



# Places API-Powered Navigation

## A Case Study with Mercedes-Benz

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# Google Features in Mercedes-Benz Cars

Already Connected to Google Services via The MB Cloud

- Setup:
  - **Embedded** into the HeadUnit
  - **Browser-based**
  - Connects via a BT **tethered** phone in EU & via **embedded** phone in USA
- Features:
  - Google Local Search
  - Street View & Panoramio
  - Google Map for New S-Class



# What Drivers Want\*

Hint: More



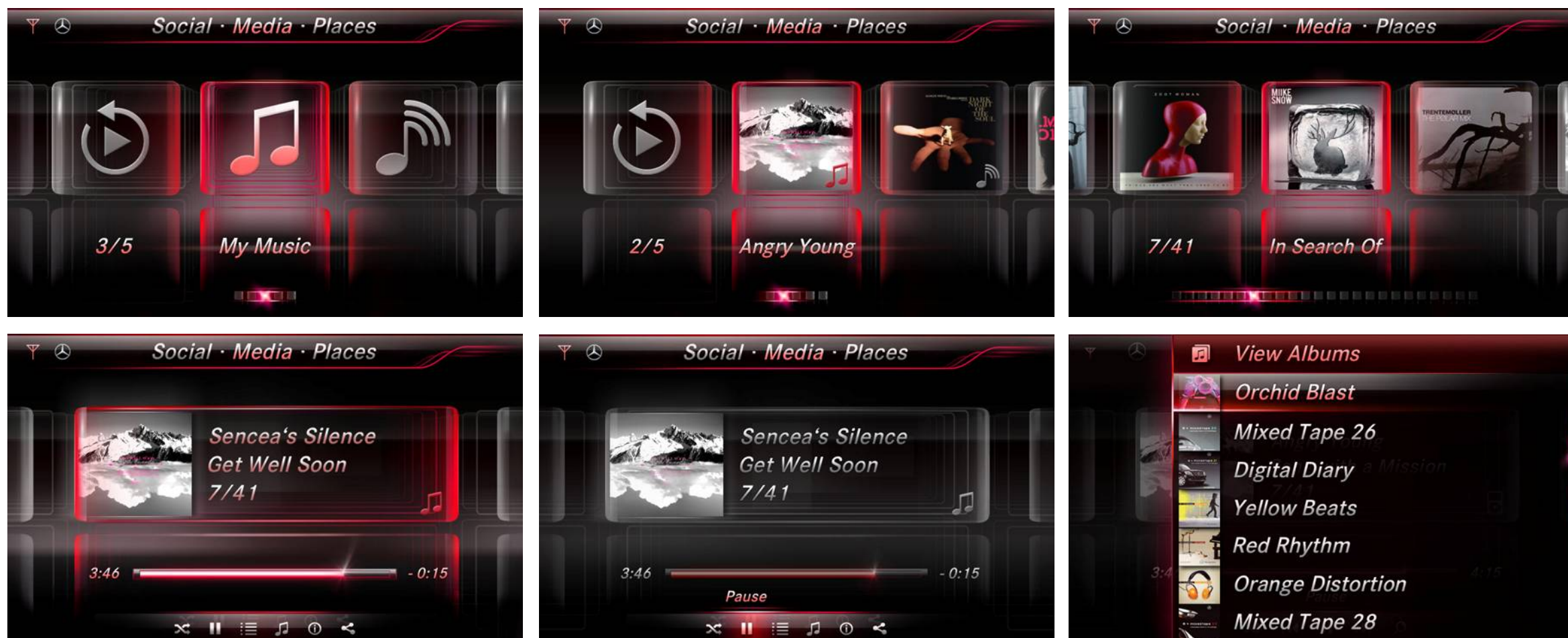
- **Easy, feature-rich** smartphone integration.
- Use **smartphone for navigation** instead of the system installed in their vehicle (**47% did that**).
- Fix destination **Input & selection** (6 of the top 10 most frequent problems).
- **One-shot destination entry is the dream.**





# What We Have: Digital DriveStyle App

- Smartphone-based
  - **Quick** update cycle + **continuous** innovation.
  - Harness HW & SW **power** of the smartphone
- Uses car's Display, Microphone, Speakers, Input Controls,..





