



# Startup Engineering

[coursera.org/course/startup](https://coursera.org/course/startup)

Guest Lecture

Alex Blackstock & Spike Brehm



Where are you going?

BROWSE ▾

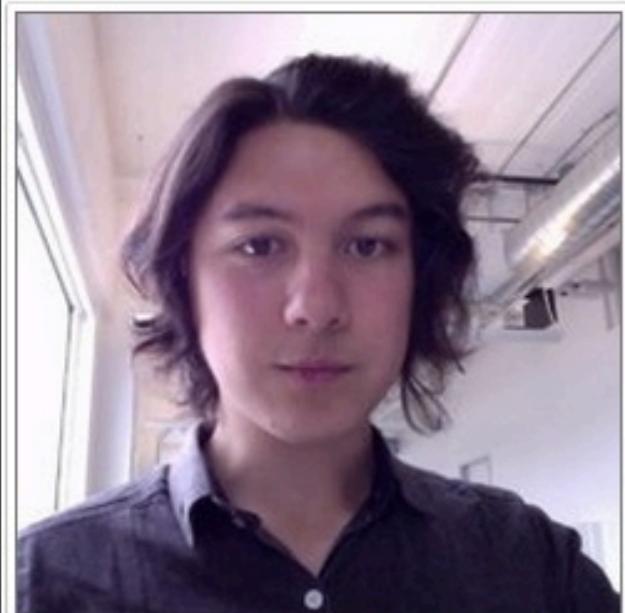


Alex ▾



HELP ▾

LIST YOUR SPACE Ad



Alex

from San Francisco, CA

Edit Profile

#### Verifications



Phone Number Verified

(415) 555-1234



#### Old Favorites

14 Listings



#### Aylin's Hood

1 Listing

Hey, I'm Alex!

Member Since August 2011

I love technology, timeless design, and bringing people together through music. In my hometown, I enjoy DJing house and techno music, craft cocktail mixology, urban photography, and conversing about the wonderful experiences life brings.

8  
1 like 1 dislike

REVIEWS

#### Wish Lists (2)



Where are you going?

BROWSE ▾



Alex ▾



HELP ▾

LIST YOUR SPACE

Admin

# Find a place to stay.

Rent from people in 36,480 cities and 192 countries.

Where do you want to go?

Check in



Check out



1 Guest



Search



**Modern Beachhouse**  
Kjosarhreppur, Iceland - \$220



Popular

Friends

Airbnb Picks

My Wish Lists

# Experience the northern lights

House - Entire home/apt · Midbud 7, Kjósarhreppur, 276 Mosfellsbaer Iceland, Kjósarhreppur, Höfuðborgarsvæði utan Reykjavíkur, Iceland

9  
Reviews

[Photos](#)[Maps](#)[Calendar](#)[Description](#)[Amenities](#)

Modern 150 sqm. house built in 2010 by the seaside with a spectacular views and scenery on all sides. Quiet and peaceful.

Bright open living area, large viewing windows to the spectacular ocean view. Two bedrooms, sleeps 5 (double bed, single bed, sofabed, 100 cm, mattress). Walk-in closet. One bathroom with shower. Large deck for outdoor enjoyment and a outdoor shower.

From

**\$220**

Per Night

Check in

Check out

Guests

1

/yyy

mm/dd/yyy

Subtotal

**Book It!****Save to Wish List**

Saved 1926 times

**Kristin****Contact Me**

# Overview

**The Story**

**The Stack**

**The Future**

**It's Hack Time!**

1

# THE STORY

# Joe

# Nate



# Brian

2007



**Brian moves  
in with Joe**



**Rent increases**  
They can't afford it



# Rent Increases

They can't afford it



## SF Design Conference





**NO VACANCY**







AirBed & Breakfast™

Find a place  
to stay.

AIRBNB LISTINGS IN SAN FRANCISCO: BLOCK-BY-BLOCK

THEN  
(2008)



NOW  
(2012)

