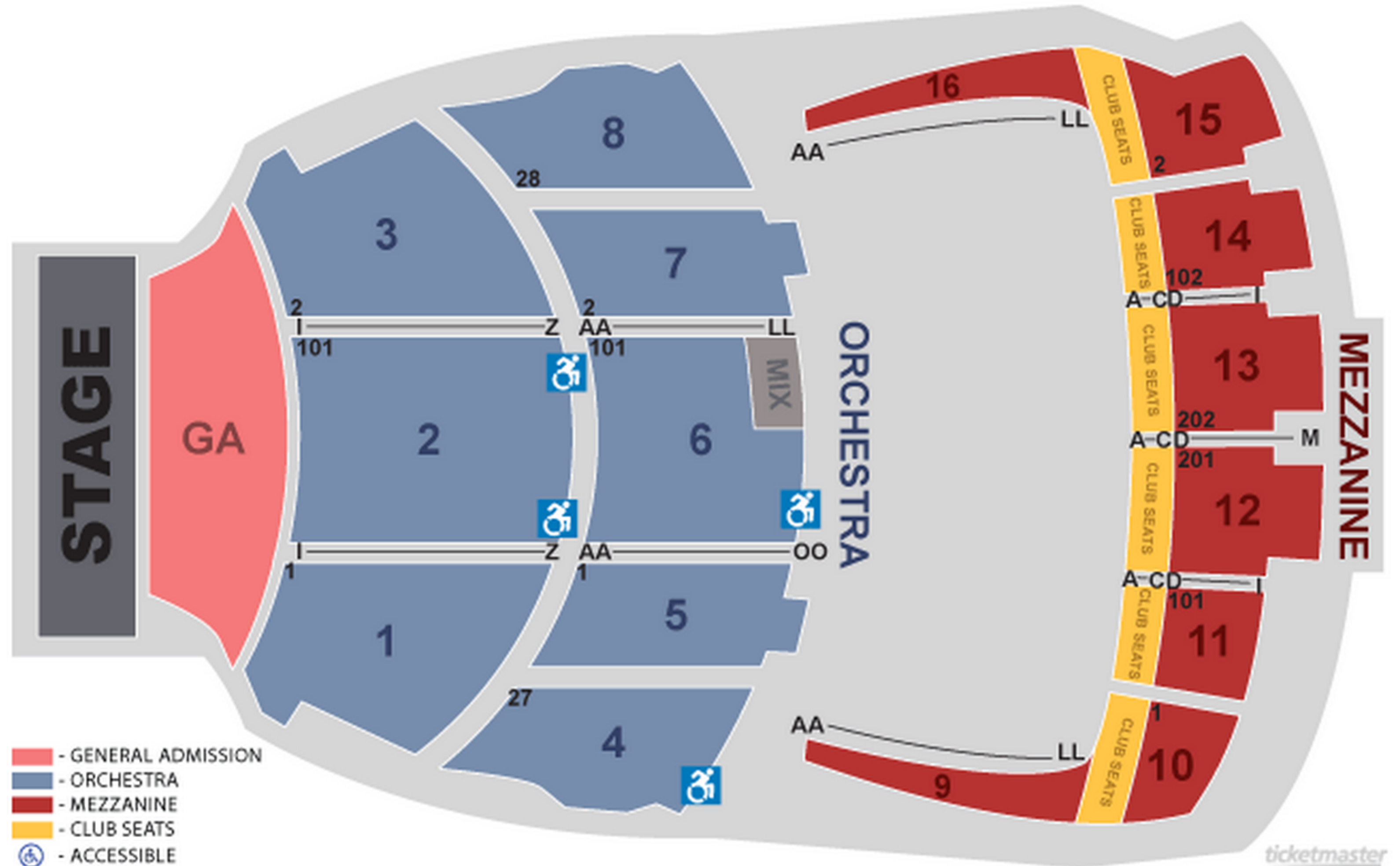
Sec SEC 1
Row Y, Seats 9-11

\$55.65 ea

Buy

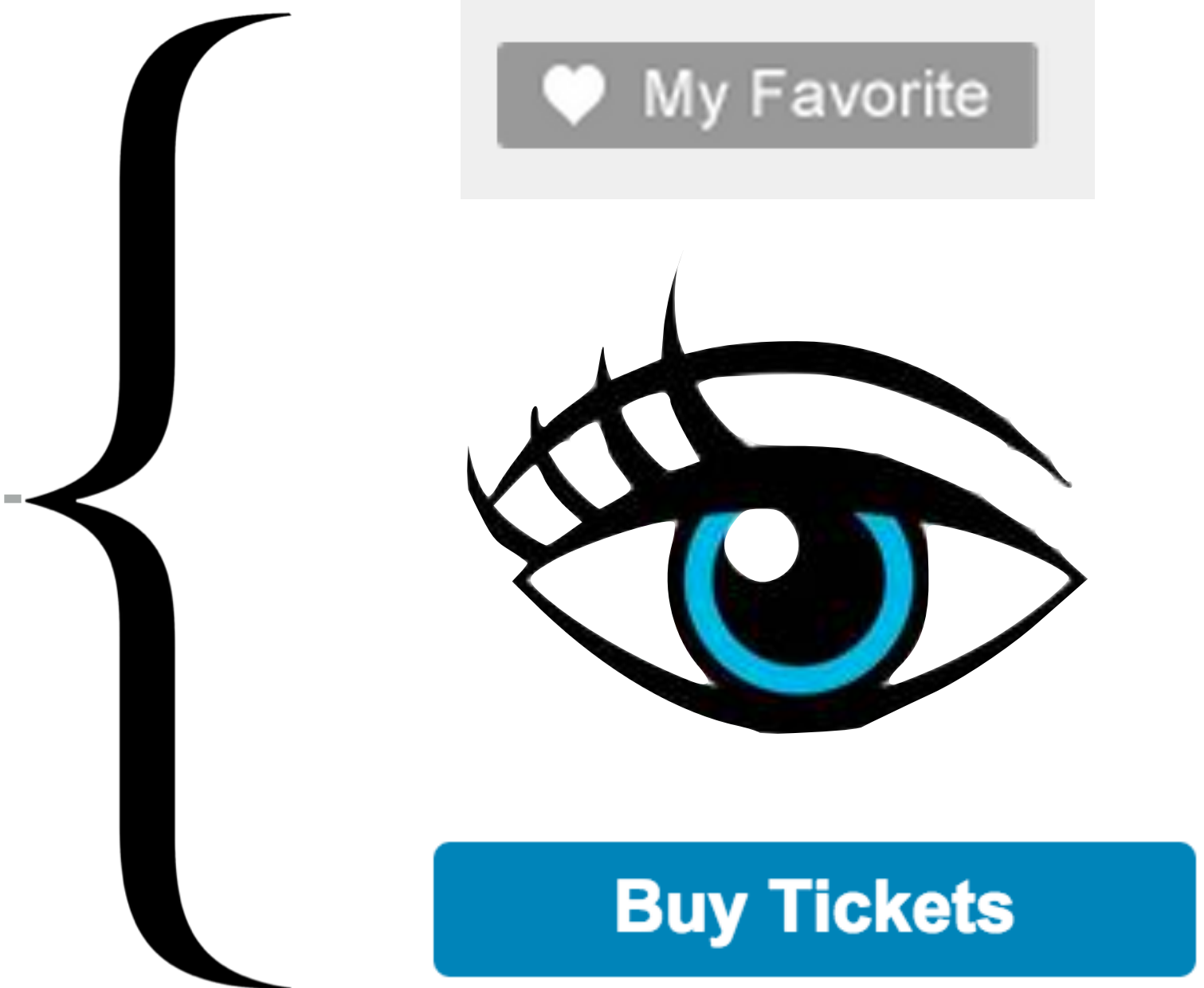
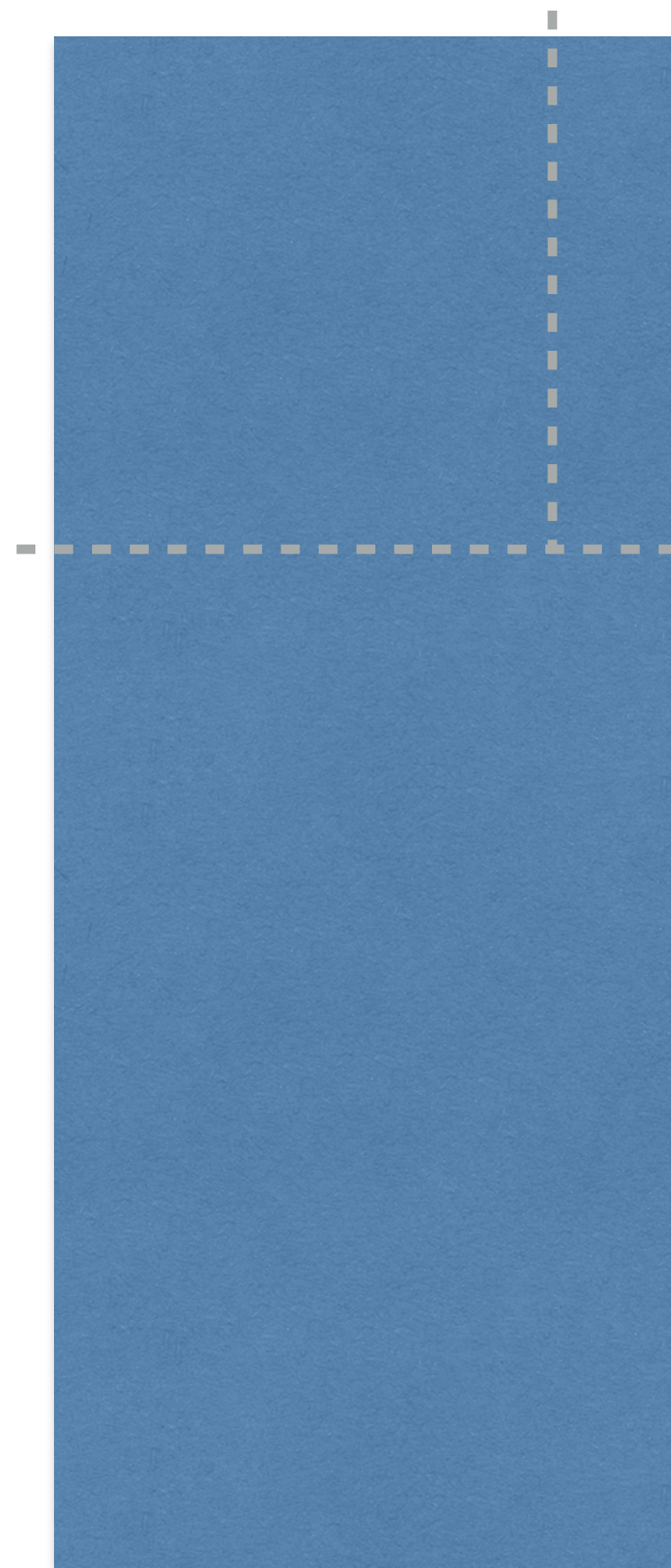
[Details](#)

More tickets from venue



tens of thousands
artists

~100m
users



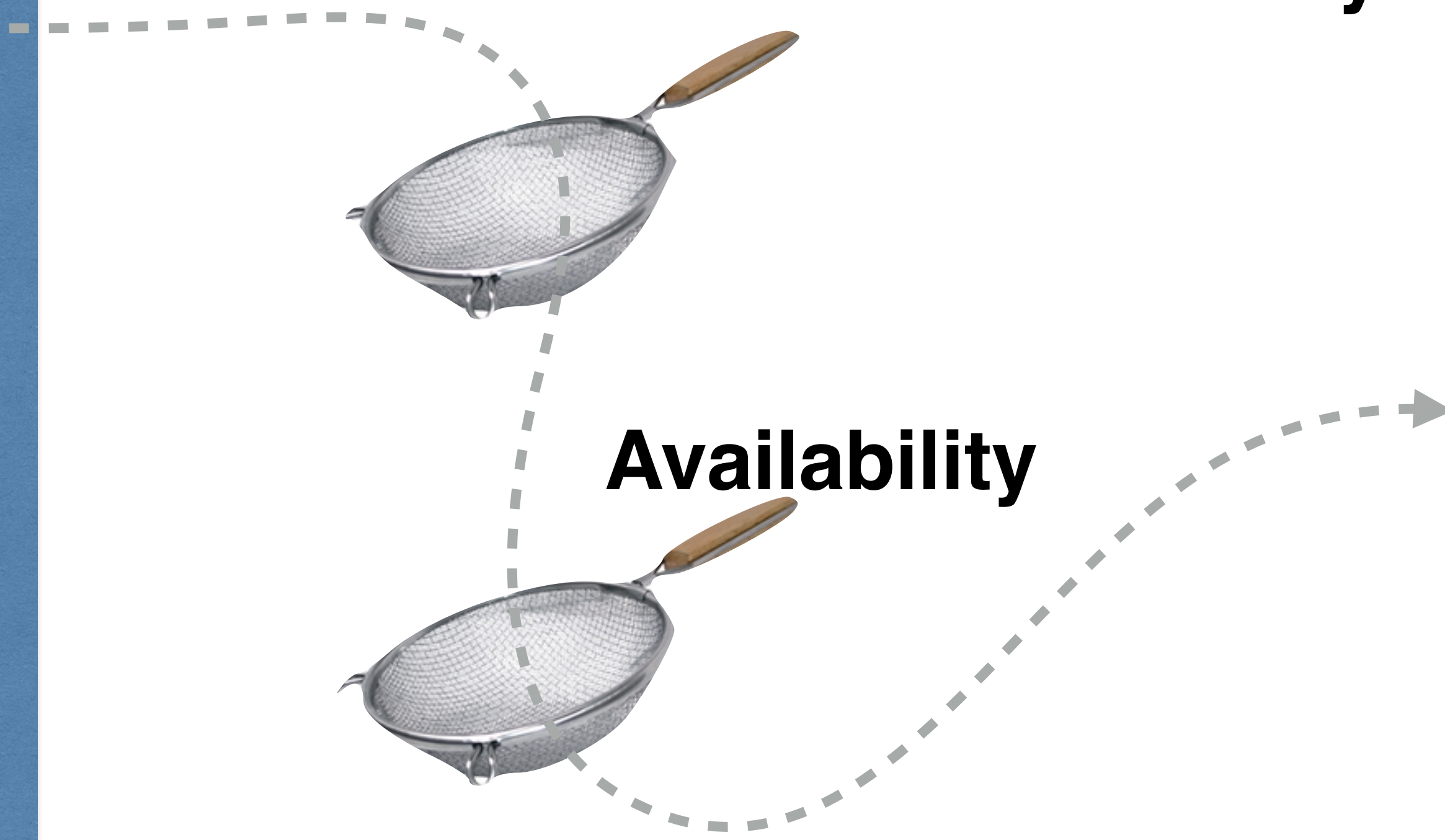
thousands
of artists

~100m
users

Recommendability



Availability



Our Weekly Picks for You



Jason Isbell
Morrison Center for the Performing Arts
Tue, 08/04/15

See Tickets



NEEDTOBREATHE
NEEDTOBREATHE: Tour de Compadres
Morrison Center for the Performing Arts
Wed, 07/15/15

See Tickets



Zac Brown Band
Zac Brown Band: JEKYLL + HYDE TOUR
Taco Bell Arena
Fri, 07/10/15

See Tickets



Imagine Dragons
Taco Bell Arena
Sat, 08/01/15

See Tickets



Our Weekly Picks for You



Event Happening Soon!