# What We Added

## A Hybrid Navigation: Onboard Navi Powered by Google Places API

- A **single** “Google Maps” style text entry and search box with auto-complete.
- Review **G+ Local Photos, Street View, ratings, call** the destination phone or **navigate**.
- Overlay realtime information on **Google maps** such as **weather, traffic, ..etc.**





# Challenges

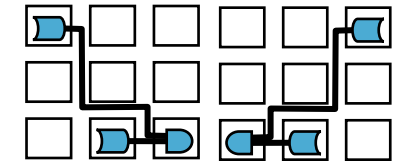
# Automotive Related Challenges

- Reliability requirements
- Release cycles
- Automotive-grade hardware
- Driver distractions





# Some Challenges When Using Places APIs



- 1 End to End Usecase**  
Connecting Places API to a traditional navigation core.
- 2 Reality of Cellular Coverage**  
Fallback to on-board capabilities when connectivity is lost
- 3 Stitching different databases**  
Handling mismatch between on-board and off-board database





# Searching For A Successful Automotive App Strategy



# Digital DriveStyle App Strategy

1

Focus on User Experience  
& Not Number of  
Features

2

Focus on Social & Context

3

Zero Tolerance to Driver  
Distraction

4

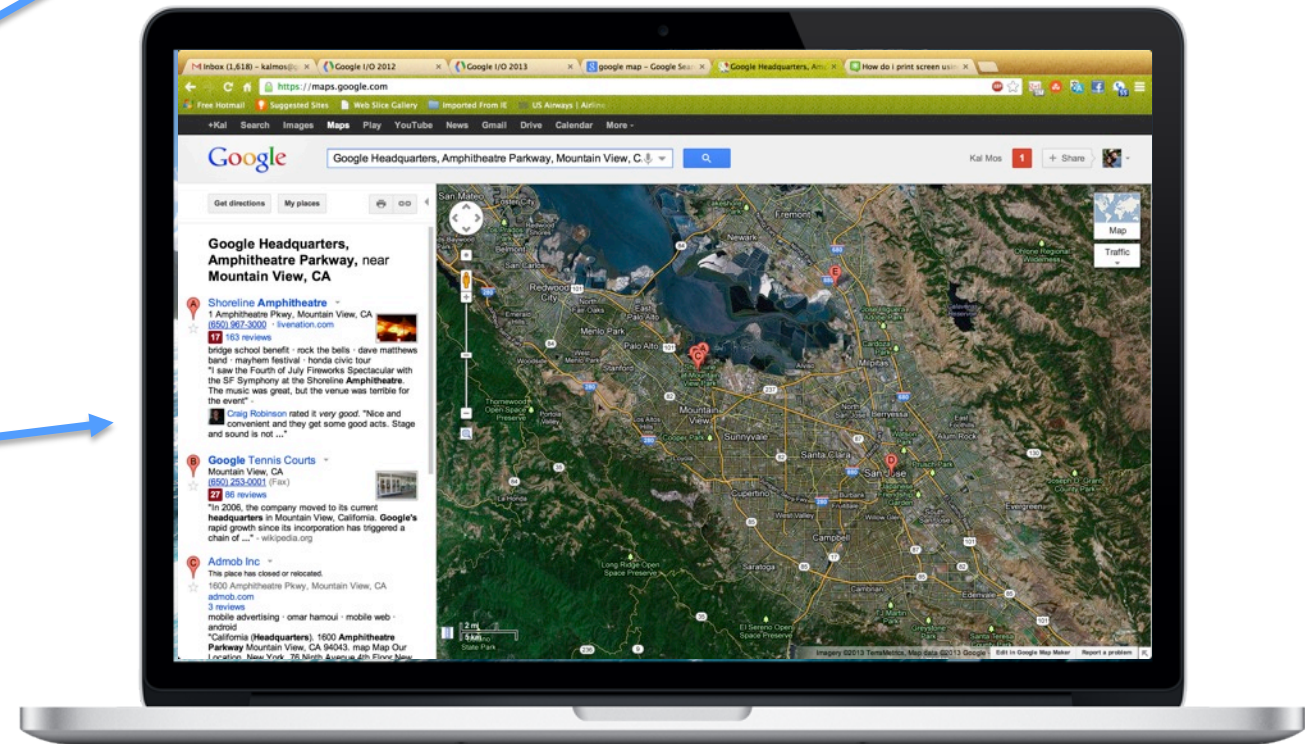
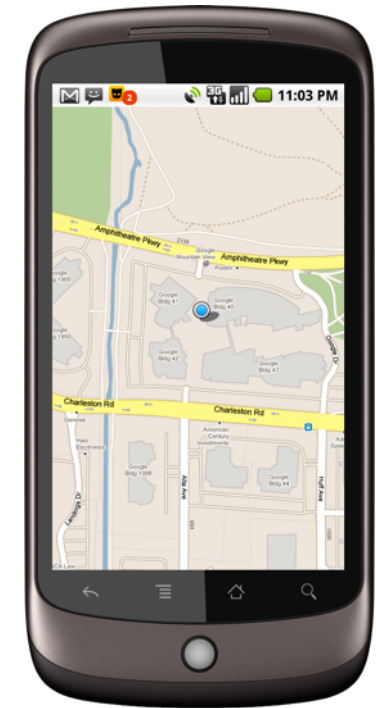
Fast Update Cycle  
Independent of The Car