# 2008

airbnb

 Tweet

 Pin it

 Like 1.6k



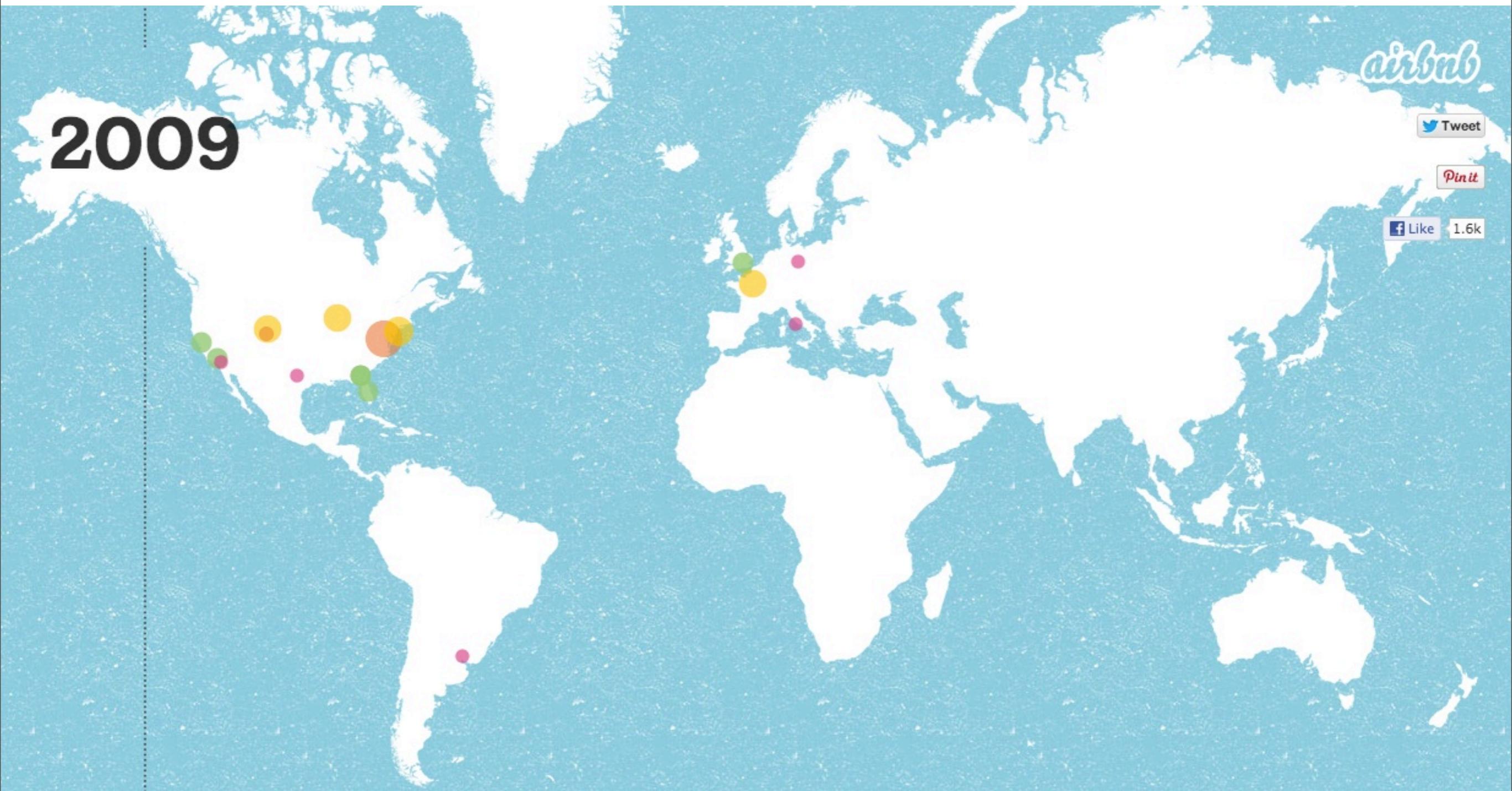
# 2009

airbnb

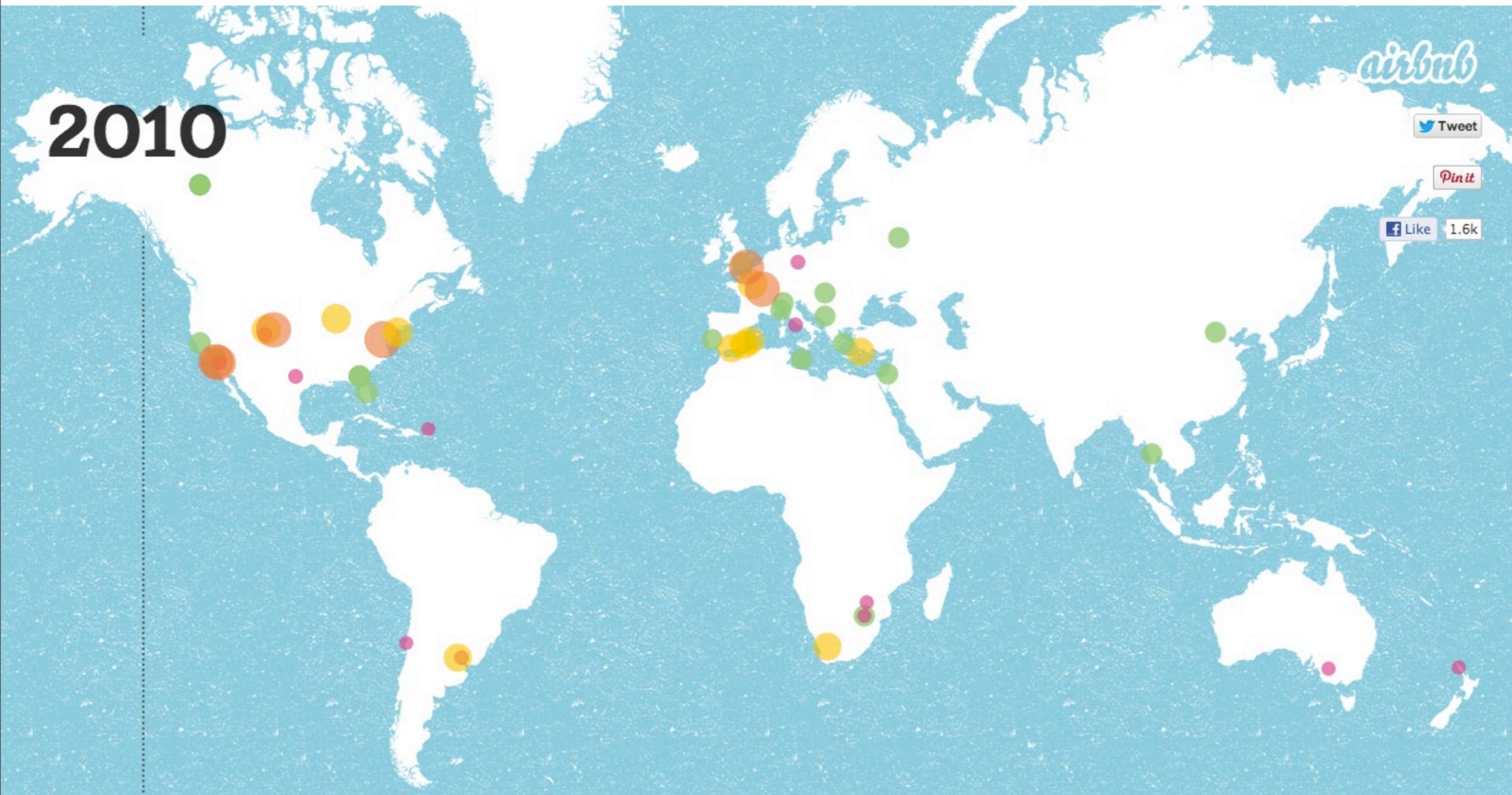
 Tweet

 Pin it

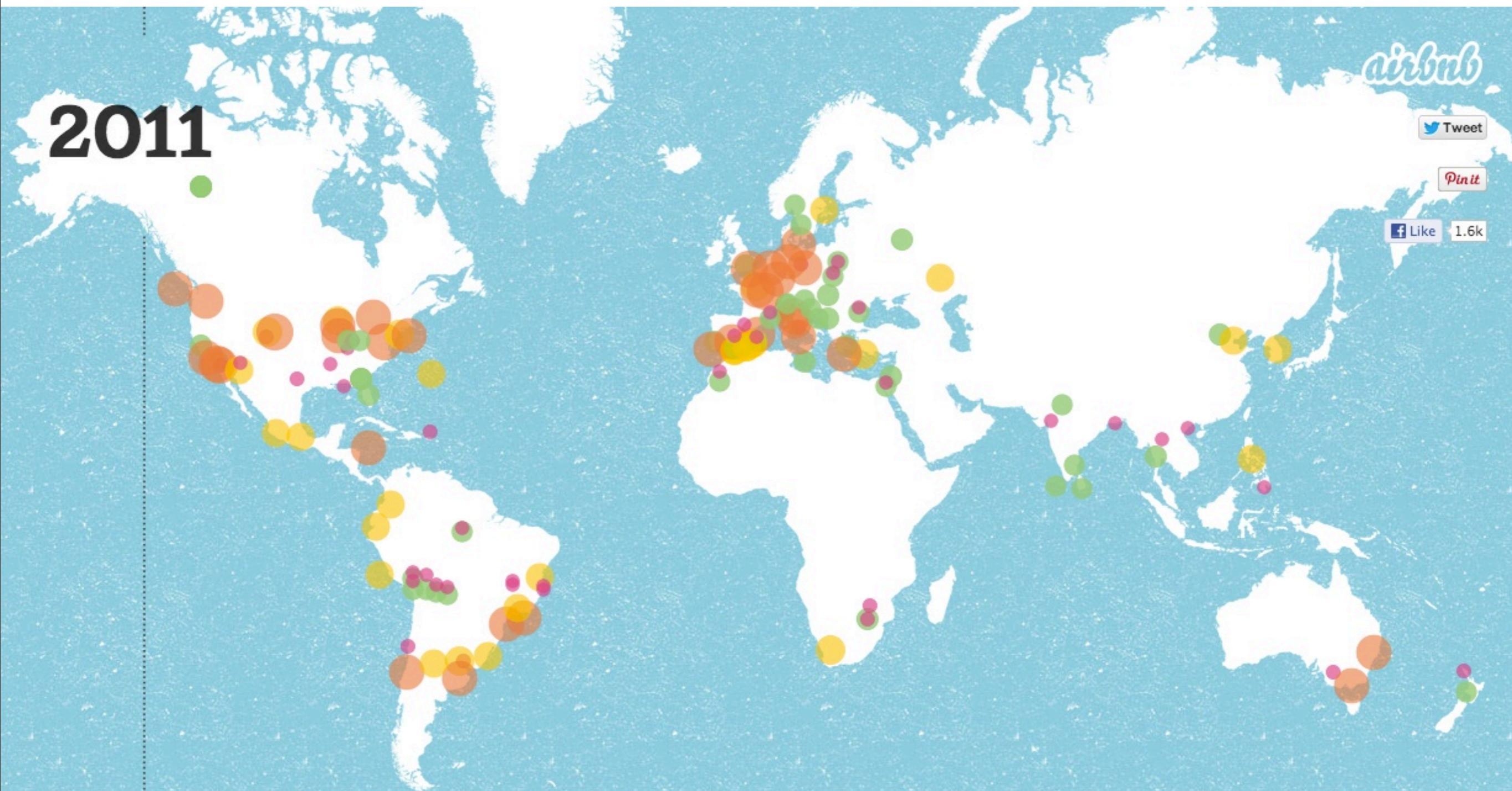
 Like 1.6k



# 2010



# 2011



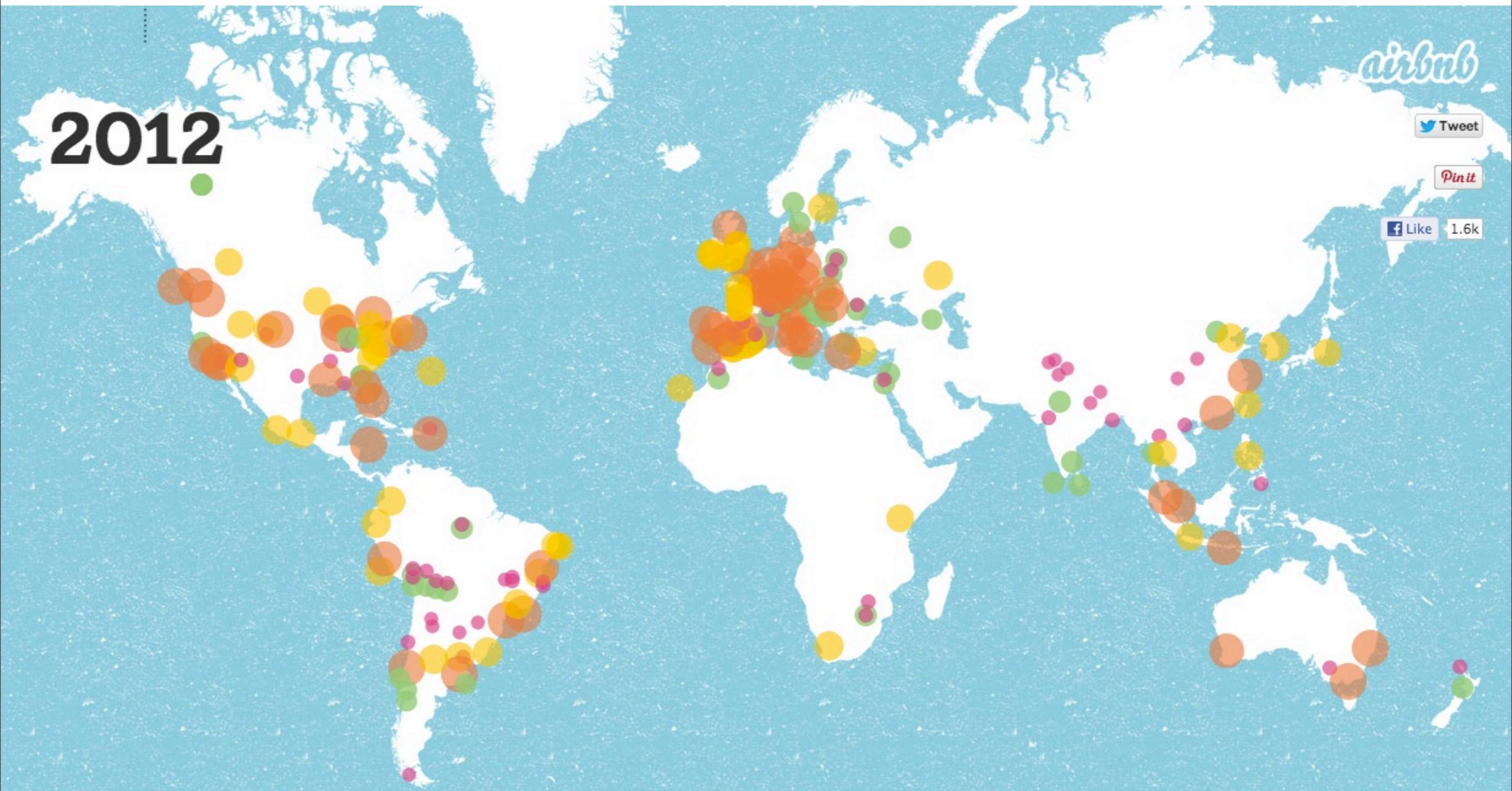
# 2012

airbnb

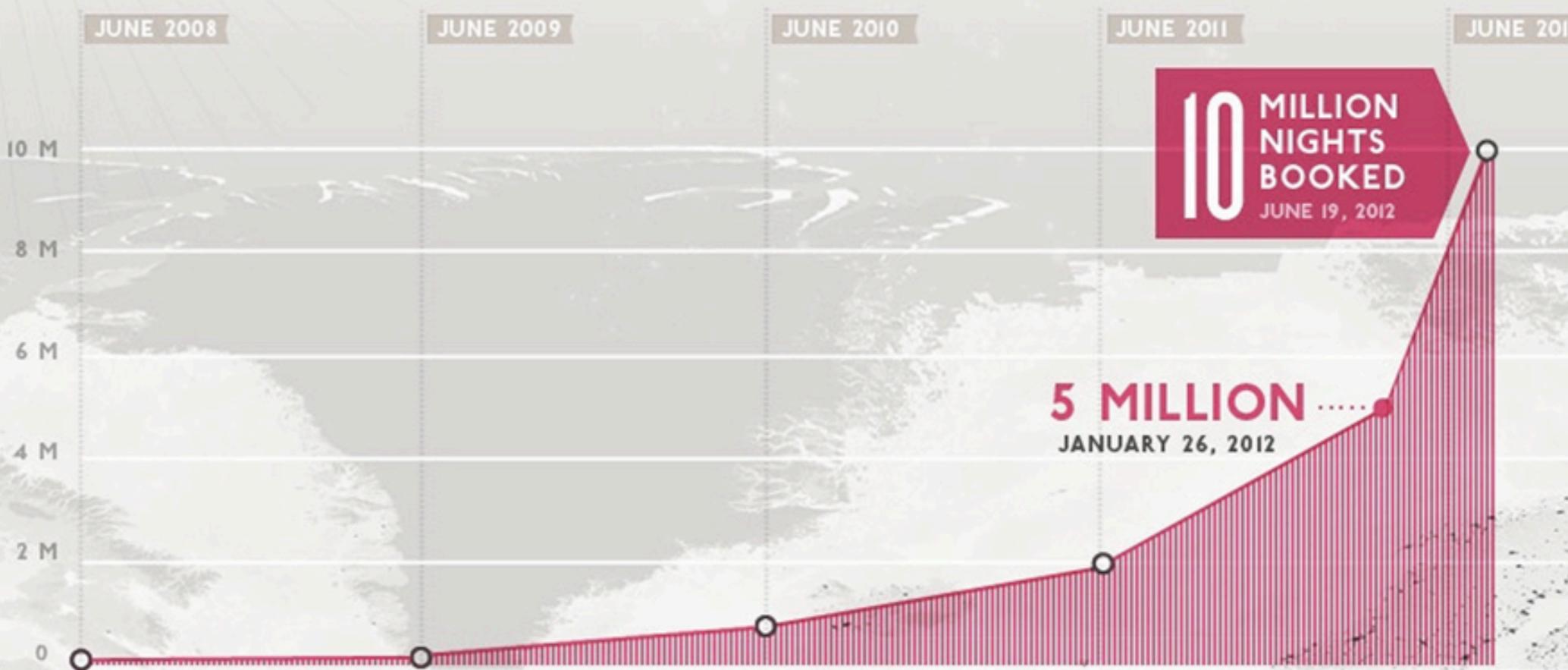
Tweet

Pin it

Like 1.6k



# GUEST NIGHTS BOOKED



A NIGHT  
IS  
BOOKED...

IN 2008 –  
  
-every-  
**DAY**

IN 2009 –  
  
-every-  
**5 MIN.**

IN 2010 –  
  
-every-  
**MINUTE**

IN 2011 –  
  
-every-  
**10 SEC.**

IN 2012 –  
  
-every-  
**2 SEC.**

# Big Growth, Big Problems

Fraud  
Search

Payments

Trust & Safety

Internationalization



# 2

## THE STACK

**Rails** Framework

**MySQL** Database

**Hadoop** Analytics

**Redis** Key/Value Store

**CoffeeScript** Client Language

**Backbone** Client Framework

**Node** SSJS

**SASS** Stylesheets

# Amazon Web Services

**EC2** Web Servers

**RDS** Database

**S3** Storage

**ELB** Load Balancing

**EMR** Cluster Computing

**DynamoDB** Distributed K/V

**Elasticache** Memcache

**Ever heard of... ?