Seattle University Redhawks Mens Basketball
Seattle University Redhawks Mens Basketball vs. Grand Canyon University Mens Bas...
KeyArena
Thu, 02/05/15 [more dates](#)

See Tickets



University of Washington Huskies Mens Basketball
University of Washington Huskies Mens Basketball vs. University of Colorado Buff...
Alaska Airlines Arena at Hec Edmundson Pavilion
Thu, 03/05/15 [more dates](#)

See Tickets



Rat City Roller girls
Rat City Roller girls 2015 Home Team Championships
KeyArena
Sat, 04/25/15 [more dates](#)

See Tickets



Tri-City Americans
Tri-City Americans vs. Portland Winterhawks
Toyota Center Kennewick
Tue, 02/17/15 [more dates](#)

See Tickets



Online Recommendations

Music >

- Kenny Chesney
- Little Big Town
- Cage the Elephant
- One Direction
- Chris Cornell
- alt-J
- All Music »**

Sports >

- Stanley Cup® Final
- Chicago White Sox
- Ultimate Fighting
- Championship - UFC
- USA Rugby Men's Eagles
- International Champions
- Cup North America pre...
- Chicago Fire
- All Sports »**

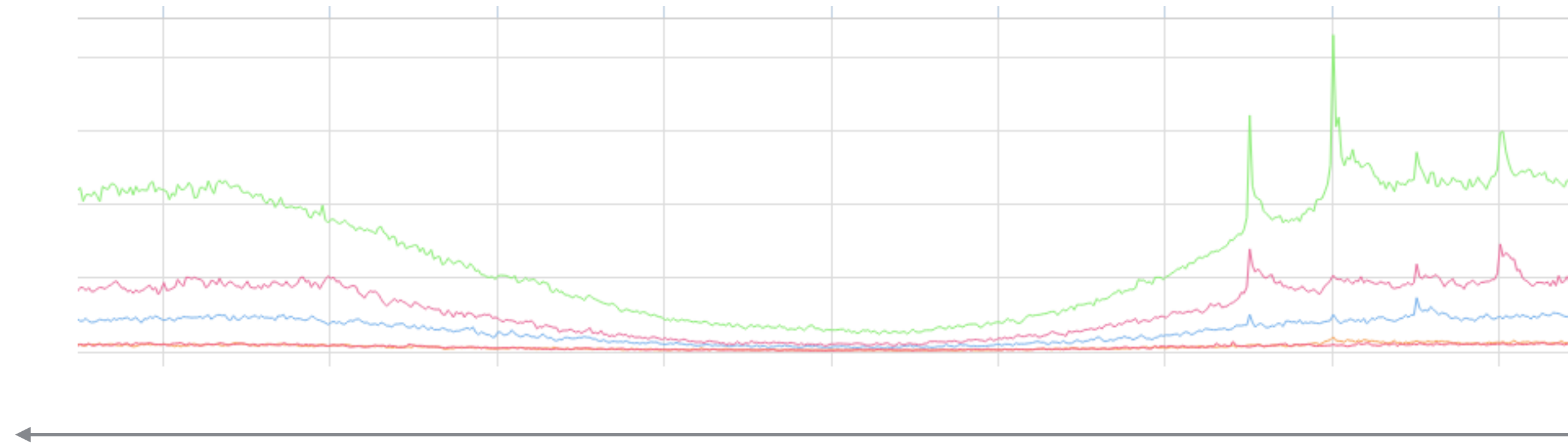
Arts & Theater >

- On Your Feet! (Chicago)
- Blue Man Group
- Once (Chicago)
- Pippin (Chicago)
- Kinky Boots (Chicago)
- Royal Ballet
- All Arts & Theater »**

Family >

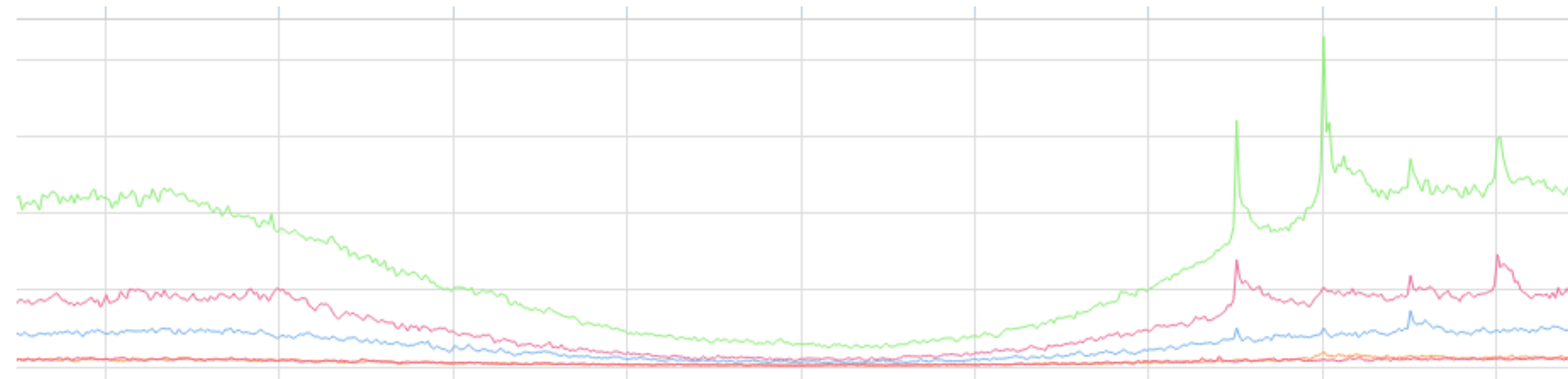
- Disney On Ice celebrates
- 100 Years of Magic P...
- Ringling Bros. and Barnum
- & Bailey: Circus Xt...
- The Marvel Experience

Top Sellers



Offline aggregate over many days

Hot right now



30min
sliding window



filter



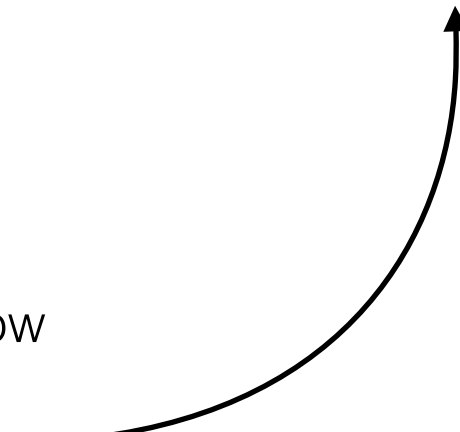
count



rank



“hot right now”



After viewing



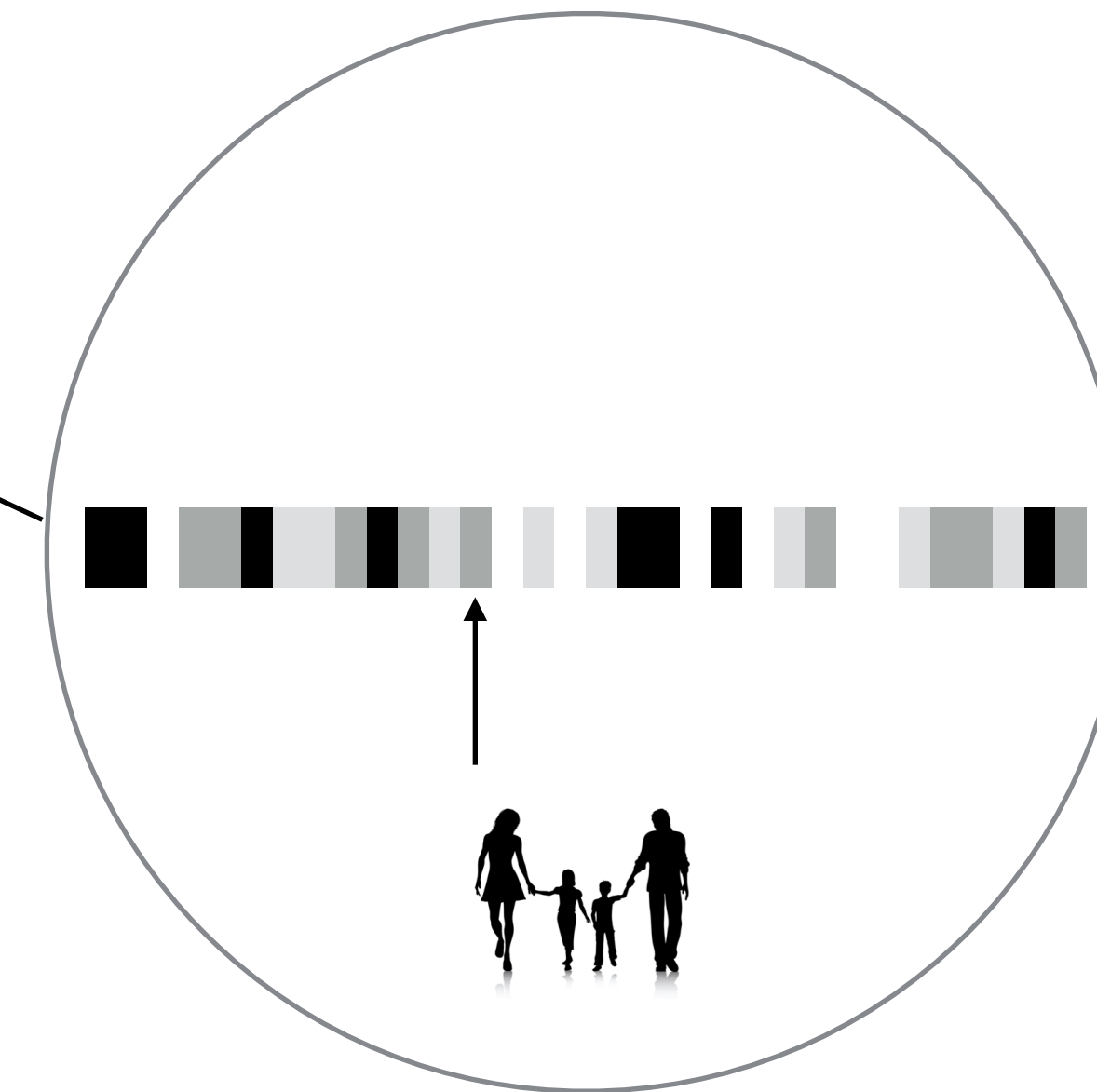
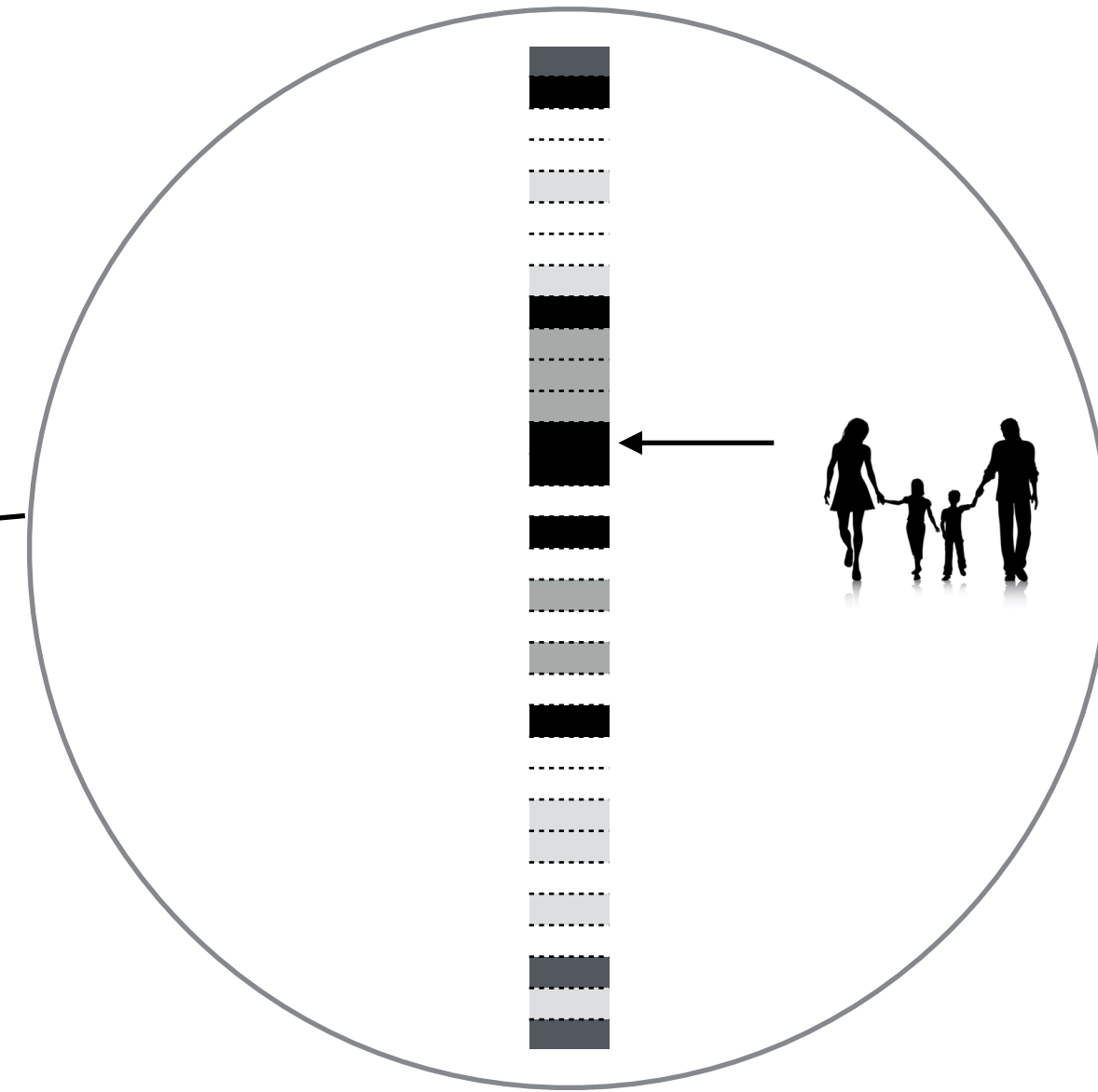
fans eventually bought