# Long Term Goal: A Seamless Map/Navi Experience

- Search on desktop/device & navigate on the car
- Leave the car & continue navigation on the device





Destination Entry Is A Pain

# Traditional Address Entry

- Navigate to “Moscone Center West”

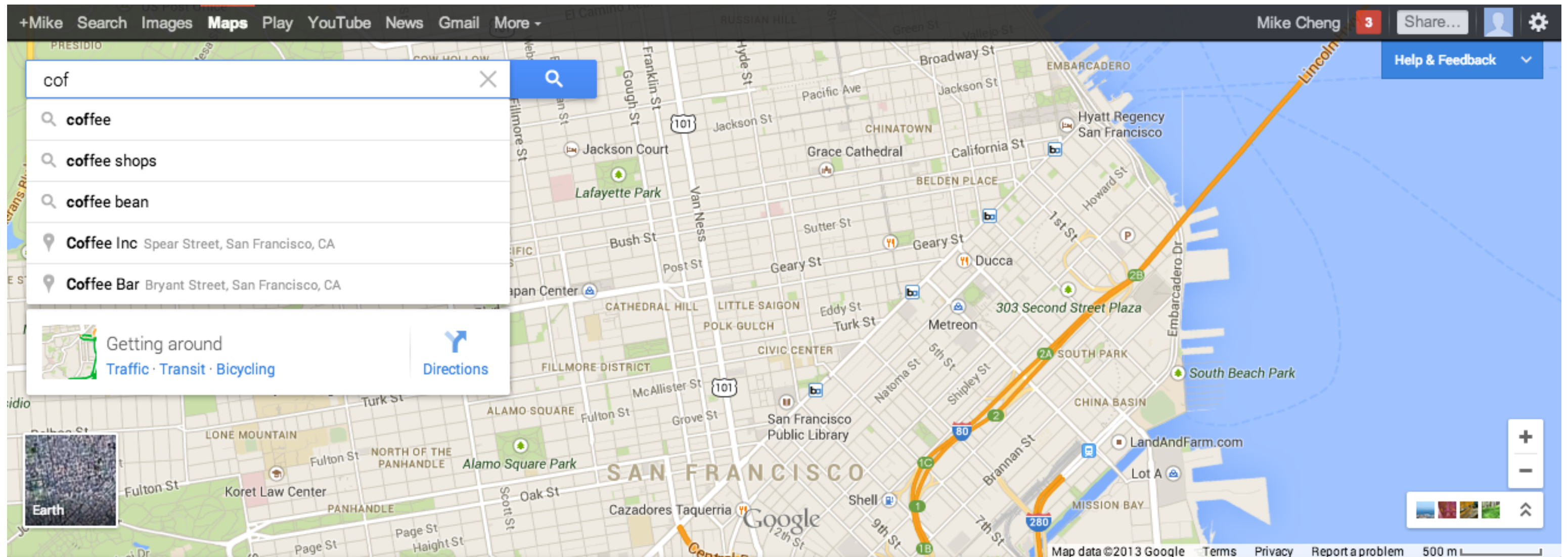
*Enter Address • California • San Francisco • Howard Street • 800*