**

**ZooKeeper** Service Discovery

**Mesos** Resource Sharing

**Redshift** Warehousing

**Chef** Deployment

**Sphinx** Search

**Weka** Data Mining

# 3

## THE FUTURE



## Where are you going?

## BROWSE -



Alex



HELP

**LIST YOUR SPACE**



Hey, I'm Spike!

Member Since April 2011

I'm a software engineer at Airbnb, which is my dream job -- building innovative web products and traveling and meeting new people along the way. I love to explore new places, and to play music. I play bass in various groups in San Francisco, with the occasional gig up or down the coast.



8

REVIEWS

## Social Connections (1)



Spike Brehm is a friend

## Verifications

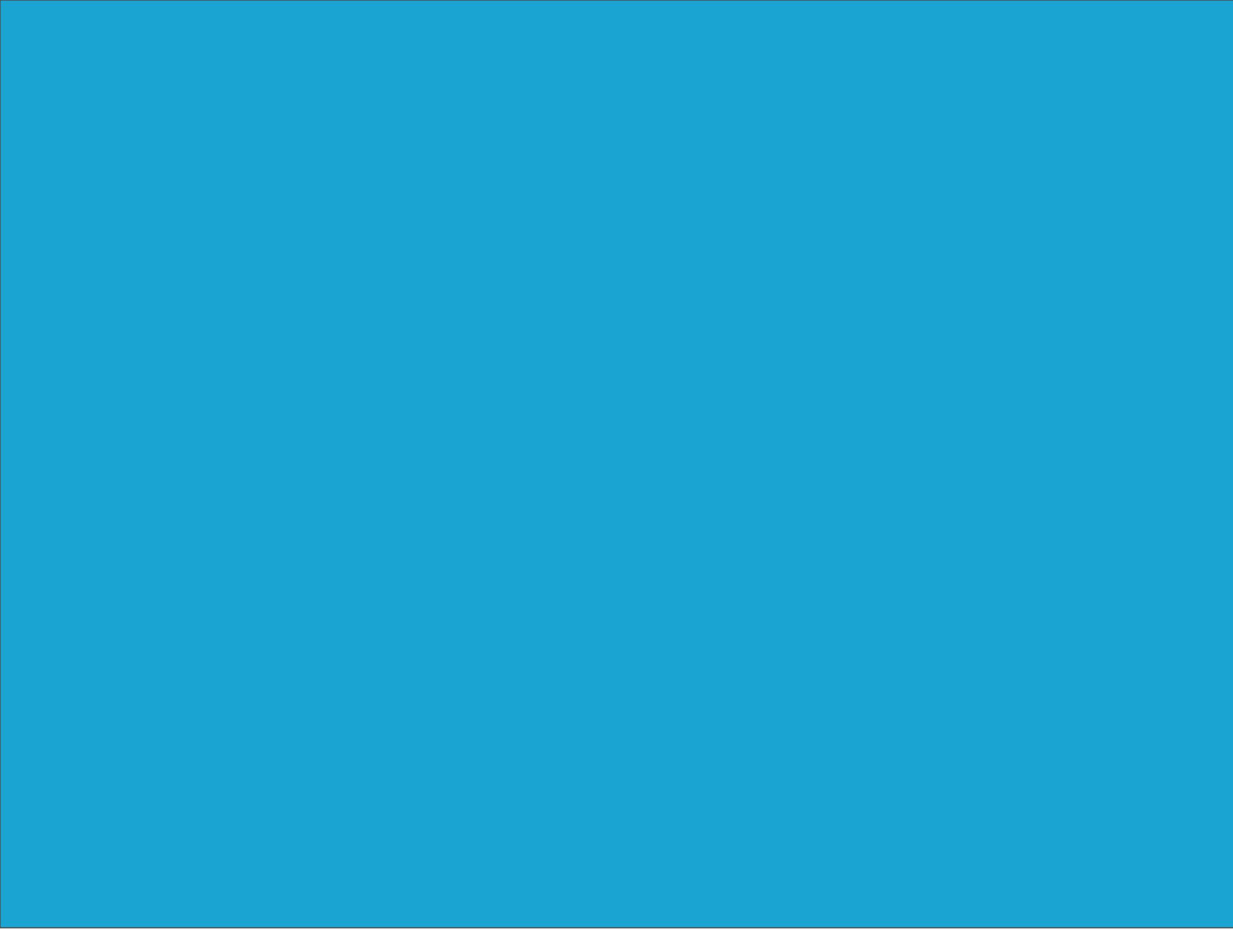


Phone Number Verified

(10) 111- 58



## Wish Lists (37)



Let's talk  
about  
webapps

**san francisco**

Check in

08/18/2008

Check out

08/20/2008

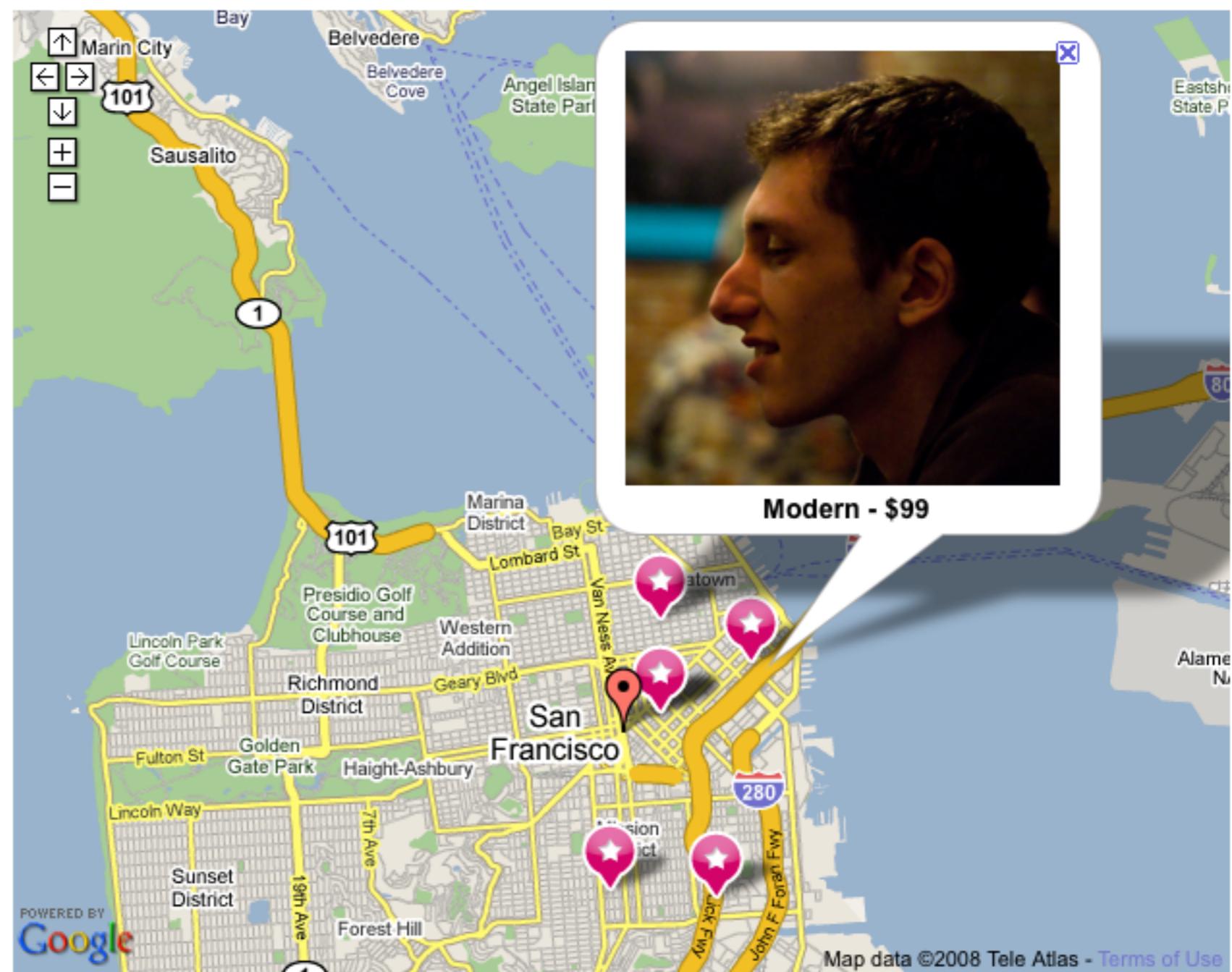
Guests

1

**Search**[Sorting Options](#)

1–10 out of 16 listings.