Personalized recommendations



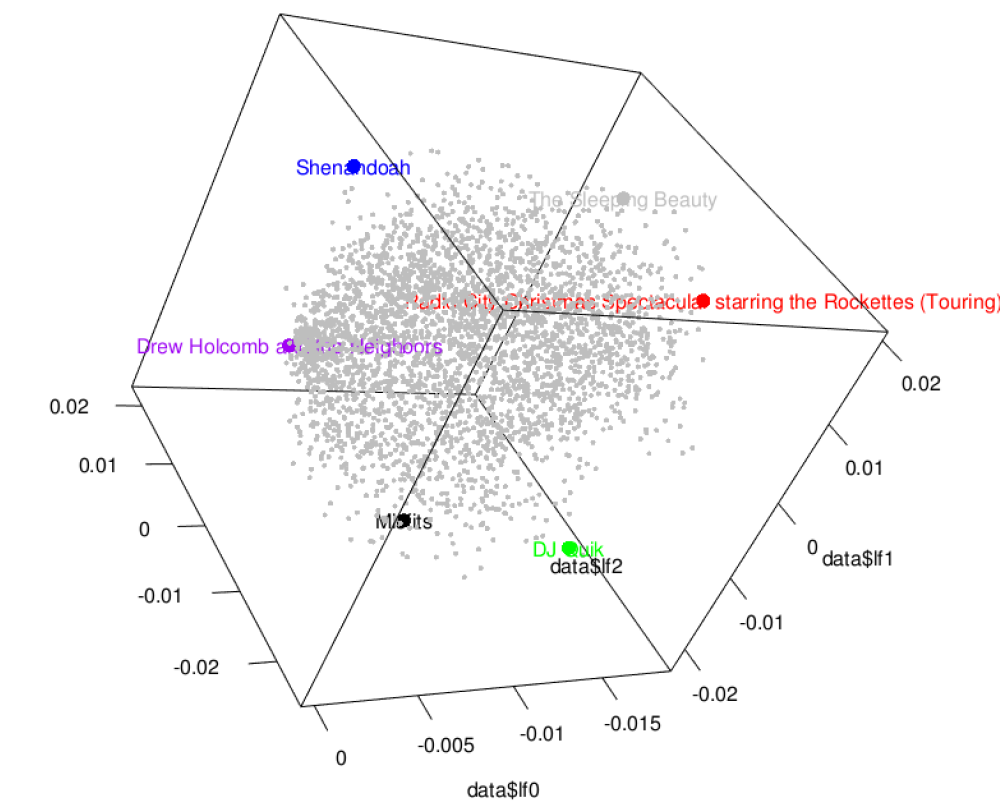
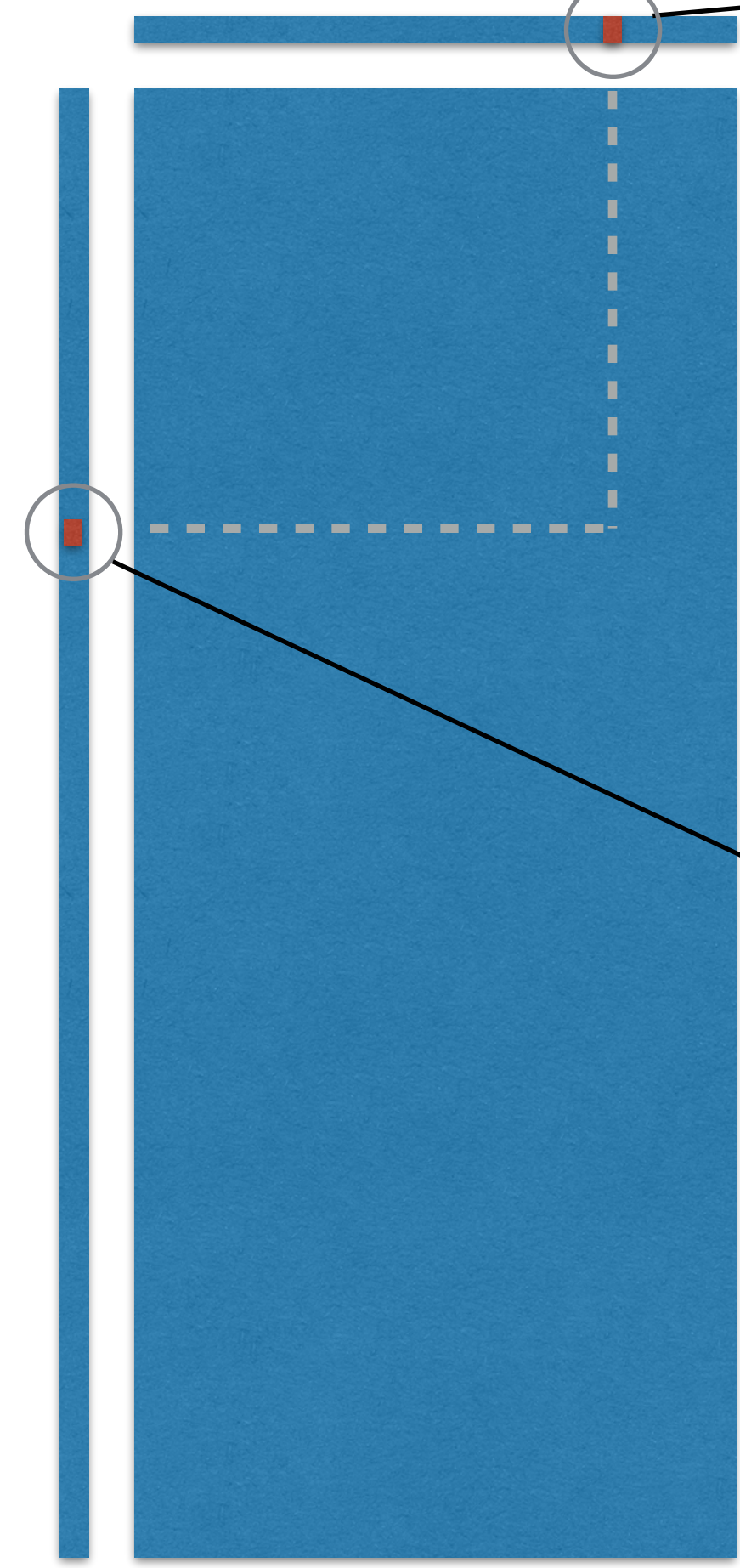
Rec of thousands
Service
artists



⋮



100m
users



Recommendations Service

A service for recommending Artists and Events

[Contact the developer](#)

artisthotness : Artist Hotness

Show/Hide | List Operations | Expand Operations | Raw

GET /artistHotness Return list of artists with their Hotness

artistlf : Artist Latent Features

Show/Hide | List Operations | Expand Operations | Raw

DELETE /artistLf Remove all artist Latent Features

POST /artistLf Add artist Latent Features

PUT /artistLf Replace all artist Latent Features

GET /artistLf Return list of artists with their Latent Features

GET /artistLf/{artistId} Return Latent Features of specified artist

artists : Artist stats and eligibility

Show/Hide | List Operations | Expand Operations | Raw

GET /artists/eligible Return eligible artists for all countries and marketIds

GET /artists/stats Return artist stats for all countries and marketIds

GET /artists/stats/{country}/{marketId} Return artist stats for a country and marketId

GET /artists/stats/{country}/{marketId}/{artistId} Return artist stats for an artistId in country and marketId

events : Event list and details

Show/Hide | List Operations | Expand Operations | Raw

GET /events Return eventIds

GET /events/{eventId}

Service endpoints

Public endpoints

hot-artists : Recommend artists hot right now

Show/Hide | List Operations | Expand Operations | Raw

GET /api/hot-artists/artist/{artistId} Find other artists hot right now

GET /api/hot-artists/event/{eventId} Find other artists hot right now

mapping : Map placements to strategies

Show/Hide | List Operations | Expand Operations | Raw

GET /api/mapping/artistPlacement Return content for placement

sim-artists : Recommend artists similar to a an artist or event

Show/Hide | List Operations | Expand Operations | Raw

GET /api/sim-artists/artist/{artistId} Find artists related to a specified artist

GET /api/sim-artists/event/{eventId} Find artists related to a specified event



async

100ms SLA



Pixel Service



Recommender Service

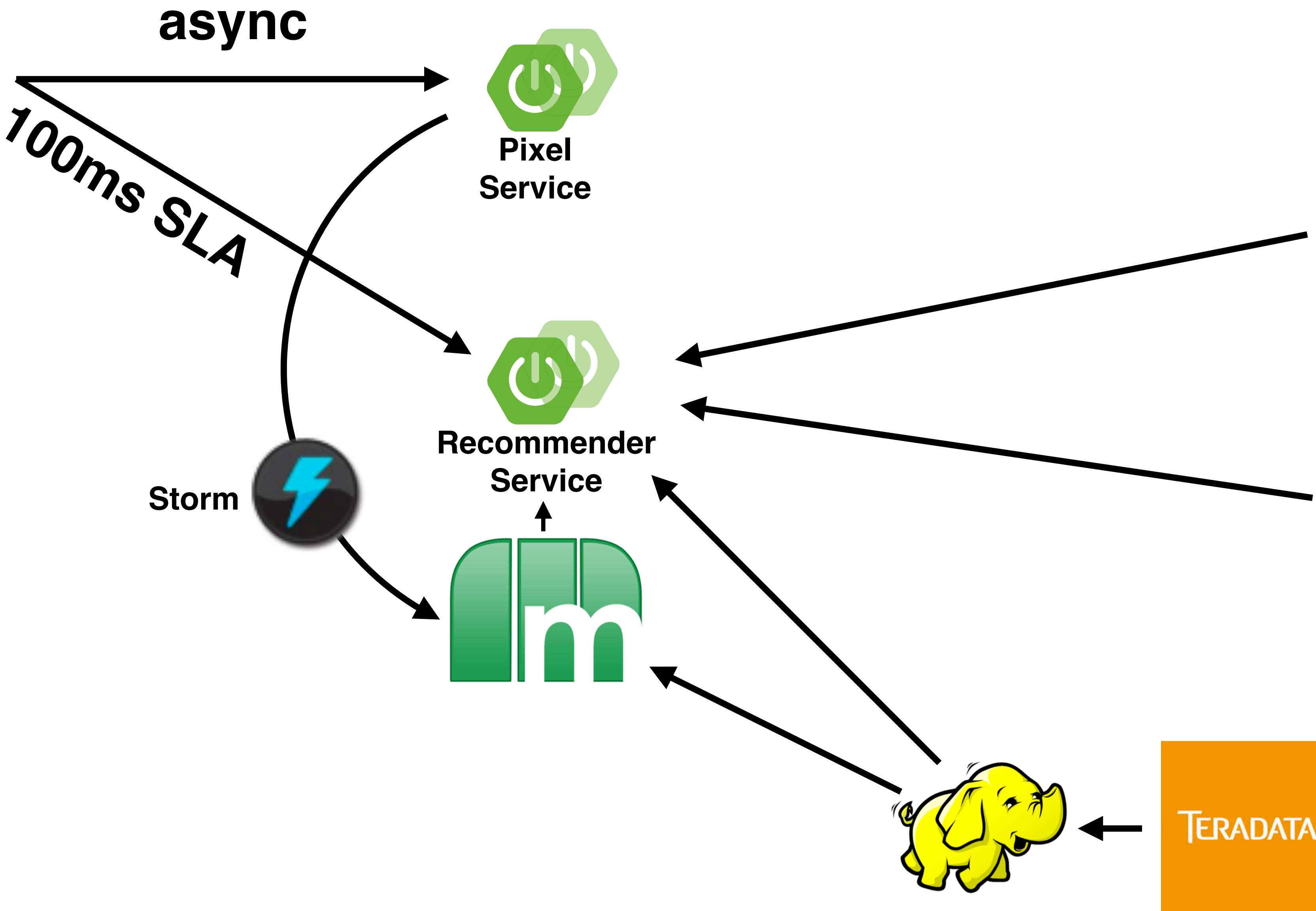
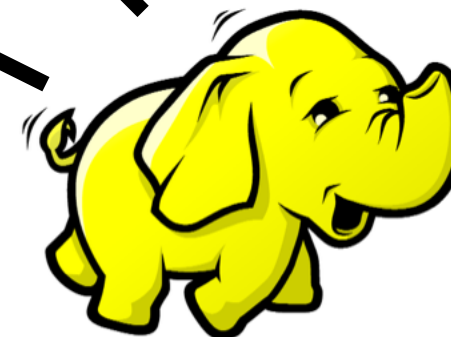
Storm



Ticket Availability Service



Event Feed



```

zookeeper:
  image: wurstmeister/zookeeper
  ports:
    - "49181:2181"
    - "22"
  environment:
    - TERM=xterm

```

```

nimbus:
  image: wurstmeister/storm-nimbus:0.9.4
  ports:
    - "49773:3773"
    - "49772:3772"
    - "49627:6627"
    - "22"
  links:
    - zookeeper:zk
    - namenode
  environment:
    - TERM=xterm

```

```

namenode:
  image: hauptmedia/hdfs-namenode
  ports:
    - "8020:8020"
    - "50070:50070"
    - "50470:50470"
  environment:
    - TERM=xterm
    - PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/opt/hadoop/bin

```

```

datanode:
  image: hauptmedia/hdfs-datanode
  ports:
    - "50010:50010"
    - "50020:50020"
    - "50075:50075"
    - "50475:50475"
  links:
    - namenode
  environment:
    - TERM=xterm

```

```

supervisor:
  image: wurstmeister/storm-supervisor:0.9.4
  ports:
    - "8000"
    - "22"
  links:
    - nimbus
    - zookeeper:zk
    - namenode
    - memcached:mcd
  volumes:
    - src/conf/logback:/opt/apache-storm-0.9.4/logback
  environment:
    - TERM=xterm

```

```

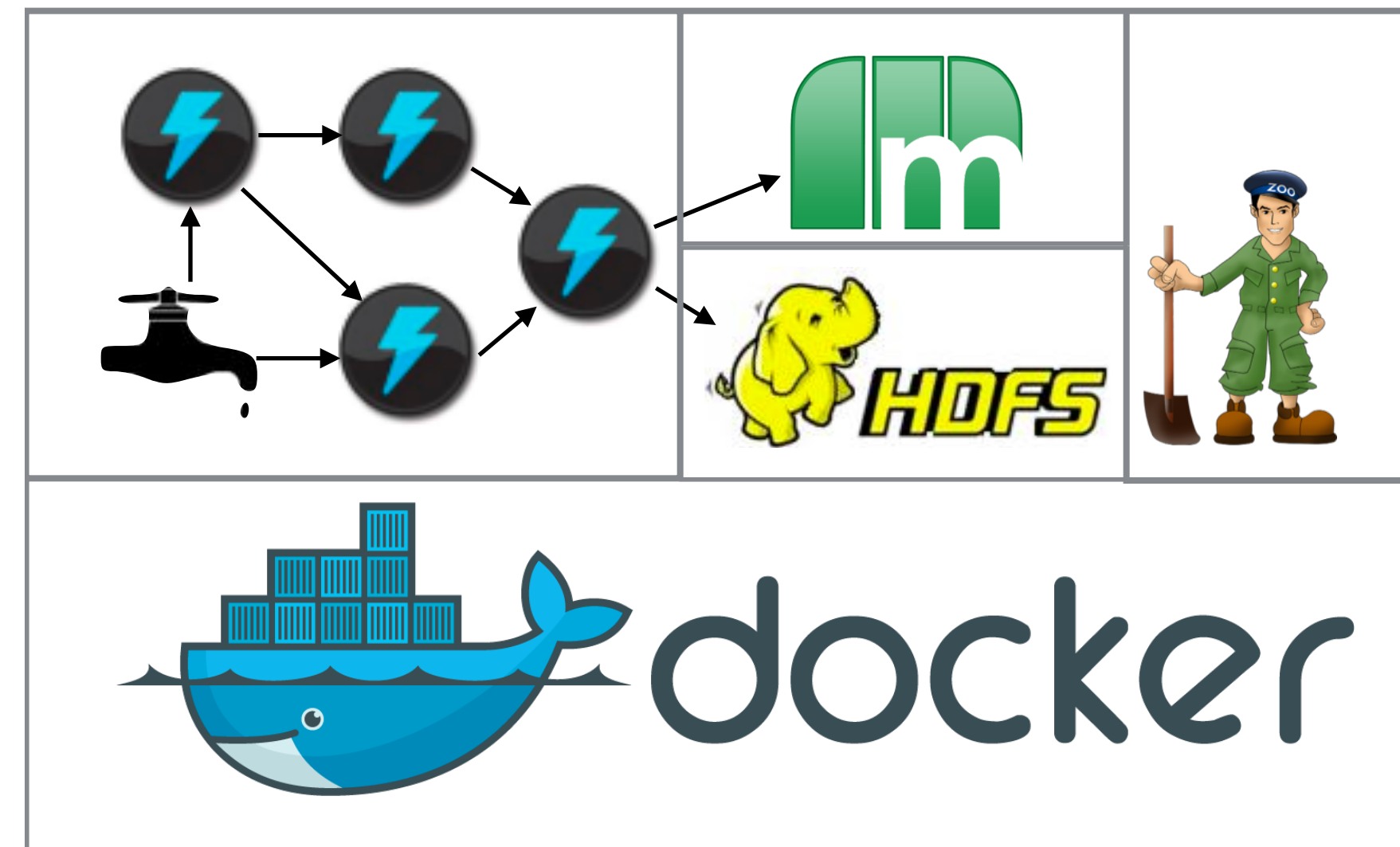
memcached:
  image: library/memcached
  ports:
    - "11211:11211"
  environment:
    - TERM=xterm