# How Can The Google Places APIs Help?

- Try to match the Google Maps experience with a single text field

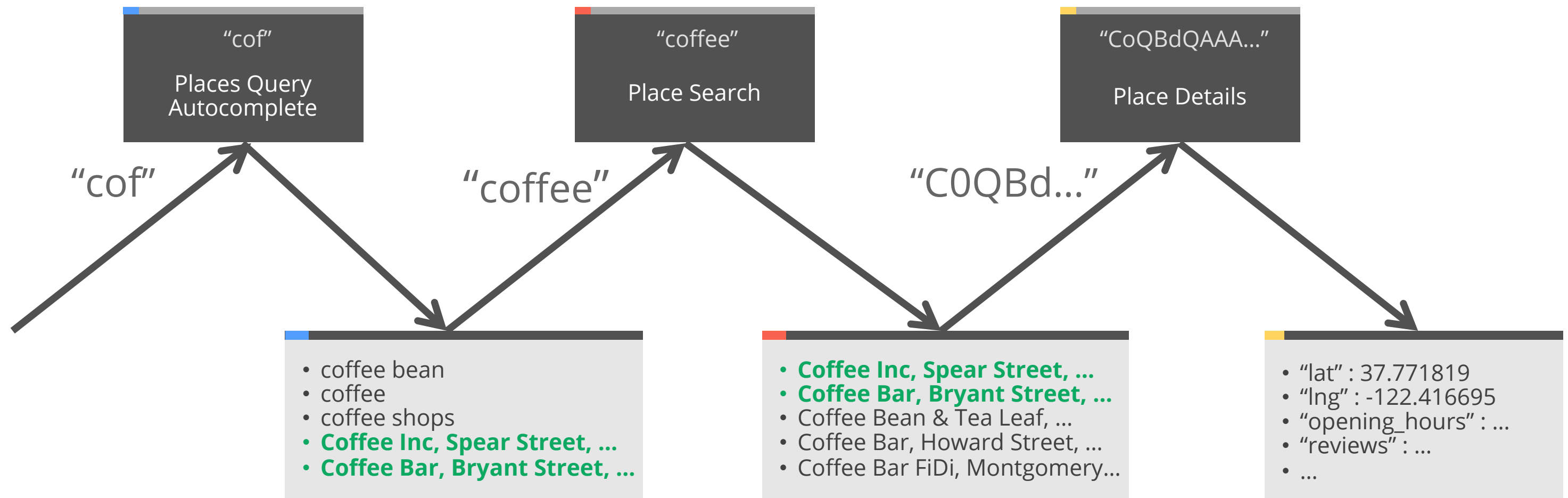


# Predictive Text Input

- Places Query Autocomplete API
- Returns a mixed list of the best query completions and Place results
- Often matches the correct address with very few input characters



# Navigating The Places API





# Places Query Autocomplete API Response

Search for "800 H"