	"tikitastic"	\$10
	"Cute!"	\$25
	"Simple"	\$50
	"AwesomeRoom"	\$50
	"happy"	\$50
	"Victorian"	\$50
	"Get Fit!"	\$80
	"Sunny"	\$85
	"Cute"	\$90
	"Modern"	\$99

[1](#) [2](#) [Next](#)

**Airbedandbreakfast.com**

# Airbedandbreakfast.com

**Started in 2008**

# Airbedandbreakfast.com

**Started in 2008**

**Ruby on Rails app**

# Airbedandbreakfast.com

**Started in 2008**

**Ruby on Rails app**

**Was Rails 2.3; painful upgrade to 3.x**

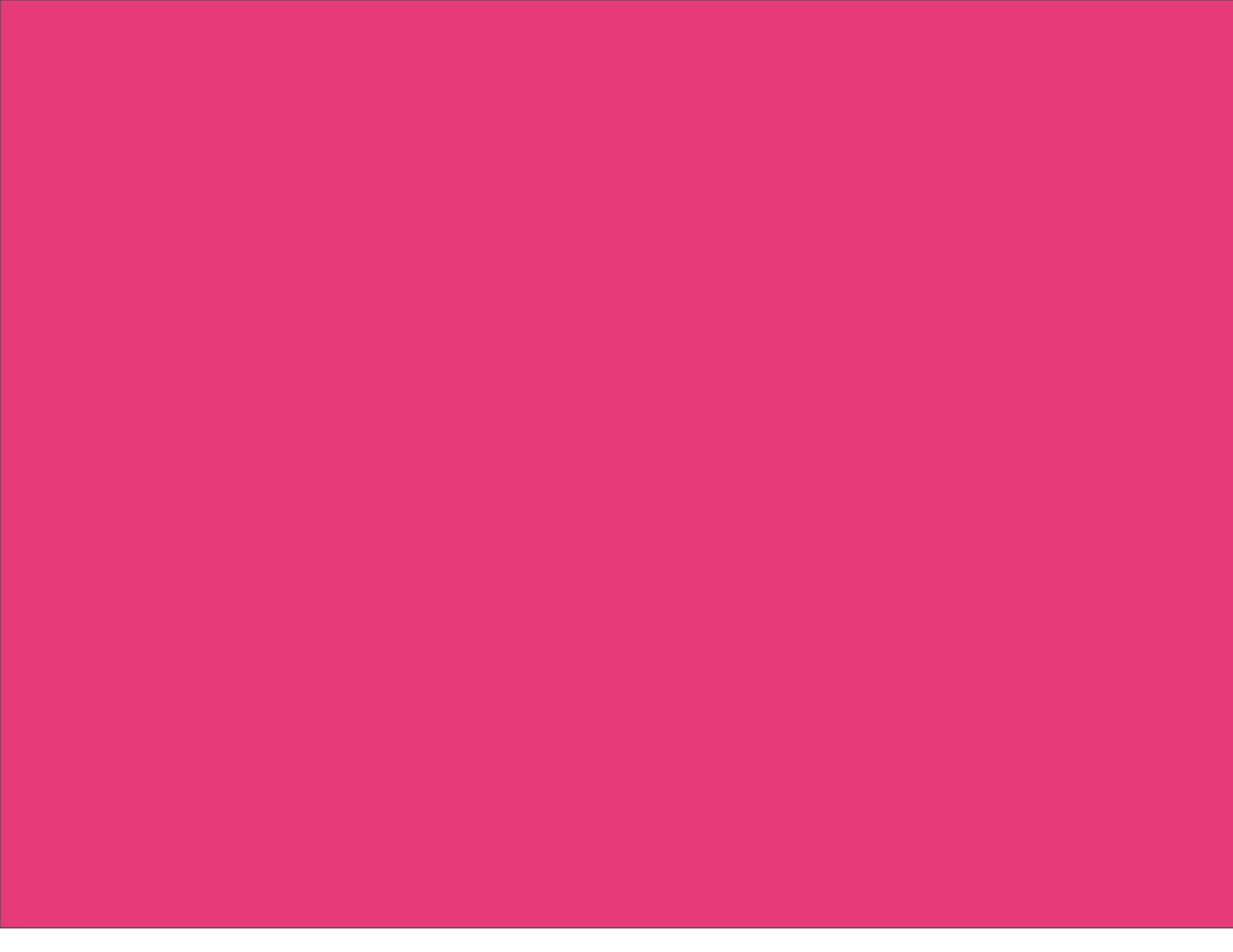
# Airbedandbreakfast.com

**Started in 2008**

**Ruby on Rails app**

**Was Rails 2.3; painful upgrade to 3.x**

**Traditional page-based paradigm**



# website

website

v.

**website**

v.

**webapp**

# website

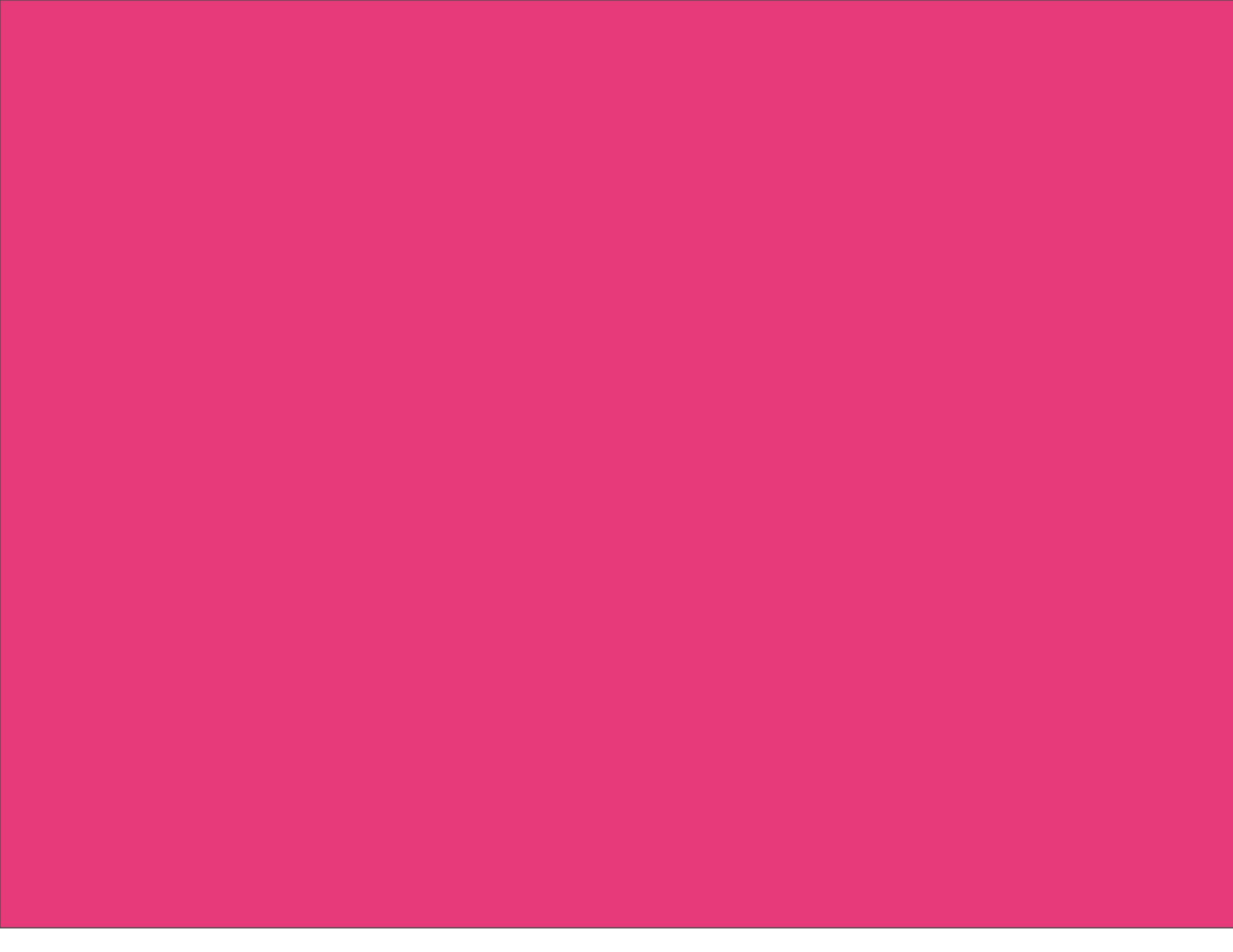
client

server

# webapp

client

server



**past**

**past**

**v.**

**past**

**v.**

**future**



# rich client app

rich client app  
**fat client app**

rich client app

fat client app

single page app



**What is a  
single page  
app?**



Search Mail

Search the Web

[Show search options](#) [Create a filter](#)[Compose Mail](#)[« Back to Inbox](#)[Archive](#)[More actions...](#) ▾1 of 4 [Older](#) ▾[Inbox](#)[Starred](#) ★[Sent Mail](#)[All Mail](#)[Spam](#)[Trash](#)

▼ Labels

[Edit labels](#)**Summer concerts, including Britney Spears!**[Inbox](#)[Apply label...](#) ▾

★ **Ana R. Yang** First, no jokes about my taste in music. Second, just got this sum... Apr 5 (17 hours ago)

★ **Roy Gilbert** to Ana, me, theman, Brian More options Apr 5 (15 hours ago)

The Beach Boys would be fun. Brian, should we get a group together to eat first? Maybe find a good Mexican restaurant nearby?