```

```

ui:
  image: wurstmeister/storm-ui:0.9.4
  ports:
    - "49080:8080"
    - "49000:8000"
    - "22"
  links:
    - nimbus
    - zookeeper:zk
    - namenode
  volumes:
    - ./workspace
  working_dir: /workspace
  environment:
    - TERM=xterm
    - APPS_CONFIG_LOCAL=/workspace/src/conf/

```



```

$ docker-compose up
:-)

```



Quality



Expert feedback



≠



≠



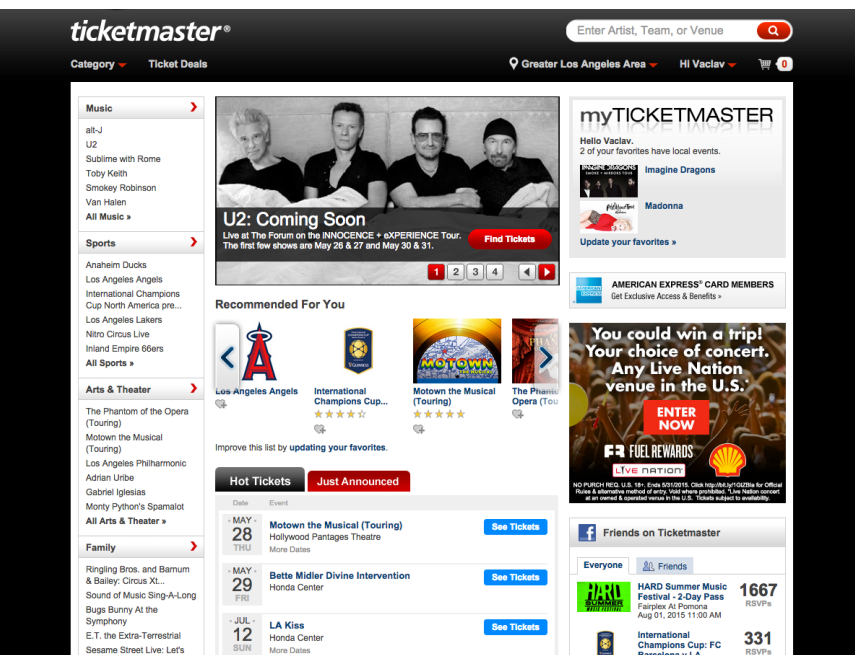
Availability



A/B testing

Stealth testing





OMG



tee bolt



hdfs bolt



replay bolt

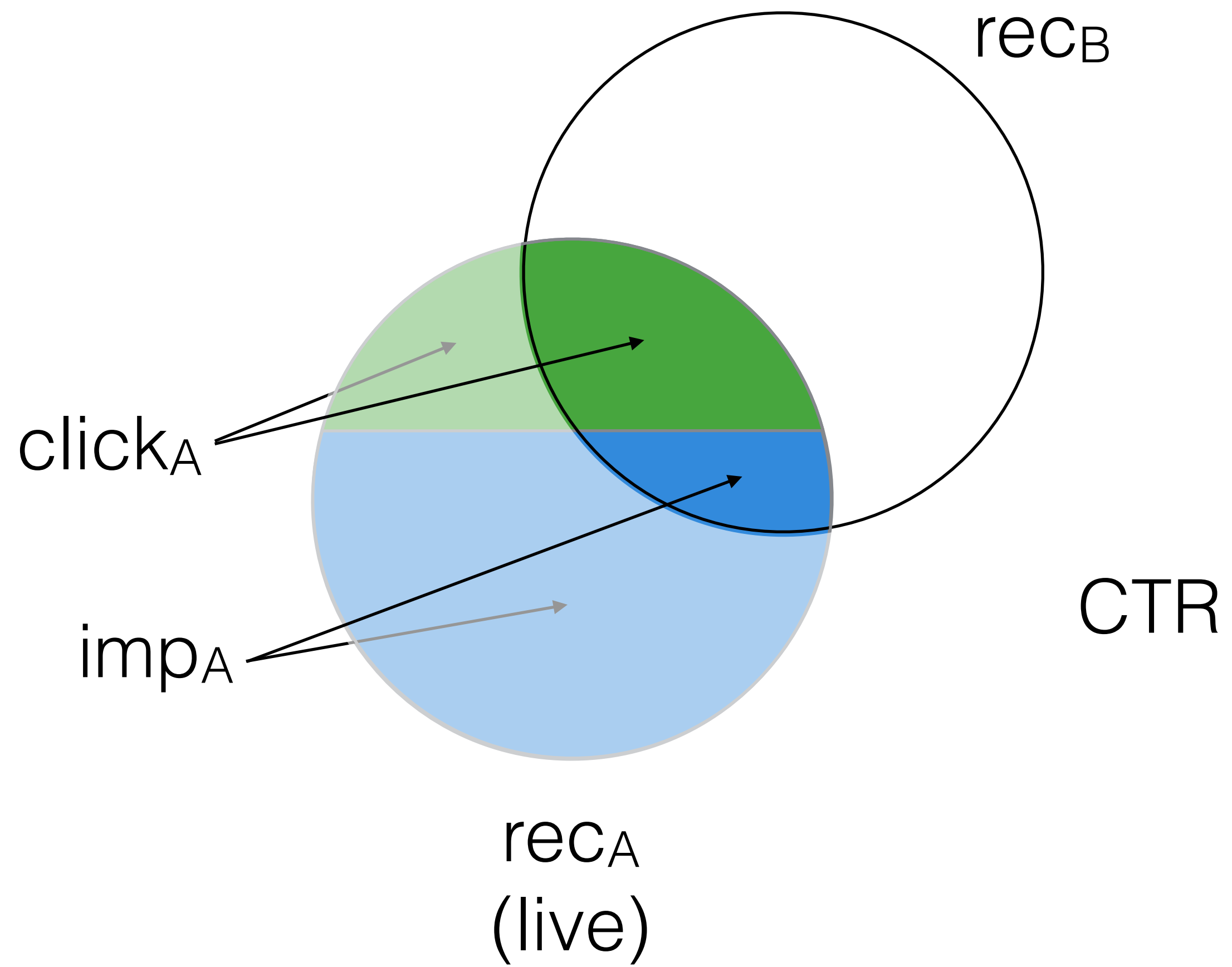


hdfs bolt

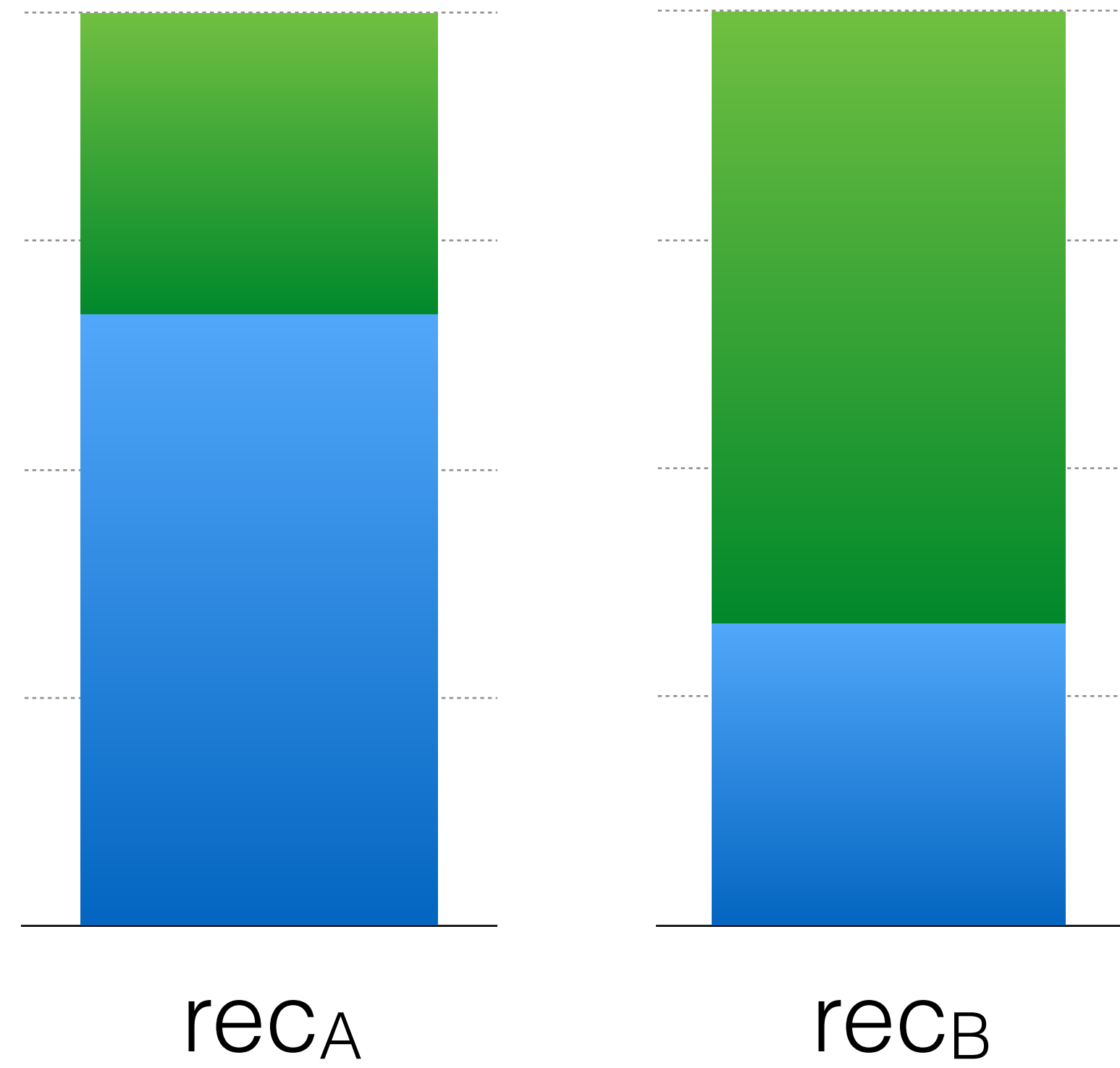


Recommender service





CTR



Data collection



Recommendation Strategies



Quality evaluation



Next steps

Contextual bandits

Exploration v Exploitation

More context
(user, artist, venue, event metadata)



Recommendations



Tickets to the Fans (not scalpers)



Madonna

Jay-Z

Shakira



U2

Who are my fans?





ticketmaster[®]







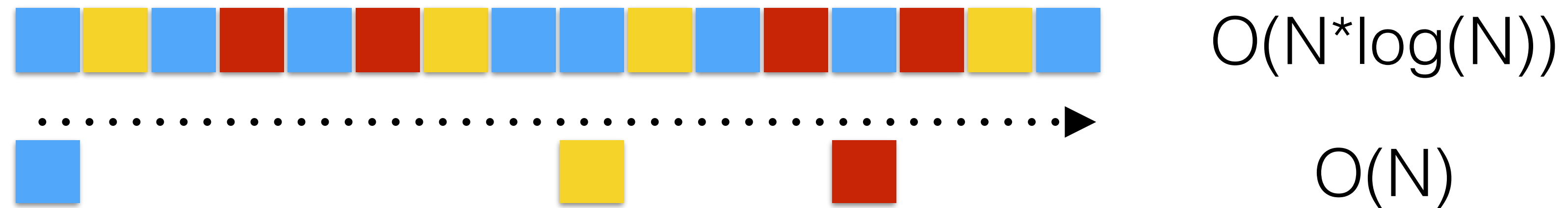
THE BOOK OF MORMON

FROM THE CREATORS OF SOUTH PARK



	\$	Family silhouette	
	\$\$\$	Family silhouette	
	\$\$\$	Family silhouette	
	\$	Family silhouette	Airplane icon