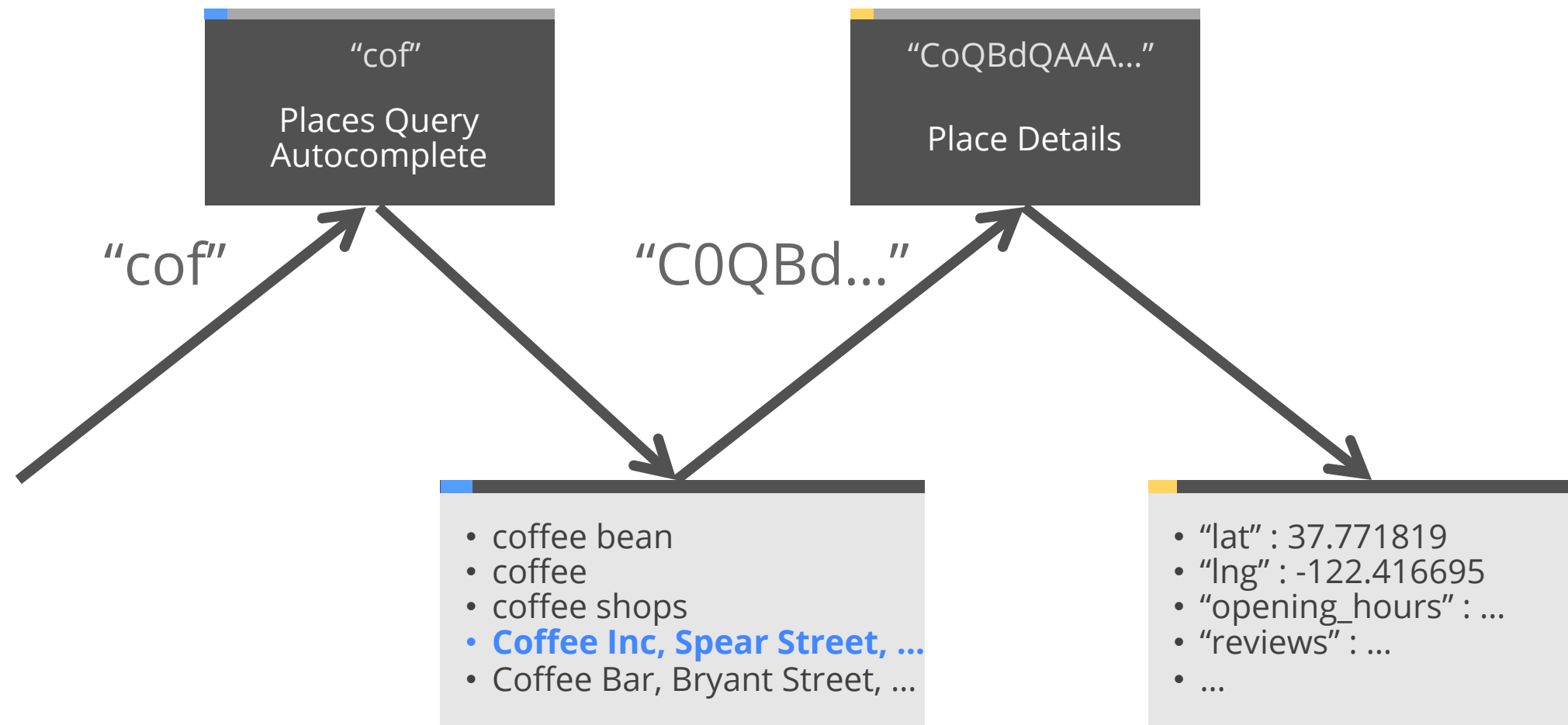
JSON

```
{
  "predictions" : [
    {
      "description" : "800 Howard Street, San Francisco, CA, United States",
      "matched_substrings" : [ { "length" : 5, "offset" : 0 } ],
      "terms" : [
        { "offset" : 0, "value" : "800 Howard Street" },
        { "offset" : 19, "value" : "San Francisco" },
        { "offset" : 34, "value" : "CA" },
        { "offset" : 38, "value" : "United States" }
      ],
      "id" : "0x80858086d81bba5b:0x94d2e15f9bb288bb",
      "reference" : "CnRhAAAAtZyfO3AyCJj8gF2jth6Ox64N5-1a9qWKp1tR6uC-...",
      "types" : [ "route", "geocode" ]
    },
    ...additional results...
  ],
  "status" : "OK"
}
```