- Show quoted text -

[Reply](#) [Reply to all](#) [Forward](#)

★ **Brian Rakowski** to Roy, Ana, me, theman More options Apr 5 (12 hours ago)

That sounds great. The winery is a nice venue too. I'm sure we can find some good Mexican food in downtown Saratoga.

Count me in,

Brian

- Show quoted text -

[Reply](#) [Reply to all](#) [Forward](#)

★ **David Pan** to Brian, Roy, Ana, theman More options 8:56am (1 hour ago)

Is it too late to get in on the Britney tickets? I watch her as often as I can on MTV. Is she on Atkin's? I think she's losing weight.

David

- Show quoted text -

[Reply](#) [Reply to all](#) [Forward](#)

[Open in new window](#)[Print conversation](#)[Expand all](#)

Sponsored Links

[TicketsNow.com](#)

Secure Shopping - affiliate Concert, Sports, & Theater Tickets!

[www.TicketsNow.com](#)[The Ticket Bank](#)

Tickets available for all events Order online or call 619-459-5322

[TheTicketBank.us](#)

Related Pages

[Official Ticketmaster site.](#)[Tickets for Music Concerts.](#)[Rock ...](#)

Find and buy concert tickets: rock, pop, soul, jazz, blues, r&b at ...

[www.ticketmaster.com](#)[Major Activities Board](#)

A student organization devoted to providing high quality ...

[mab1.uchicago.edu](#)[About these links](#)[« Back to Inbox](#)[Archive](#)[More actions...](#) ▾1 of 4 [Older](#) ▾

You are currently using 0 MB (0%) of your 1000 MB.

Visit [settings](#) to save time with **keyboard shortcuts!**

[Terms of Use](#) - [Privacy Policy](#) - [Program Policies](#) - [Google Home](#)

©2004 Google



**navigate around the app  
without page refresh**

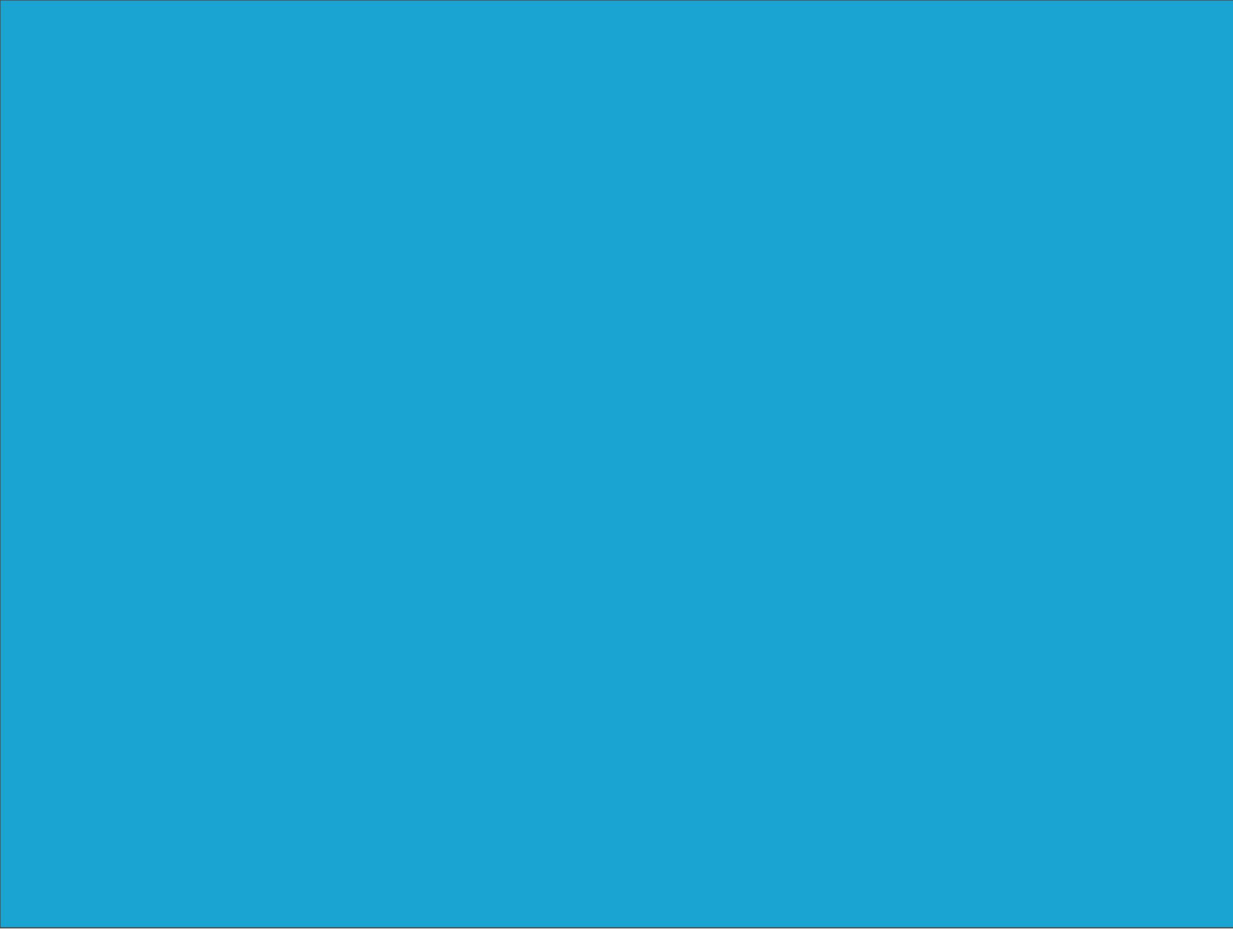
navigate around the app  
without page refresh

application logic in the client

**navigate around the app  
without page refresh**

**application logic in the client**

**fetch data on demand**



**How do you  
build a single  
page app?**



**JS**



**Why now?**



# faster JavaScript runtimes

# faster JavaScript runtimes

## new browser features (pushState, localStorage, WebGL, etc.)

faster JavaScript runtimes

new browser features  
(pushState, localStorage,  
WebGL, etc.)

heightened user expectations



# How we do it.





# BACKBONE.JS

+





## [Backbone.js \(0.9.10\)](#)

- » [GitHub Repository](#)
- » [Annotated Source](#)

### [Introduction](#)

### [Upgrading](#)

### [Events](#)

- [on](#)
- [off](#)
- [trigger](#)
- [once](#)
- [listenTo](#)
- [stopListening](#)
- [Catalog of Built-in Events](#)

### [Model](#)

- [extend](#)
- [constructor / initialize](#)
- [get](#)
- [set](#)
- [escape](#)
- [has](#)
- [unset](#)
- [clear](#)
- [id](#)
- [idAttribute](#)
- [cid](#)
- [attributes](#)
- [changed](#)
- [defaults](#)
- [toJSON](#)
- [sync](#)
- [fetch](#)
- [save](#)
- [destroy](#)
- [validate](#)
- [validationError](#)
- [url](#)
- [urlRoot](#)



# BACKBONE.JS

Backbone.js gives structure to web applications by providing **models** with key-value binding and custom events, **collections** with a rich API of enumerable functions, **views** with declarative event handling, and connects it all to your existing API over a RESTful JSON interface.

The project is [hosted on GitHub](#), and the [annotated source code](#) is available, as well as an online [test suite](#), an [example application](#), a [list of tutorials](#) and a [long list of real-world projects](#) that use Backbone. Backbone is available for use under the [MIT software license](#).

You can report bugs and discuss features on the [GitHub issues page](#), on Freenode IRC in the `#documentcloud` channel, post questions to the [Google Group](#), add pages to the [wiki](#) or send tweets to [@documentcloud](#).

*Backbone is an open-source component of [DocumentCloud](#).*

## Downloads & Dependencies (Right-click, and use "Save As")

### Development Version (0.9.10)

56kb, Full source, lots of comments

### Production Version (0.9.10)

6.3kb, Packed and gzipped

### Edge Version (master)

Unreleased, use at your own risk

[build status](#) passing



**provides structure to your JS**

**provides structure to your JS**

**MV\* (MVC, MVP, MVVM, ...)**

**provides structure to your JS**

**MV\* (MVC, MVP, MVVM, ...)**

**Backbone.View,  
Backbone.Model,  
Backbone.Collection,  
Backbone.Router**



**think about building an  
application, rather than  
manipulating HTML**



Popular

Friends

Airbnb Picks

My Wish Lists



There's something profound in being held aloft by the breathing, woody arms of nature. Escape the city bustle and channel your inner John Muir with an arboreal sojourn, allowing the treehouses of this Wish List to reconnect you with the rhythms of the forest.