Counting unique users

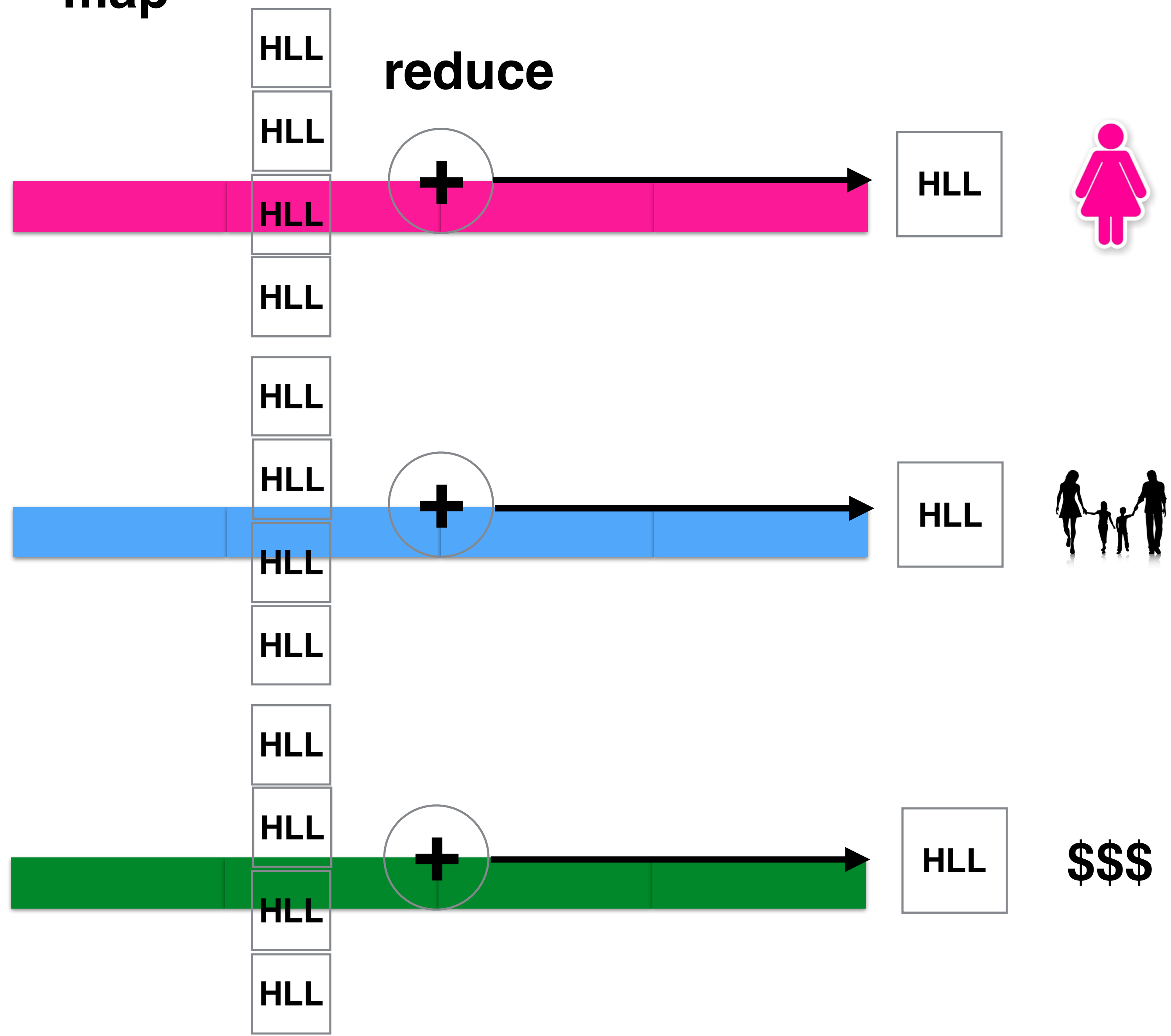


HyperLogLog



map

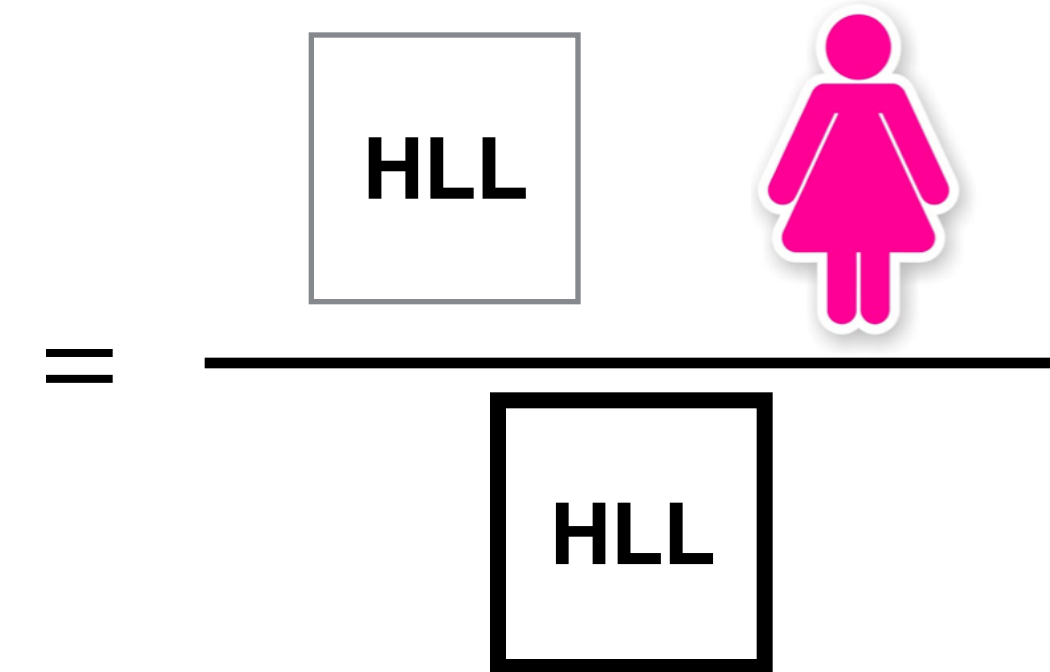
reduce





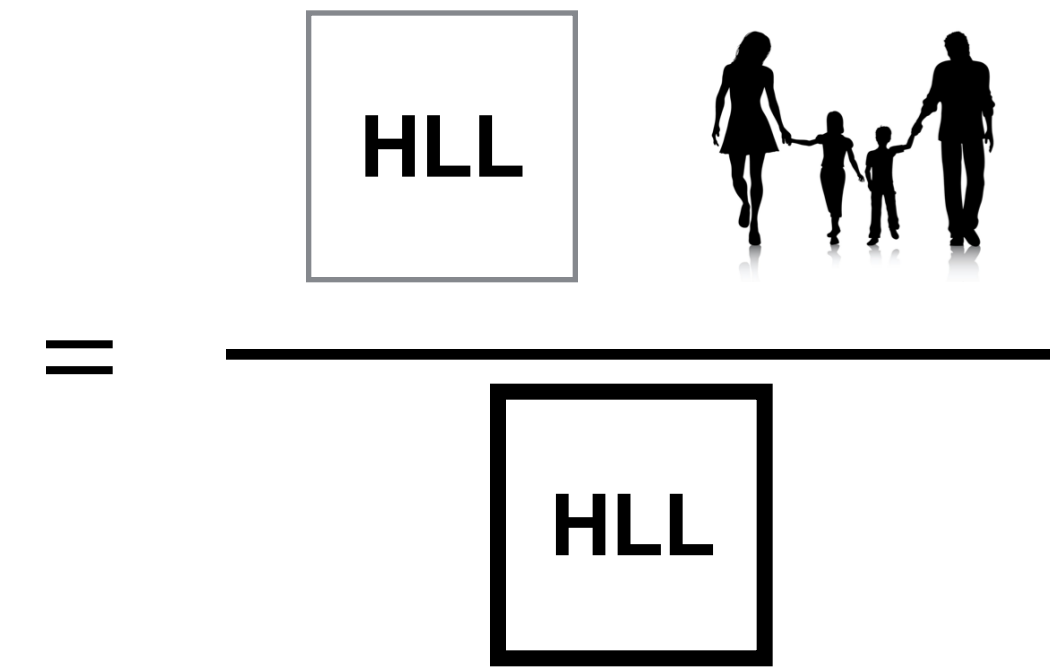
Unique **female** users

Unique users total



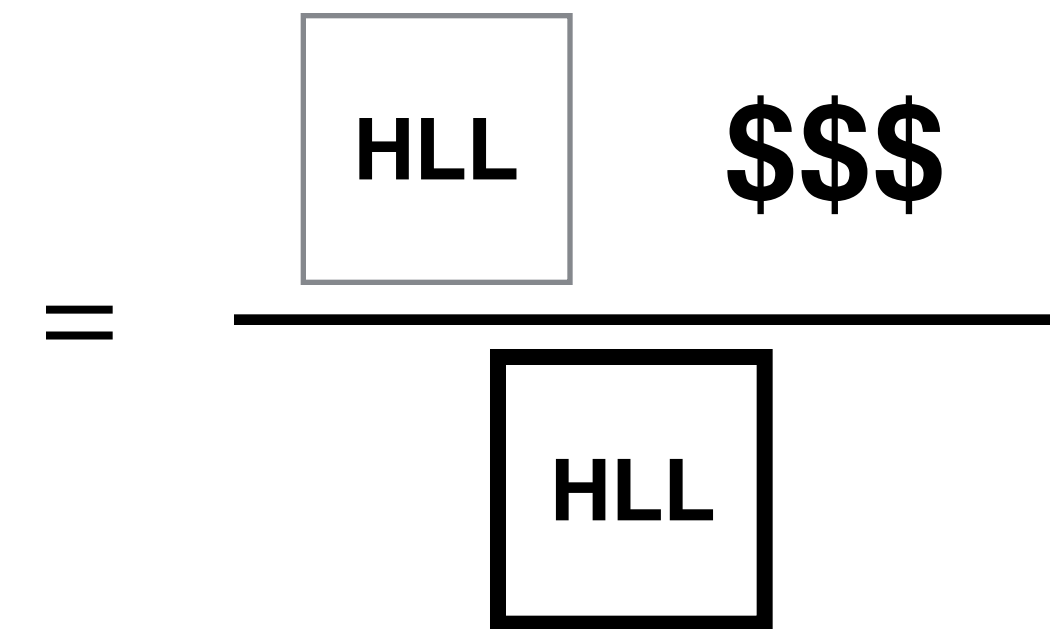
Unique users **with family**

Unique users total



Unique **high income** users

Unique users total

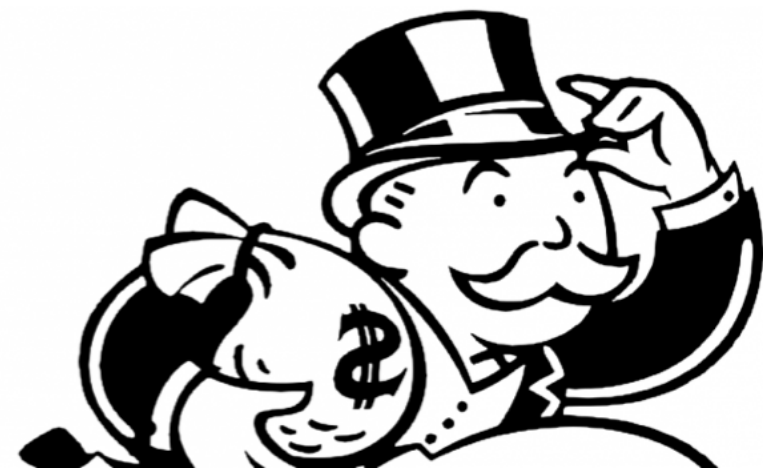




Meshuggah



Backstreet Boys



SF Philharmonic



Phish



Chvrchs 15% Asian



K. Michelle 57% African American



Ramon Ayala 92% Hispanic



Tom Petty 96% Caucasian

Baby Boomers



Chicago Musical

Gen X

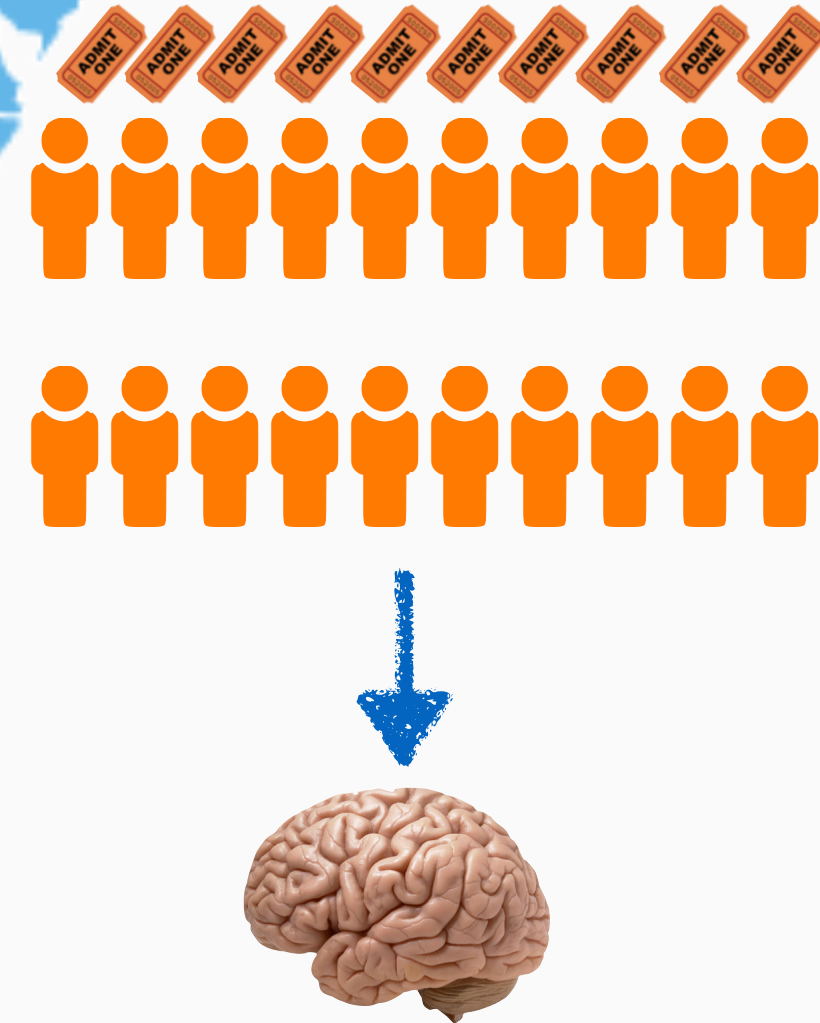
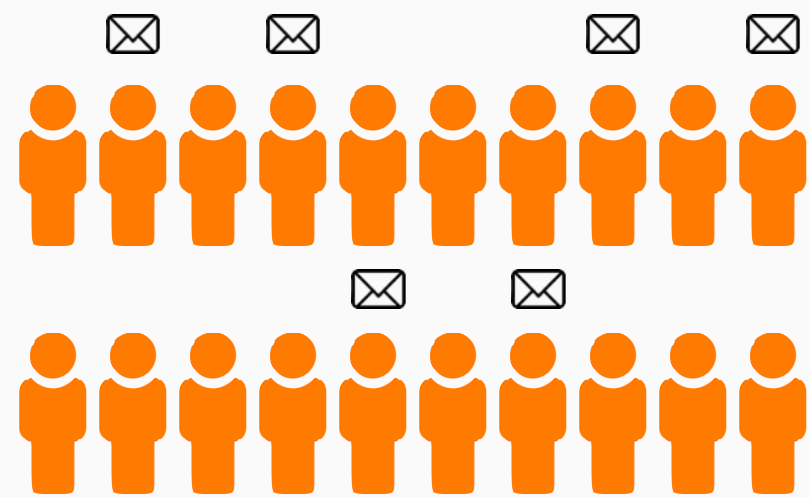
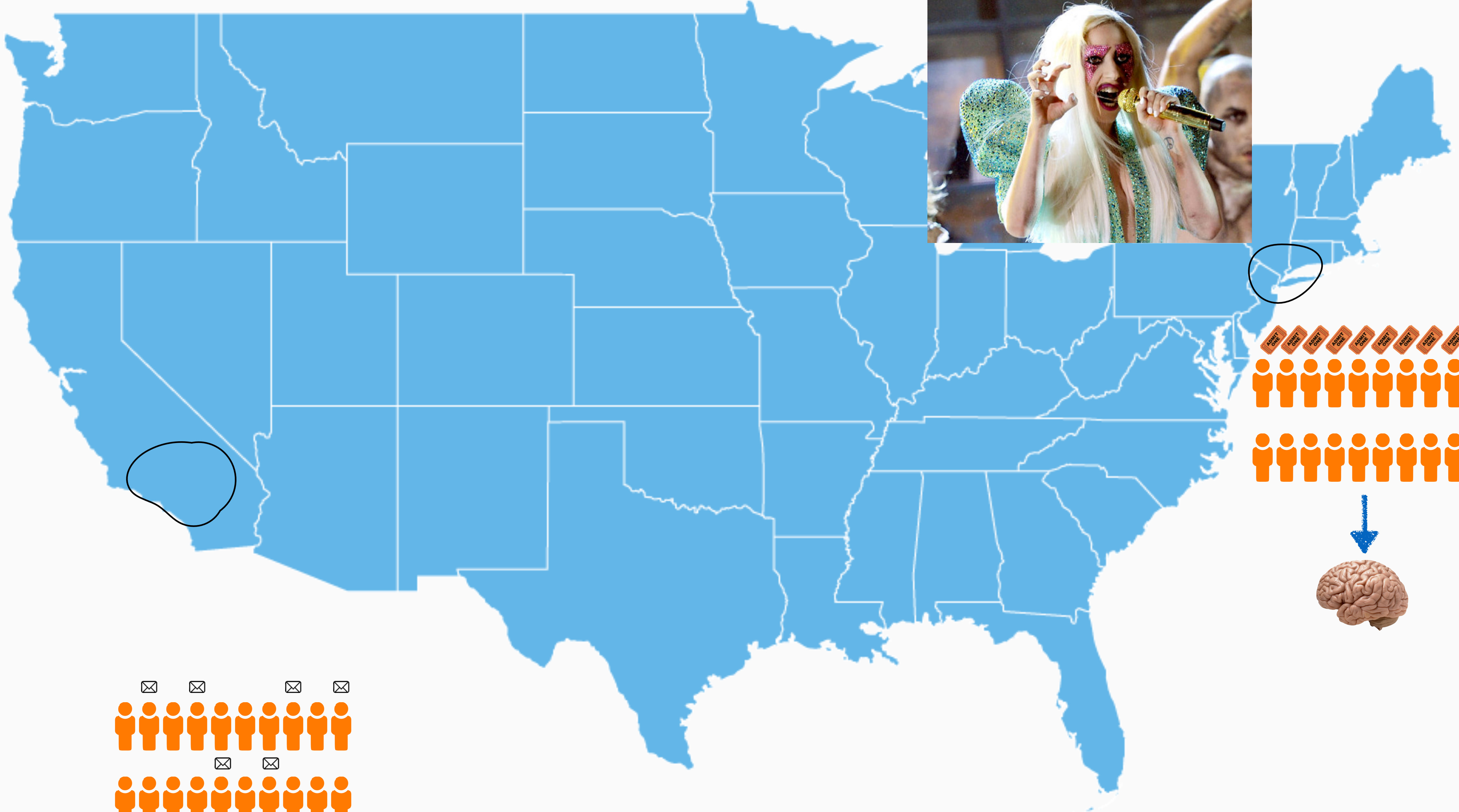