*New!*



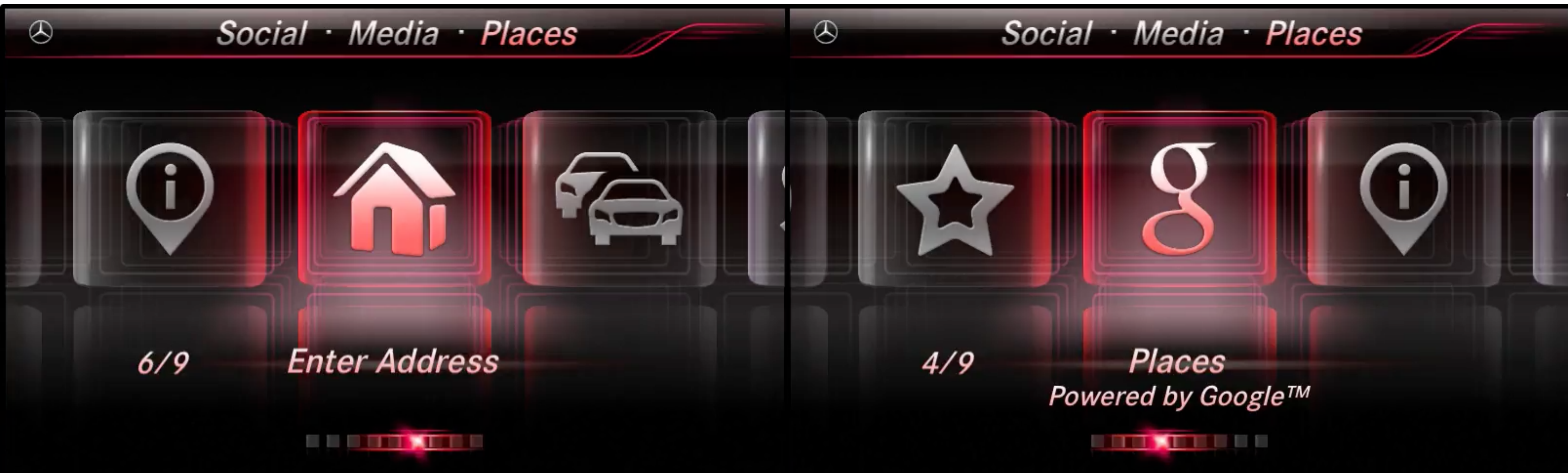
# Navigating The Places API, Simplified



# Before & After

Traditional

With Google Places

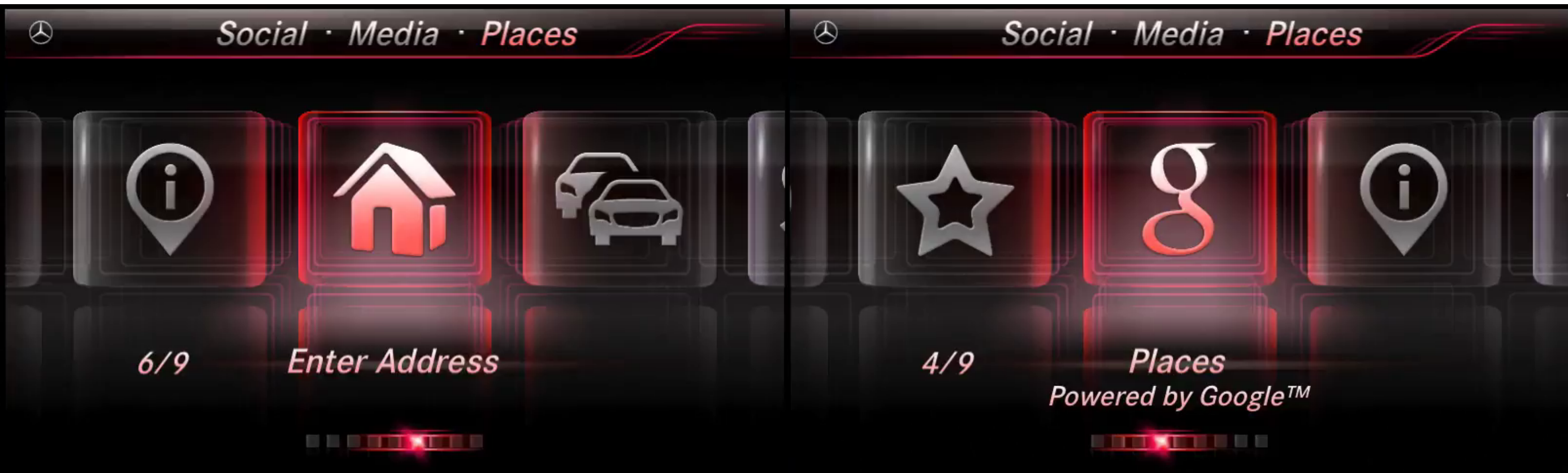




# Before & After

Traditional

With Google Places





# Going Beyond Street Addresses

# How Can We Bring Places Online?

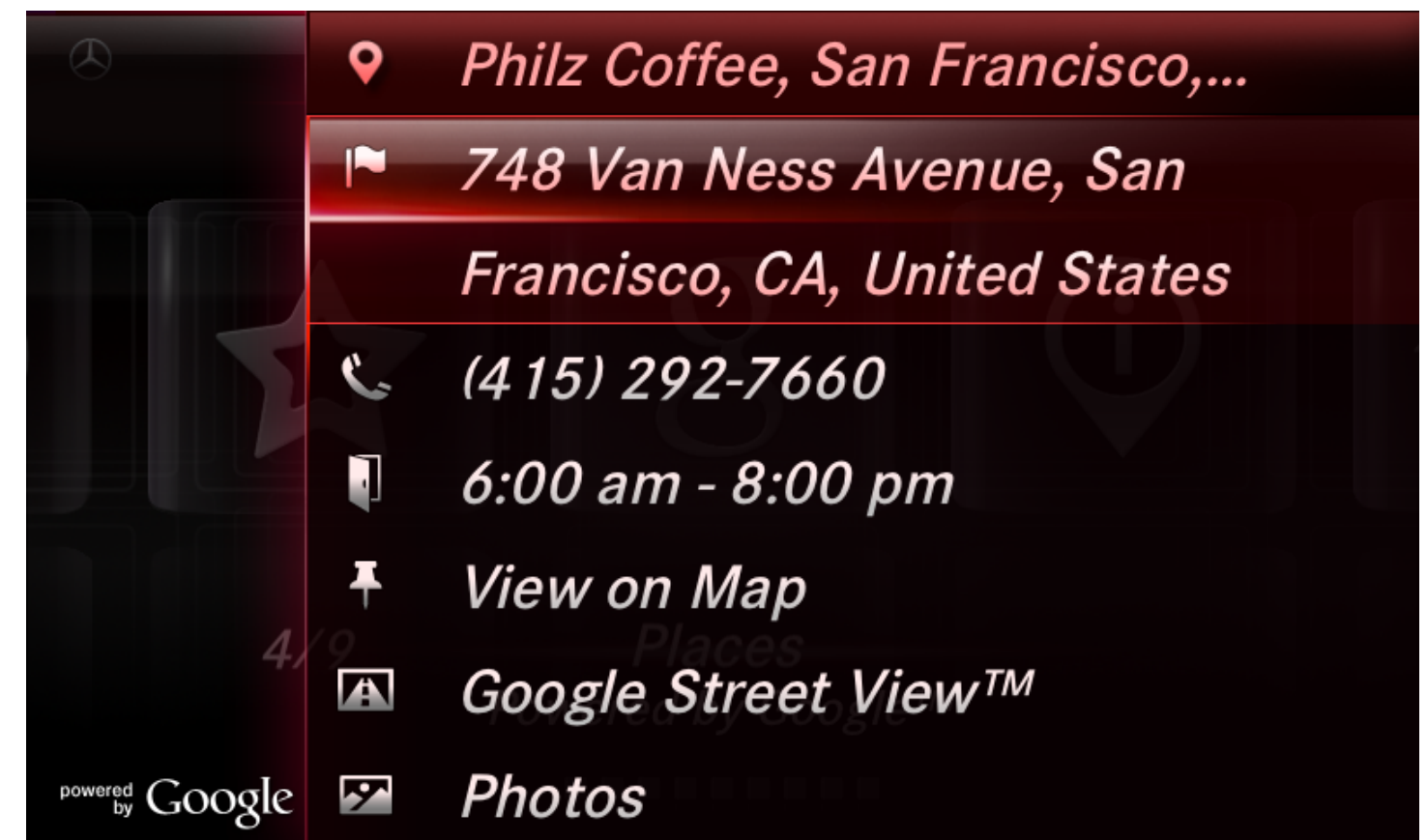
The screenshot displays the Google Maps interface. At the top, there's a navigation bar with links for '+Mike', 'Search', 'Images', 'Maps', 'Play', 'YouTube', 'News', 'Gmail', and 'More'. On the right, it shows the user's name 'Mike Cheng', a notification count '3', and options for 'Share...', a profile icon, and 'Settings'. Below this is a search bar containing 'Philz Coffee'. The main information panel on the left provides details for a selected Philz Coffee location: '748 Van Ness Ave, San Francisco, CA 94109', 'Open today 6:00 am - 8:00 pm', 'philzcoffee.com', and '(415) 292-7660'. It also features 'Directions' and 'Save' buttons. Below the text are 'Street View' and '4 Photos' thumbnails. The rating is '4.4 ★★★★★' with '97 reviews', a 'Menu' link, and a '\$\$' price indicator. A list of menu items includes 'Coffee Shop', 'mojito iced', 'philharmonic', 'turkish', 'mocha', and 'spices'. The map itself shows several Philz Coffee locations marked with red pins and labels like 'Local chain of coffee hangouts'. Other nearby businesses like Starbucks and Peet's Coffee & Tea are also visible. The map includes standard navigation controls like zoom in (+), zoom out (-), and a compass. At the bottom, there's a scale bar for '2 km' and links for 'Map data ©2013 Google', 'Terms', 'Privacy', and 'Report a problem'.