Airbnb Picks:  
Trees & Zzzs 35

[Like 1.2k](#)[SHARE](#)

The Tiny Fern Forest Treehouse  
Lincoln, VT

\$  
149  
per night



The Tree House - Black Cabin  
Arlena Di Castro, Italia

\$  
523  
per night



Sunset Beach Treehouse Bung  
Haleiwa, HI

\$  
149  
per night





Palo Alto, CA

Check in



Check out

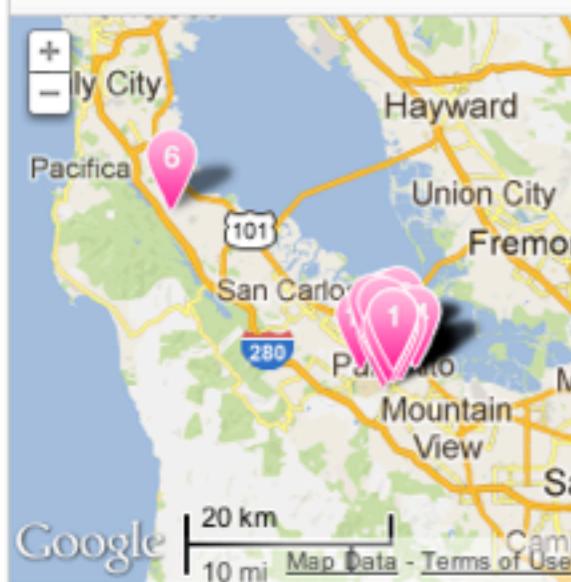
1 Guest

SEARCH

LIST

PHOTO

MAP

 Redo search in map

## Room type

 Entire home/apt

312

 Private room

513

 Shared room

105

[Show More...](#)

## Price

\$10

\$300+



## Neighborhood

 Bayview

22

 Crocker Amazon

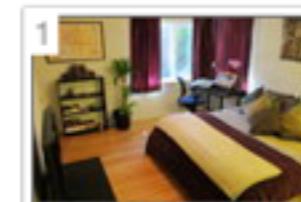
12

 Visitacion Valley

7

 Portola

4

[Show More...](#)930 results [with 10 popular on Wish Lists](#)**Stanford Palo Alto Car-Free DaVinci**

Private room — Palo Alto

25 reviews

99+ other reviews

superhost

\$95  
Per night**Palo Alto Bachelor Pad - Stanford**

Private room — Palo Alto

14 reviews

\$80  
Per night**Palo Alto Stanford Car-Free Ando**

Private room — Palo Alto

9 reviews

99+ other reviews

superhost

\$70  
Per night**Modern Downtown Palo Alto Townhome**

Entire home/apt — Palo Alto

12 reviews

7 other reviews

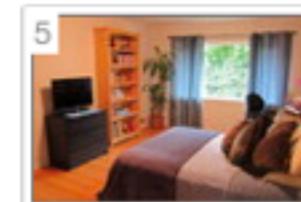
\$299  
Per night**Stanford Palo Alto Car-Free Hockney**

Private room — Palo Alto

20 reviews

99+ other reviews

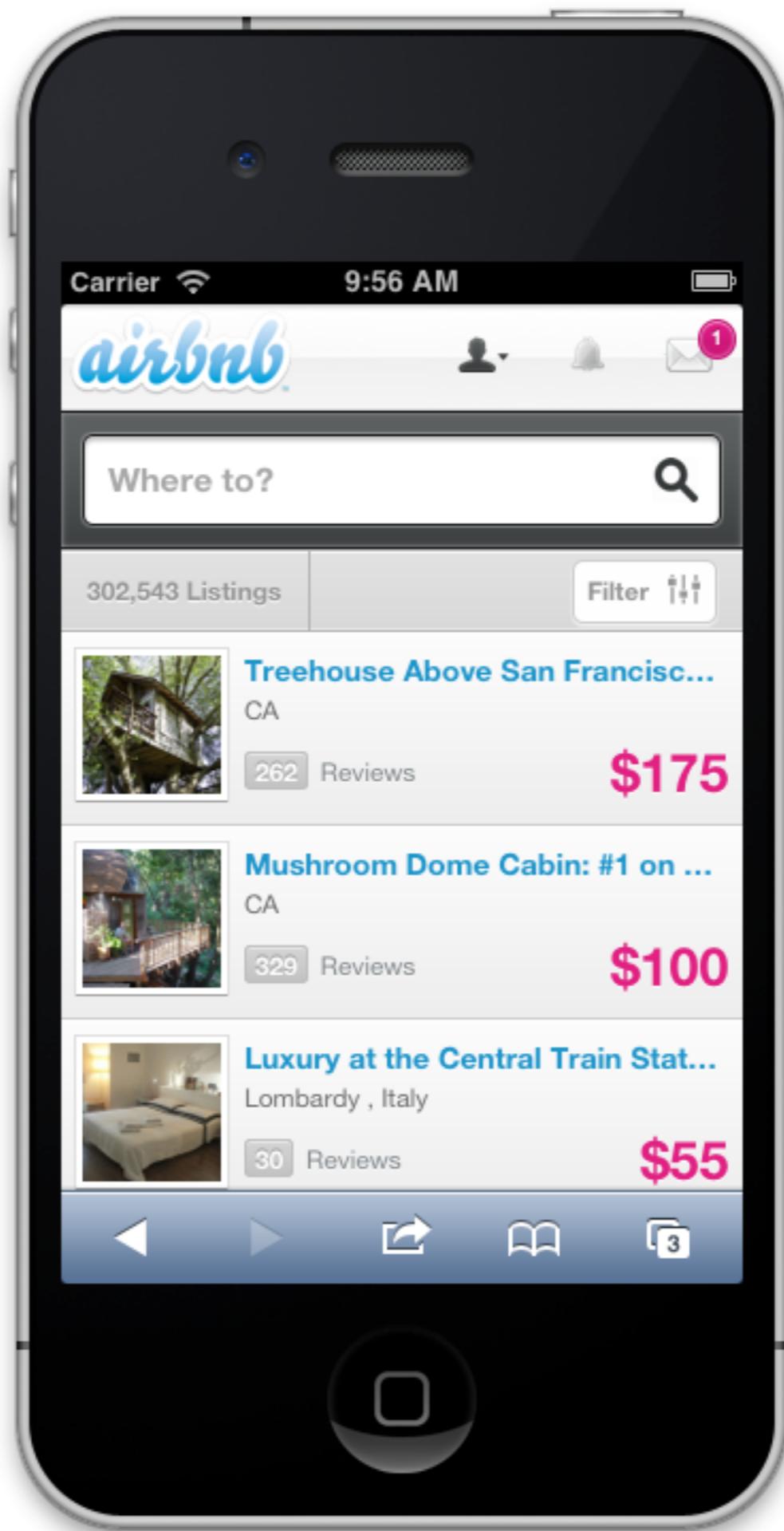
superhost

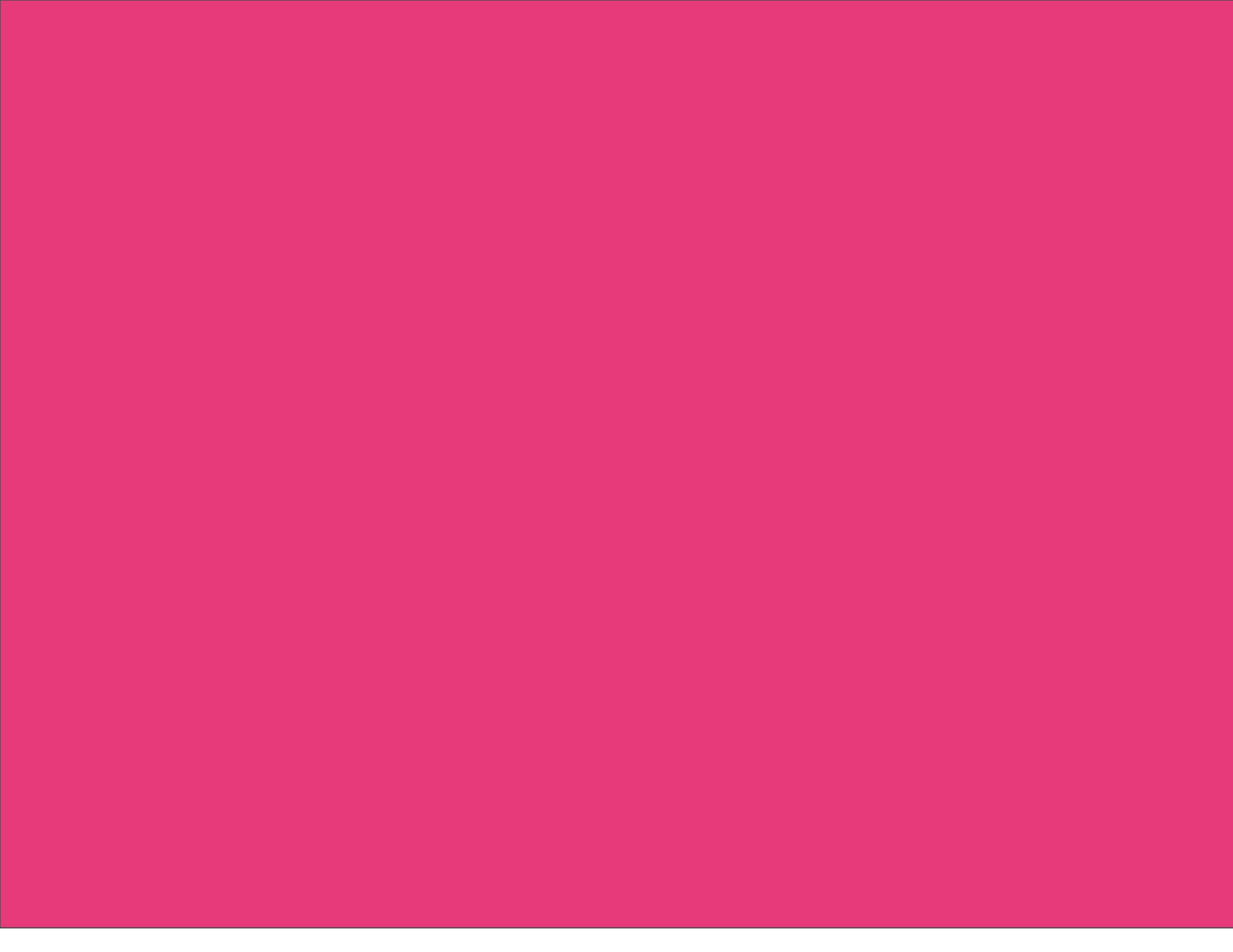
\$95  
Per night**Treehouse Above San Francisco Bay**