Depeche Mode

Millennials

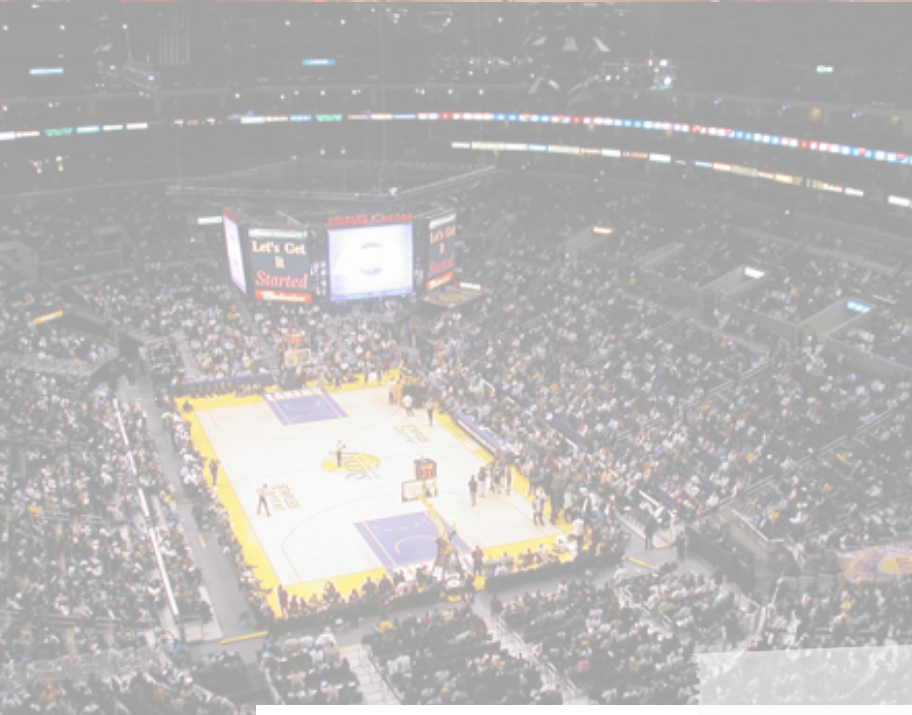


Grits and Biscuits



Next

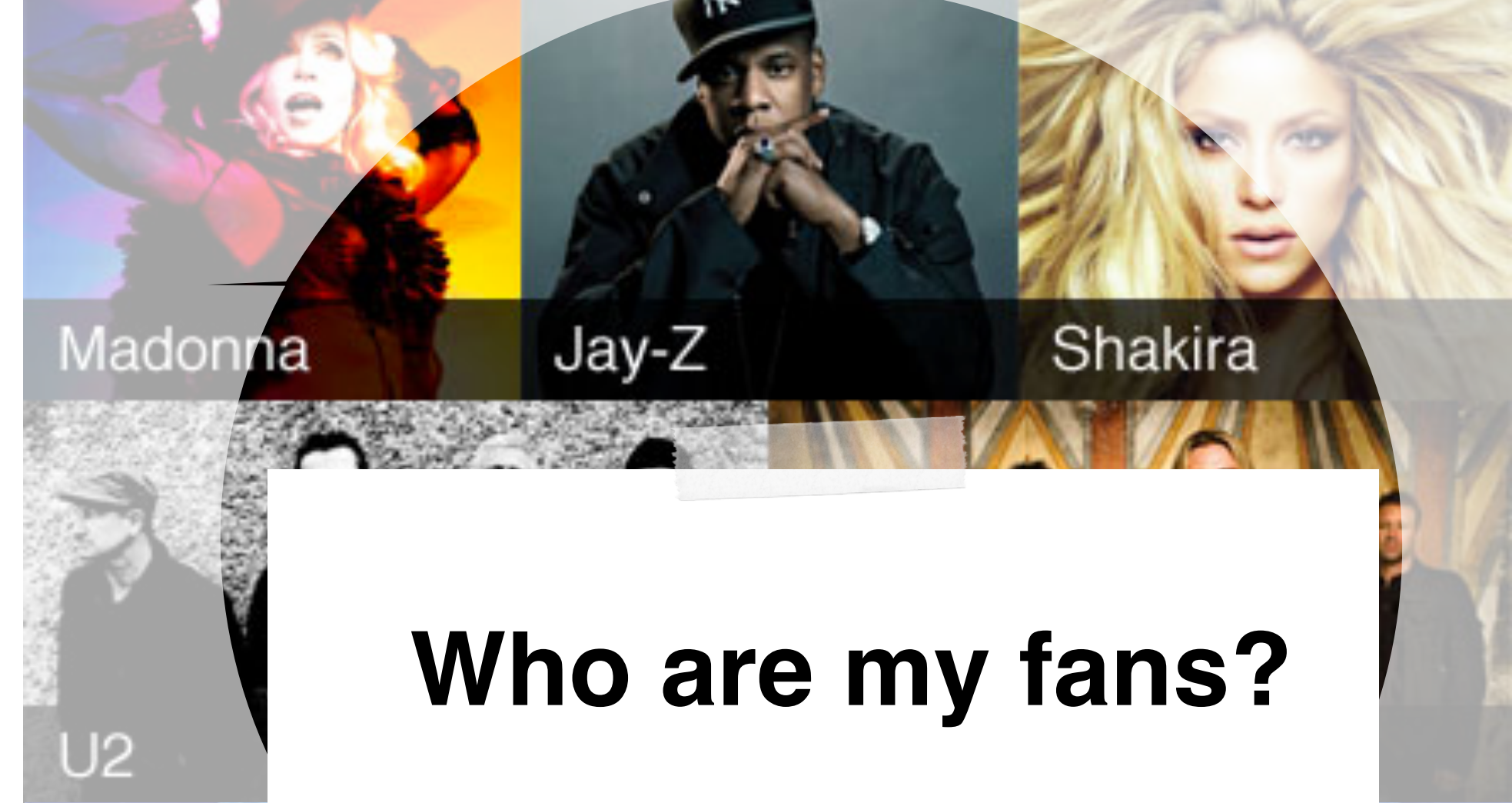
Tens of thousands
models



Recommendations



Tickets to the Fans (not scalpers)

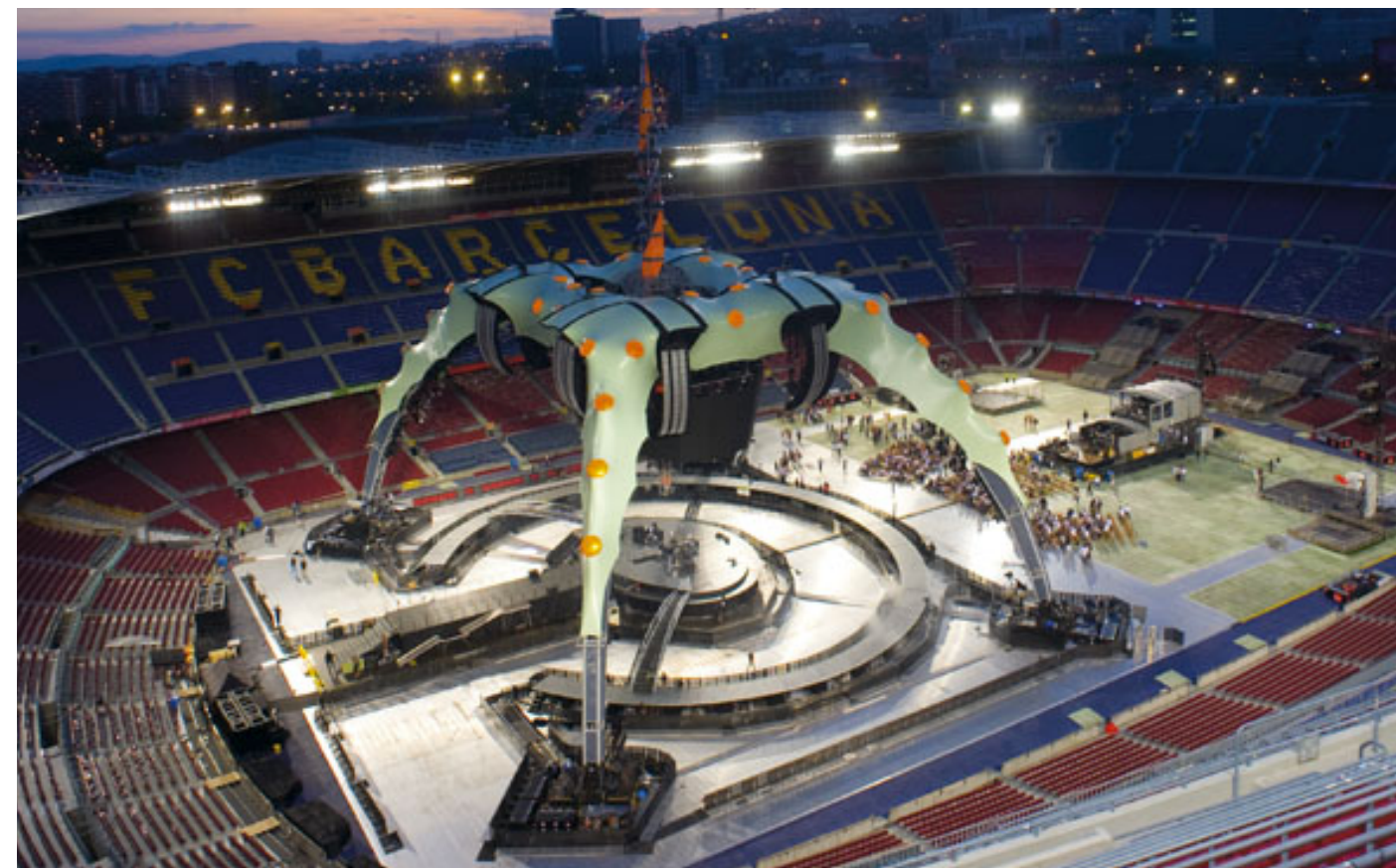


Who are my fans?

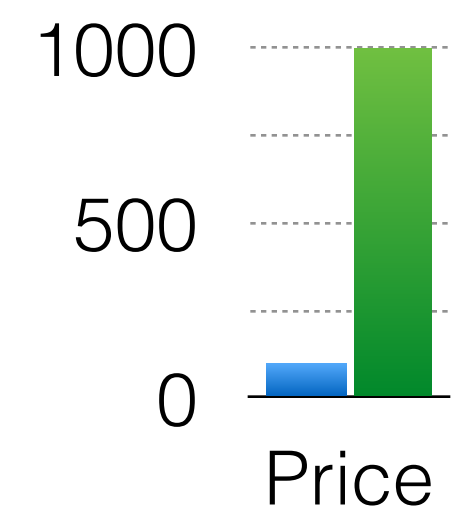
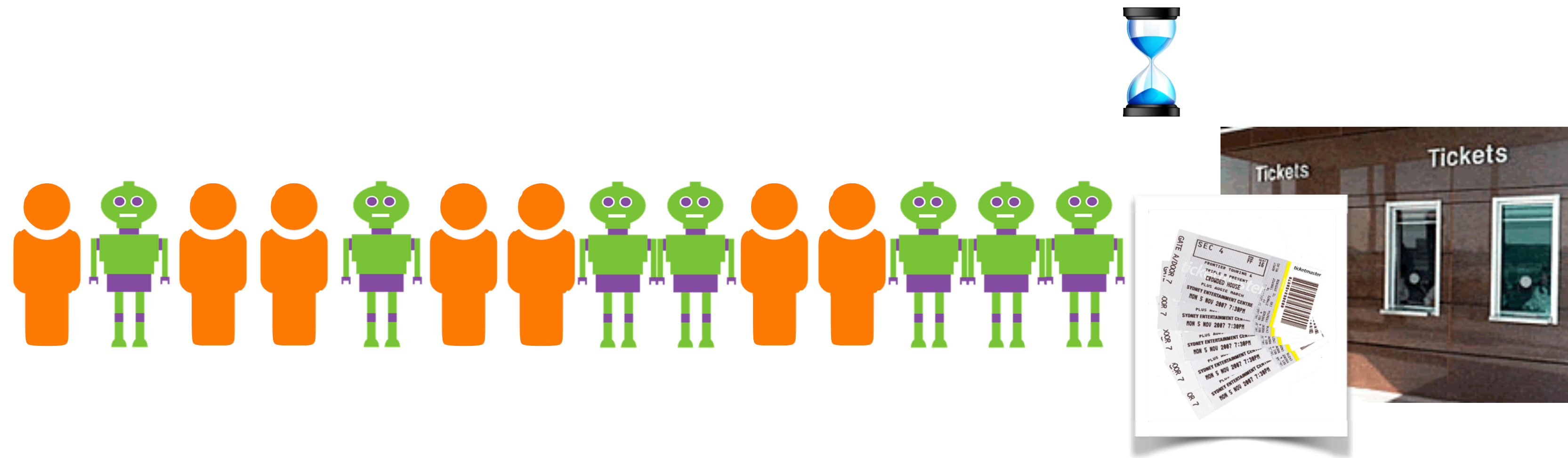


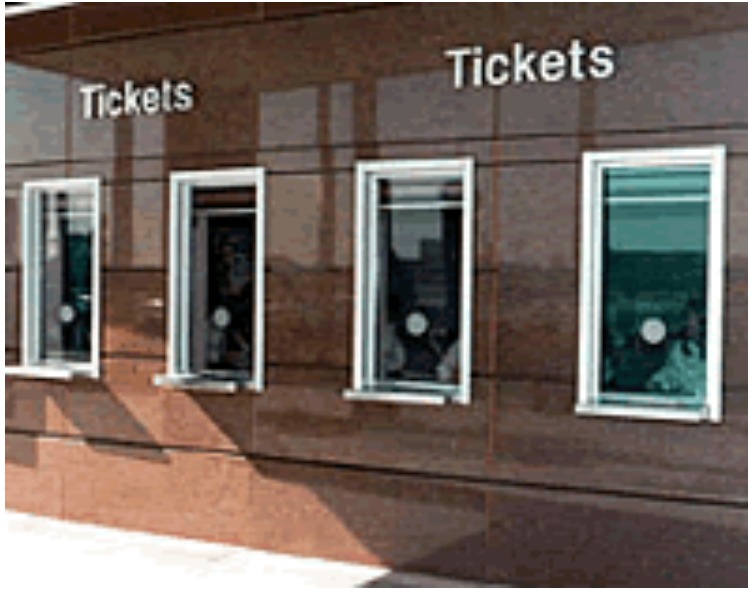
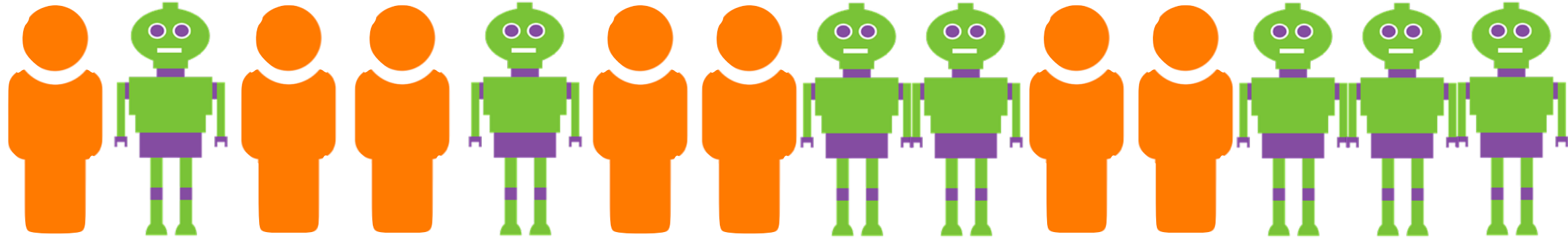