Entire home/apt — Burlingame

\$175  
Per night







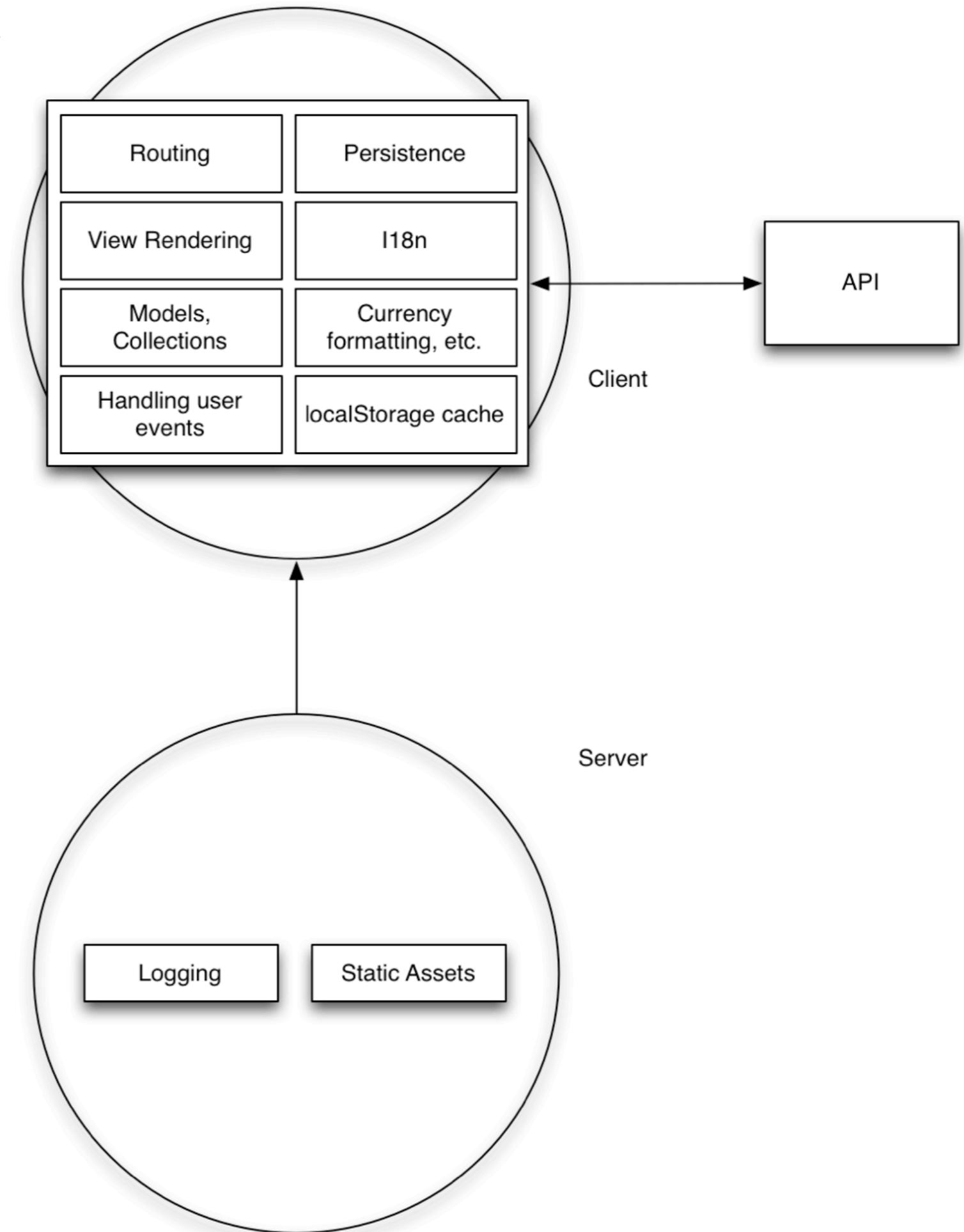
# The Easy Way

# The Easy Way

v.

The Easy Way  
v.  
The Hard Way

# The Easy Way





# JS app runs entirely in client

**JS app runs entirely in client**

**Server technology agnostic**

**JS app runs entirely in client**

**Server technology agnostic**

**Poor SEO; not crawlable**

**JS app runs entirely in client**

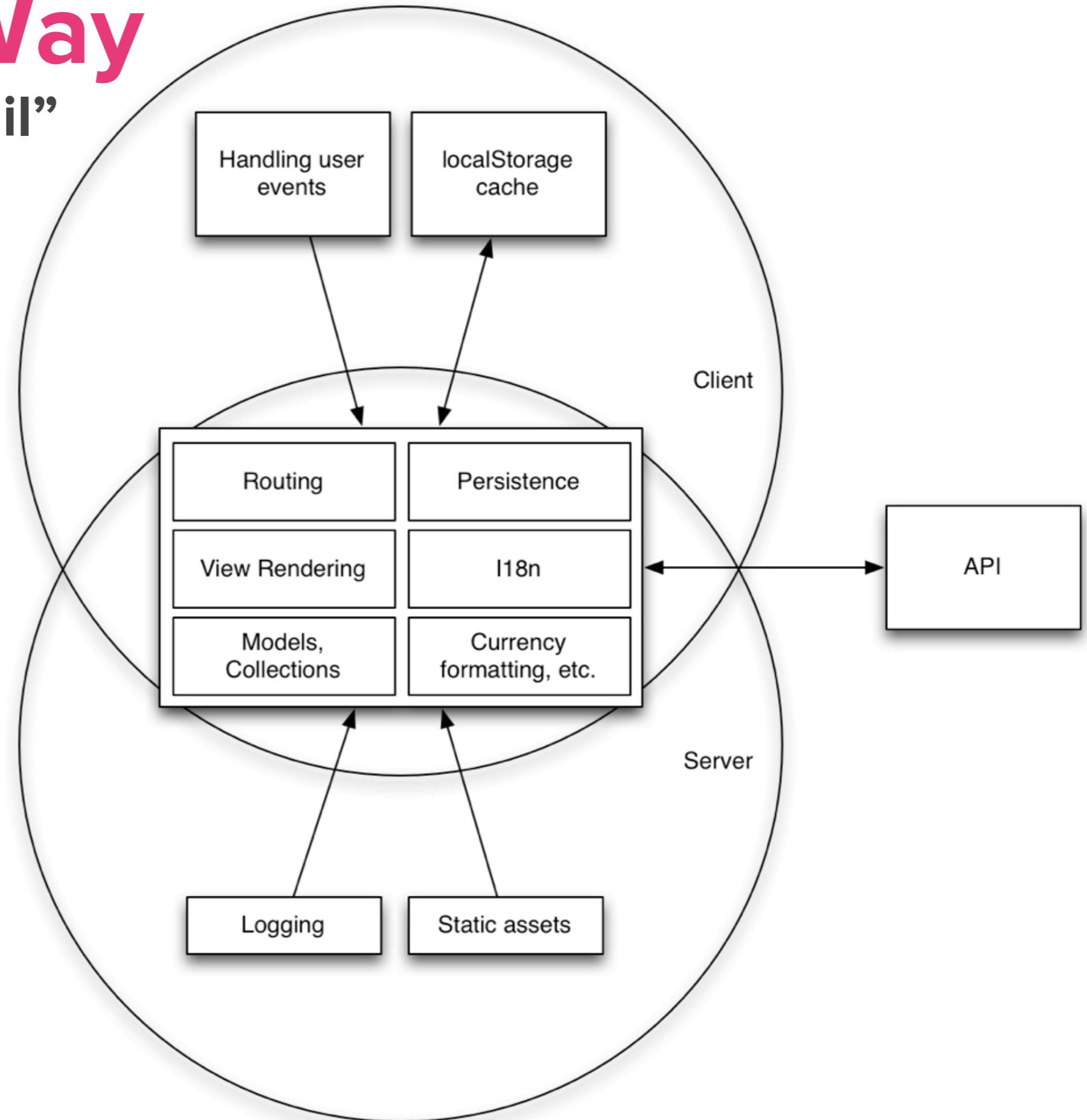
**Server technology agnostic**

**Poor SEO; not crawlable**

**Performance hit to download  
& evaluate JS before  
rendering**

# The Hard Way

aka “The Holy Grail”