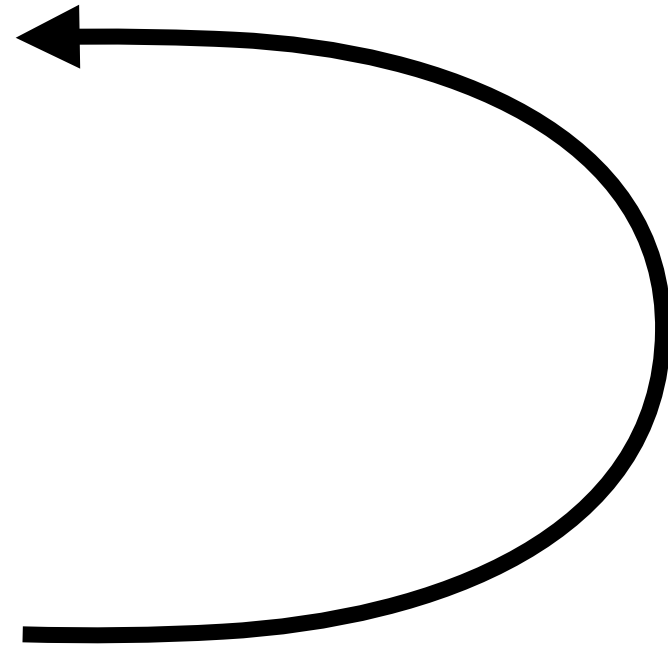
ticketmaster®



LIVE NATION®







Storm



JNI

vowpal wabbit

```

x | Headers | Preview Response Cookies Timing
* General
Remote Address: 188.87.136.288:80
Request URL: http://creativecommons.org/licenses/by-sa/4.0/
Request Method: GET
Status Code: 200 OK
* Response Headers
Server: Apache/2.4.18 (Ubuntu)
Cache-Control: no-cache, no-store, must-revalidate
Connection: keep-alive
Content-Encoding: gzip
Content-Length: 1138
Content-Type: text/html
Date: Wed, 27 May 2015 19:13:58 GMT
Expires: Wed, 27 May 2015 19:13:58 GMT
* Request Headers
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Encoding: gzip, deflate, sdch
Accept-Language: en-US,en;q=0.8,cs;q=0.4
Connection: keep-alive
Cookie: ...
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_0_3; AppleWebKit/537.36 (KHTML, like Gecko) Chrome/37.0.2062.120 Safari/537.36

```

```

x | Headers | Preview Response Cookies Timing
* General
Remote Address: 188.87.136.288:80
Request URL: http://creativecommons.org/licenses/by-sa/4.0/
Request Method: GET
Status Code: 200 OK
* Response Headers
Server: Apache/2.4.18 (Ubuntu)
Cache-Control: no-cache, no-store, must-revalidate
Connection: keep-alive
Content-Encoding: gzip
Content-Length: 1138
Content-Type: text/html
Date: Wed, 27 May 2015 19:13:58 GMT
Expires: Wed, 27 May 2015 19:13:58 GMT
* Request Headers
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Encoding: gzip, deflate, sdch
Accept-Language: en-US,en;q=0.8,cs;q=0.4
Connection: keep-alive
Cookie: ...
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_0_3; AppleWebKit/537.36 (KHTML, like Gecko) Chrome/37.0.2062.120 Safari/537.36

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```

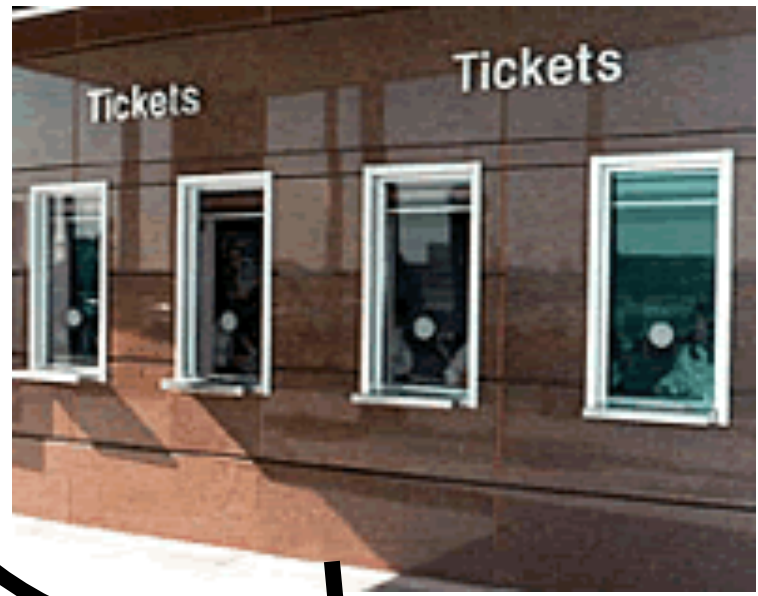
```

x | Headers | Preview Response Cookies Timing
* General
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Request URL: http://creativecommons.org/licenses/by-sa/4.0/
Request Method: GET
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Accept-Encoding: gzip, deflate, sdch
Accept-Language: en-US,en;q=0.8,cs;q=0.4
Connection: keep-alive
Cookie: ...
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_0_3; AppleWebKit/537.36 (KHTML, like Gecko) Chrome/37.0.2062.120 Safari/537.36

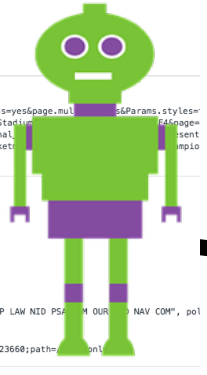
```



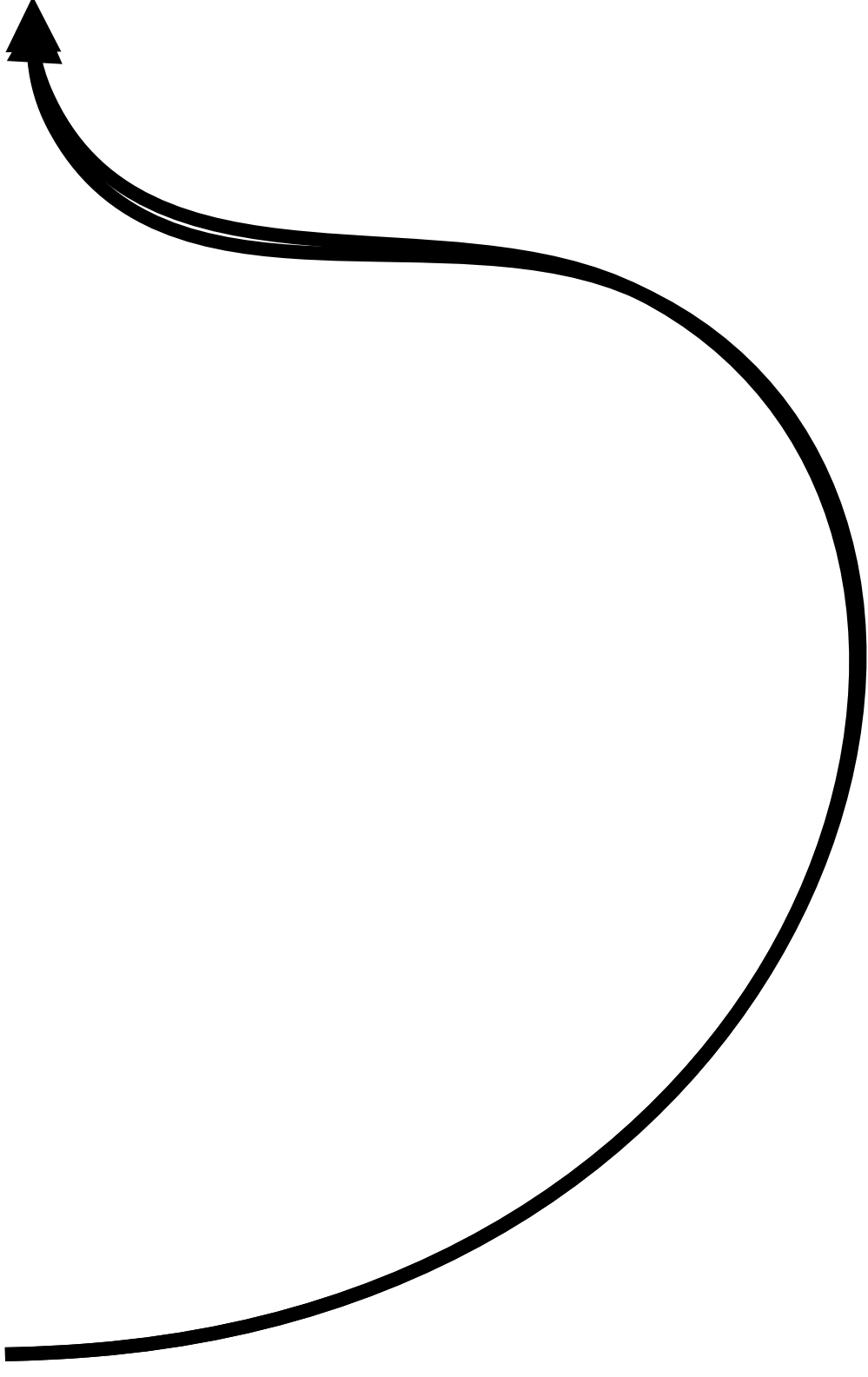
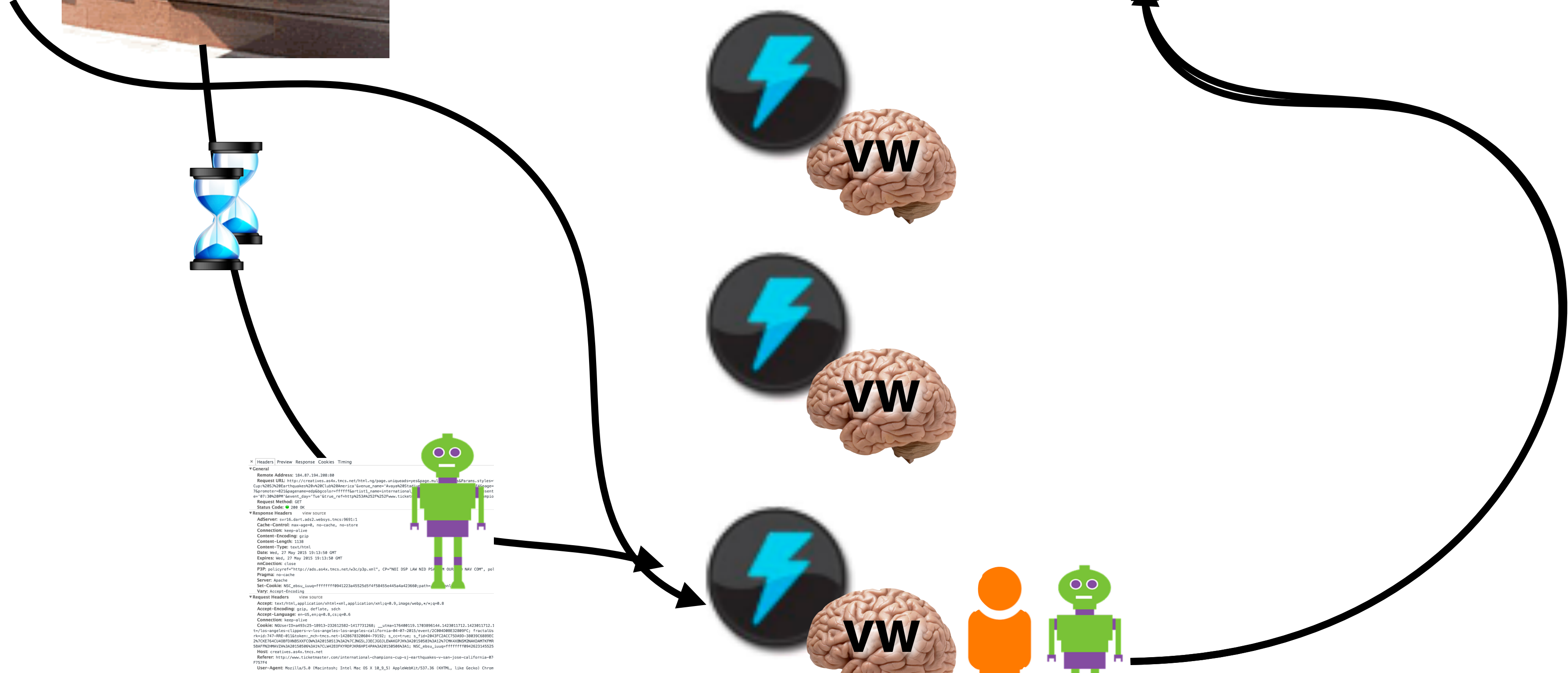
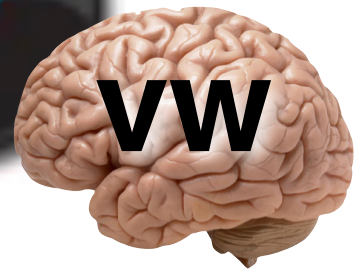
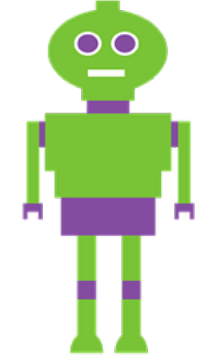
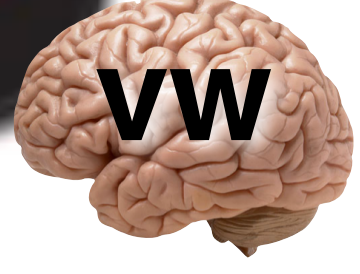
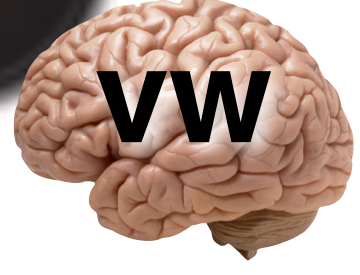