**Routing, rendering, biz logic  
run on client & server**

**Routing, rendering, biz logic  
run on client & server**

**Re-render in client with  
pushState; hit refresh, serve  
full page of HTML**

**Routing, rendering, biz logic  
run on client & server**

**Re-render in client with  
pushState; hit refresh, serve  
full page of HTML**

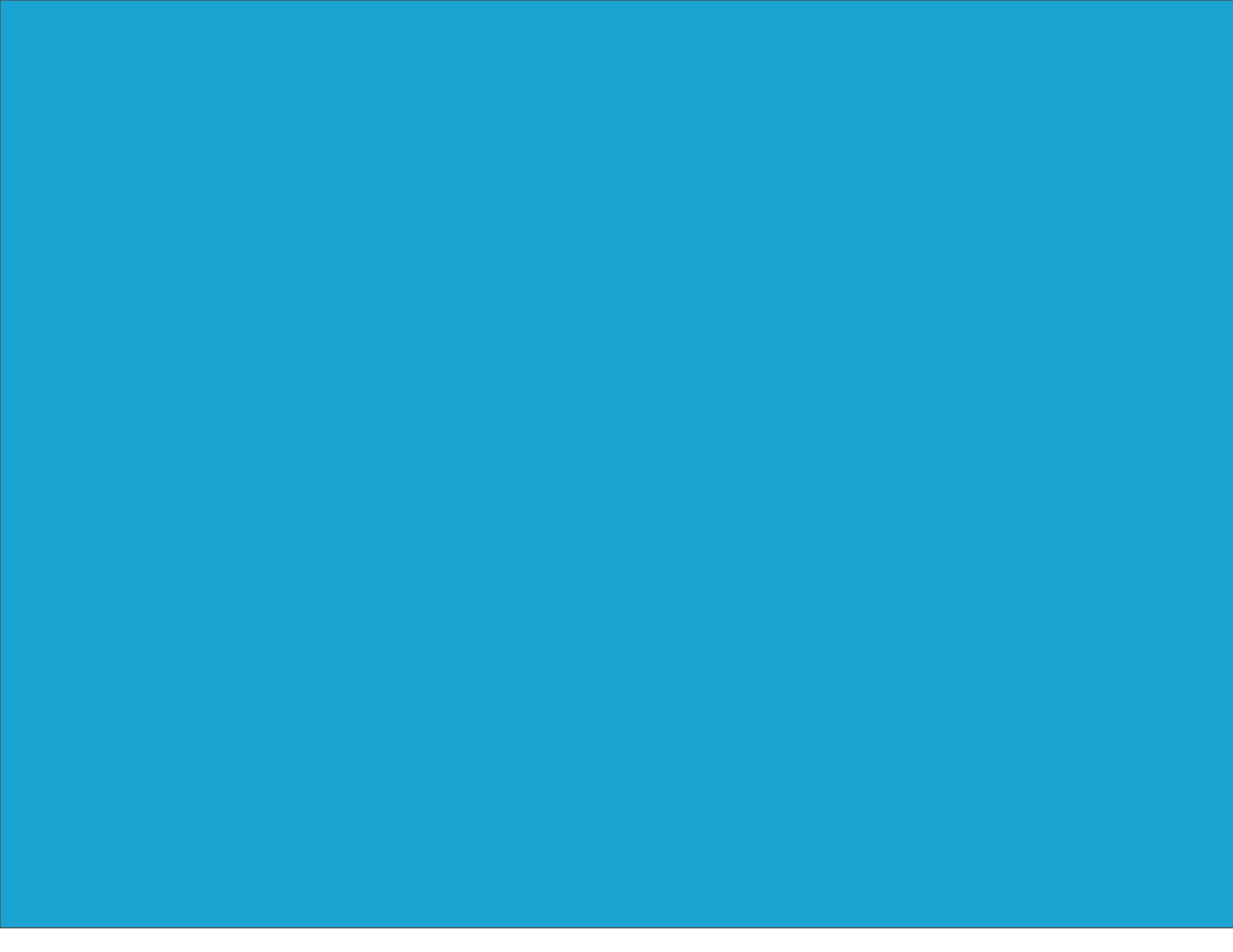
**Provides SEO**

**Routing, rendering, biz logic  
run on client & server**

**Re-render in client with  
pushState; hit refresh, serve  
full page of HTML**

**Provides SEO**

**Initial pageload is faster**



**Enter Rendr.**





# BACKBONE.JS

+





# BACKBONE.JS

+





# Pulls Backbone to the server

**Pulls Backbone to the server**

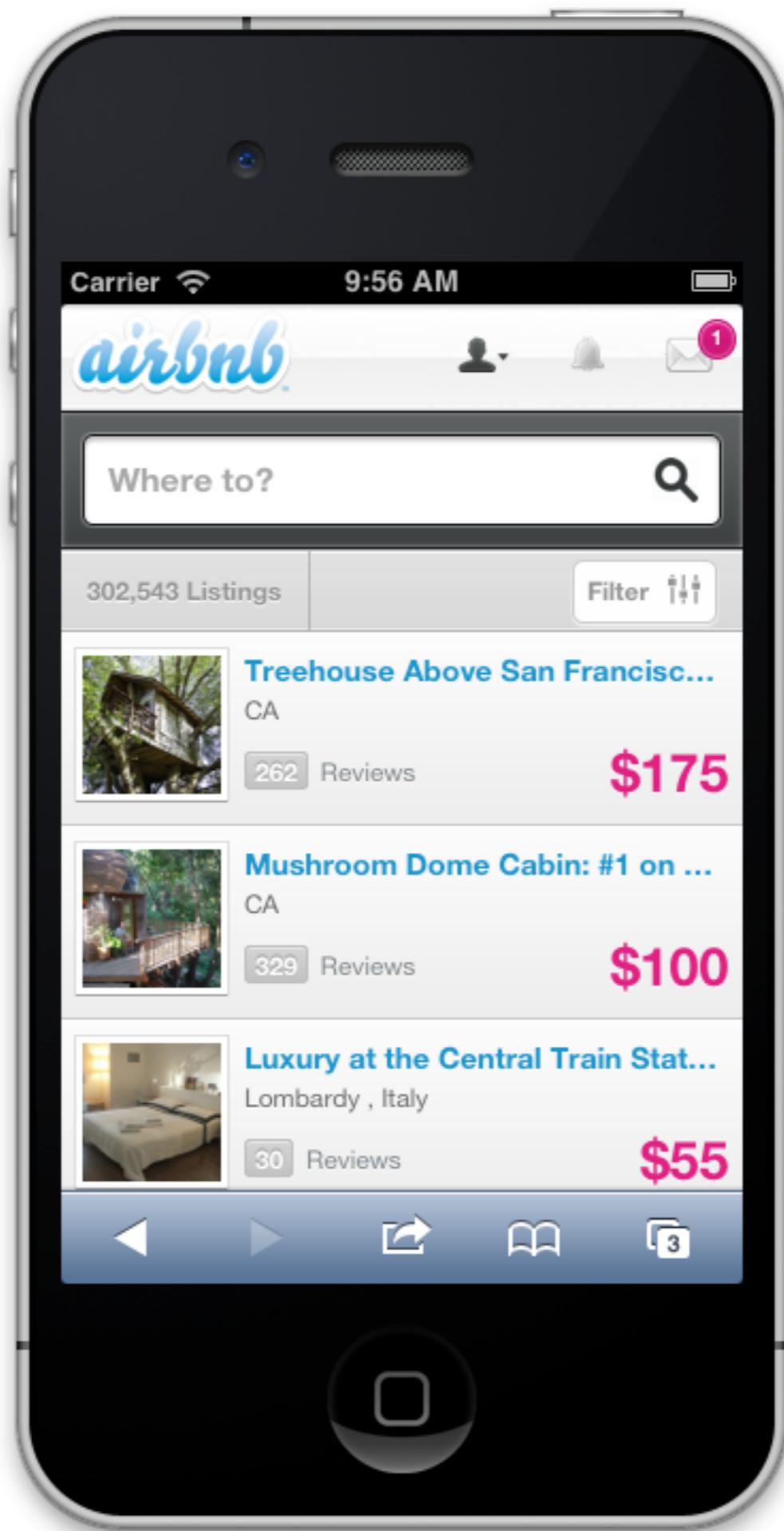
**Write your application once**

**Pulls Backbone to the server**

**Write your application once**

**Run application in web  
browser and in Node.js**







Popular Searches: references | paypal | tax | review | payment | security deposit | refund | cancellation

🔍 Search the help center

## HELP CENTER

- Getting Started >
- FAQs >
- Policies >
- Trust & Safety
- Contact Airbnb

## Airbnb Help Center



### Hosting Basics

Learn how to create your listing, handle inquiries from travelers, and get paid

[Learn More](#)



### Traveling Basics

Learn how to search for a place, message hosts, and pay for your trip

[Learn More](#)

Location Settings

English ▾

USD ▾

Discover

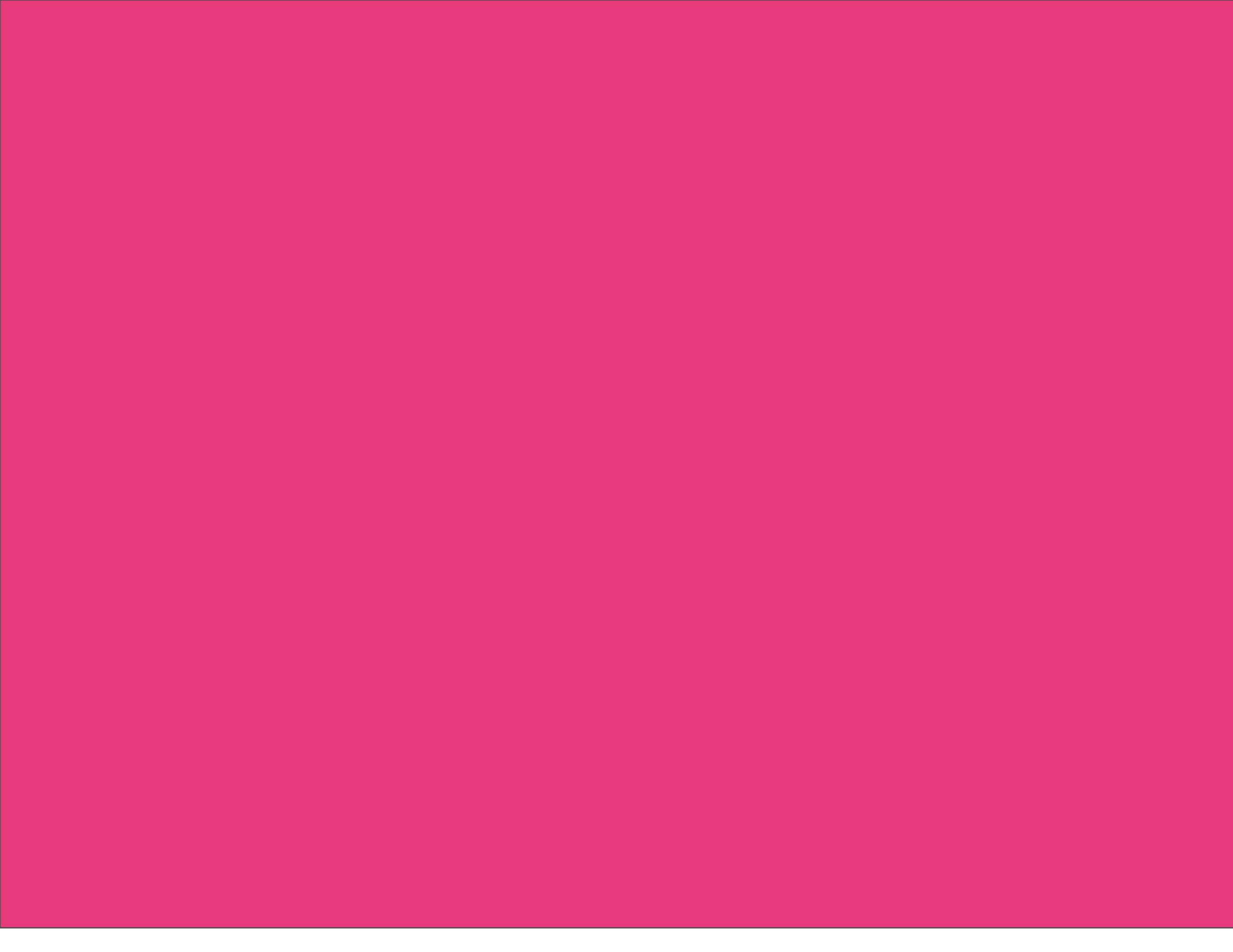
Safety  
Airbnb Picks

Company

About  
Jobs

Join us on

Twitter  
Facebook



**Check out  
the blog  
post.**

**Check out  
the blog  
post.**

<http://nerds.airbnb.com/weve-launched-our-first-nodejs-app-to-product>



# Coming soon.

[nerds.airbnb.com](http://nerds.airbnb.com)

4



A close-up photograph of a woman's face. She has vibrant blue hair styled in a voluminous, textured updo. Her eyes are a striking shade of blue, with bright highlights that suggest a futuristic or otherworldly glow. She is wearing dark, smoky eye makeup and a light-colored, possibly white, top. The background is dark and out of focus.

Never stop  
hacking

# Technological Vigilantism

# Cross-functional Collaboration

**Creating and Learning  
Together**

# Hackairthon #1

# Thanks!

alex@airbnb.com  
spike@airbnb.com