```
< Headers | Preview | Response | Cookies | Timing
* General
Remote Address: 194.87.194.208:80
Request URL: http://tickets.aa44.tncc.net/html-ng/page-unitedoverseaspage.html?dst=system-stylor=
...
Response Headers
Server: Apache
Set-Cookie: MDC_session_id=...
Request Headers
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-us,en;q=0.8,cs;q=0.6
...
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_8_3) AppleWebKit/537.36 (KHTML, like Gecko) Chrome
```



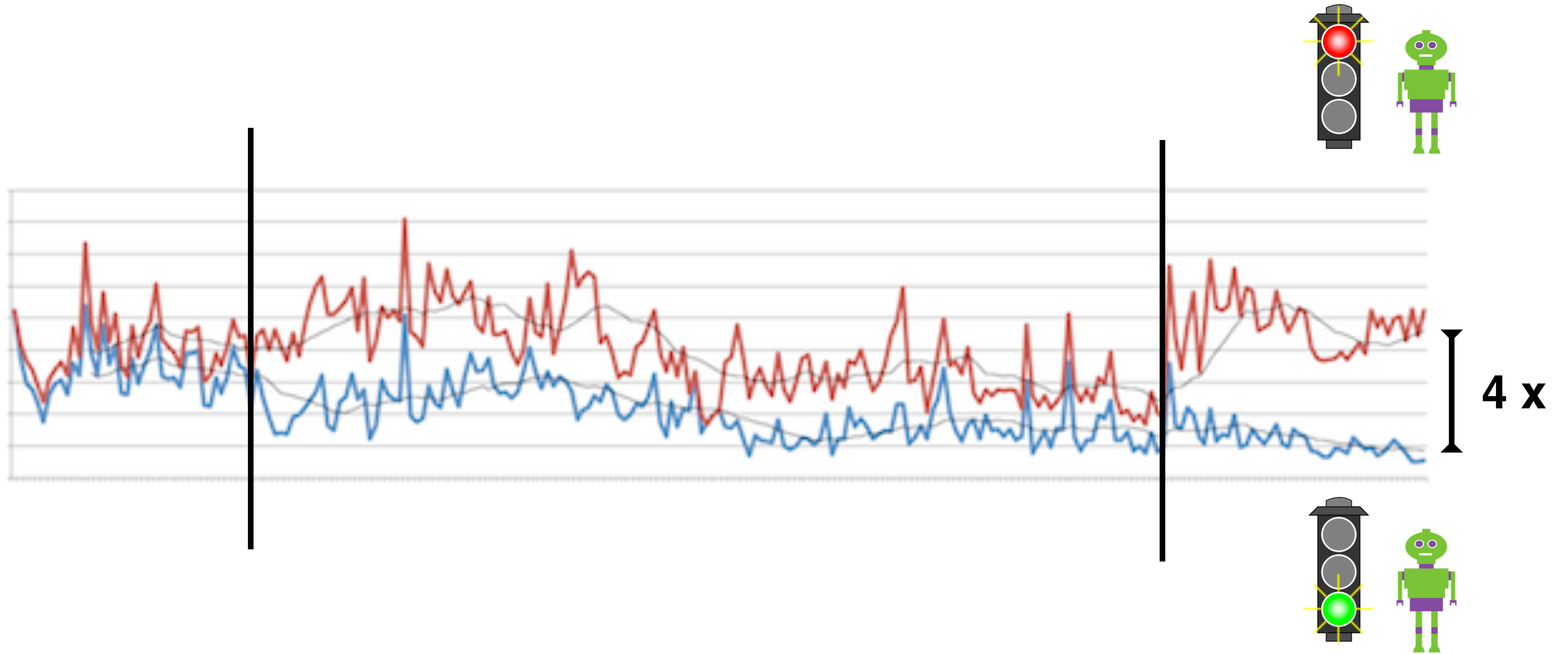
?



```
< Headers | Preview | Response | Cookies | Timing
* General
Remote Address: 194.87.194.208:80
Request URL: http://tickets.aa44.tncc.net/html-ng/page-unitedoverseaspage.html?dst=system-stylor=
...
Response Headers
Server: Apache
Set-Cookie: MDC_session_id=...
Request Headers
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-us,en;q=0.8,cs;q=0.6
...
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_8_3) AppleWebKit/537.36 (KHTML, like Gecko) Chrome
```

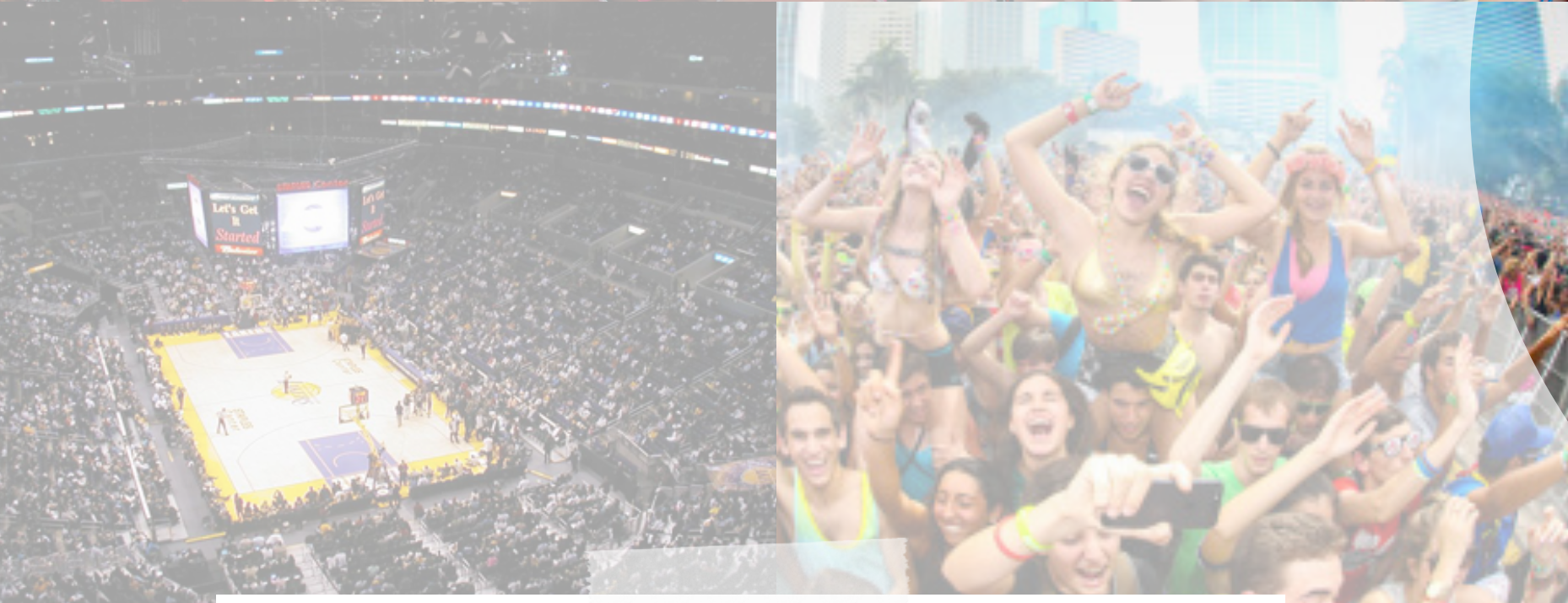


In-cart conversion



Next steps

Arms Race



Recommendations



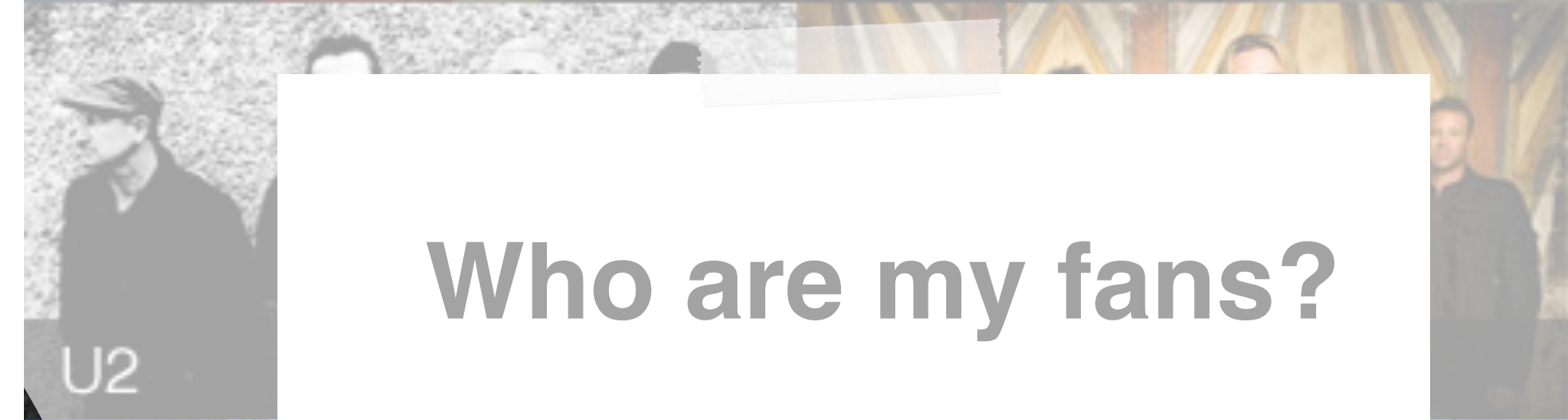
Tickets to the Fans (not scalpers)



Madonna

Jay-Z

Shakira



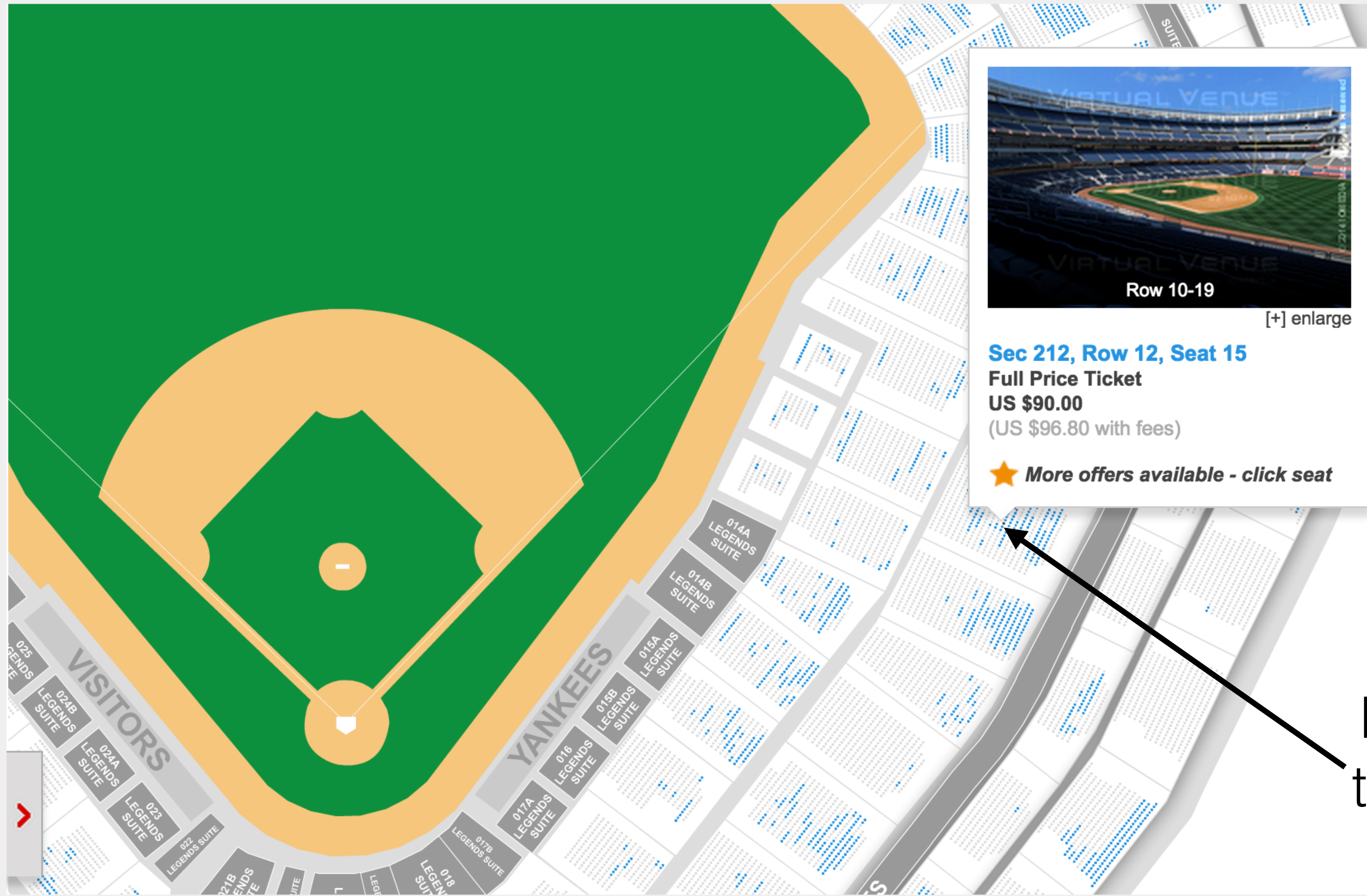
U2

Who are my fans?



Now what?

Decades of
granular and
longitudinal data



Row 10-19

[+] enlarge

Sec 212, Row 12, Seat 15

Full Price Ticket

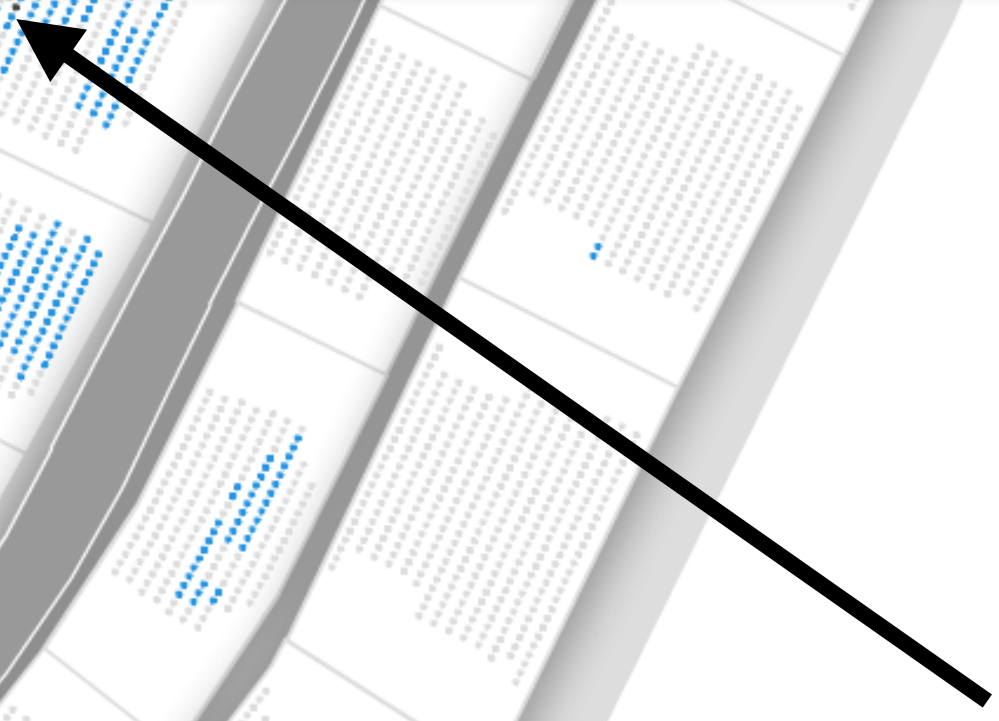
US \$90.00

(US \$96.80 with fees)

★ **More offers available - click seat**



Jump from section to section here!



Recommend
the best **Seat**
for you



[linkedin.com/in/petricek](https://www.linkedin.com/in/petricek)