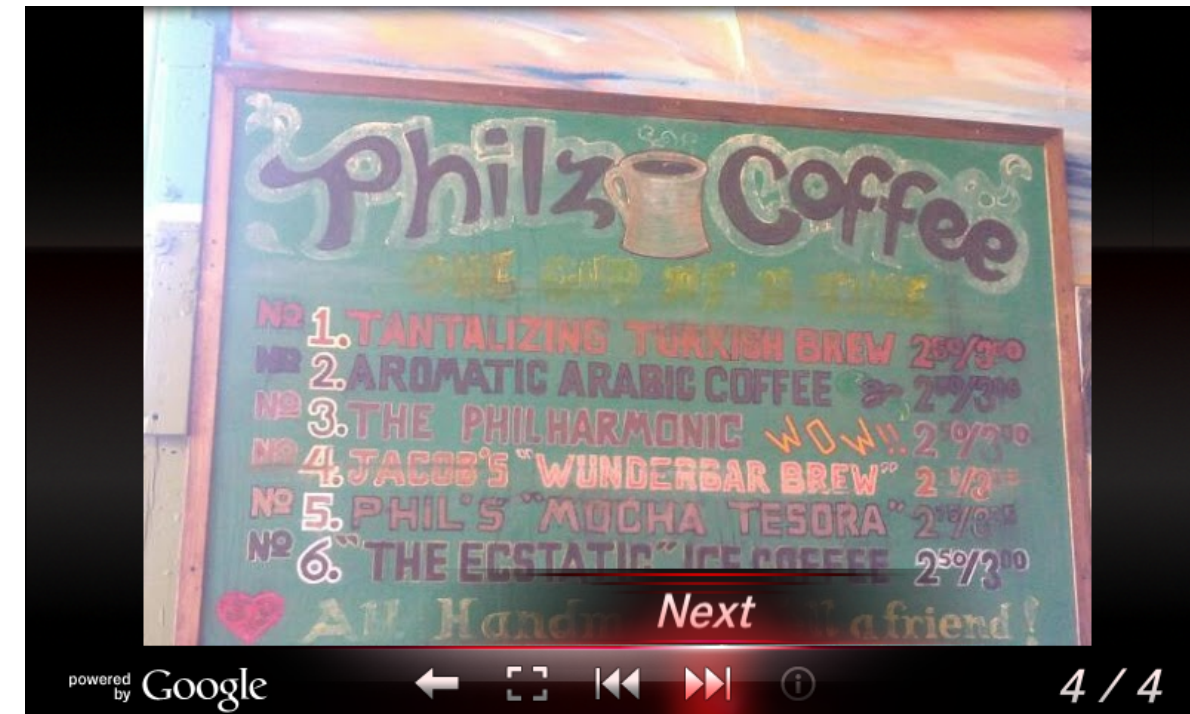


# Rich Metadata

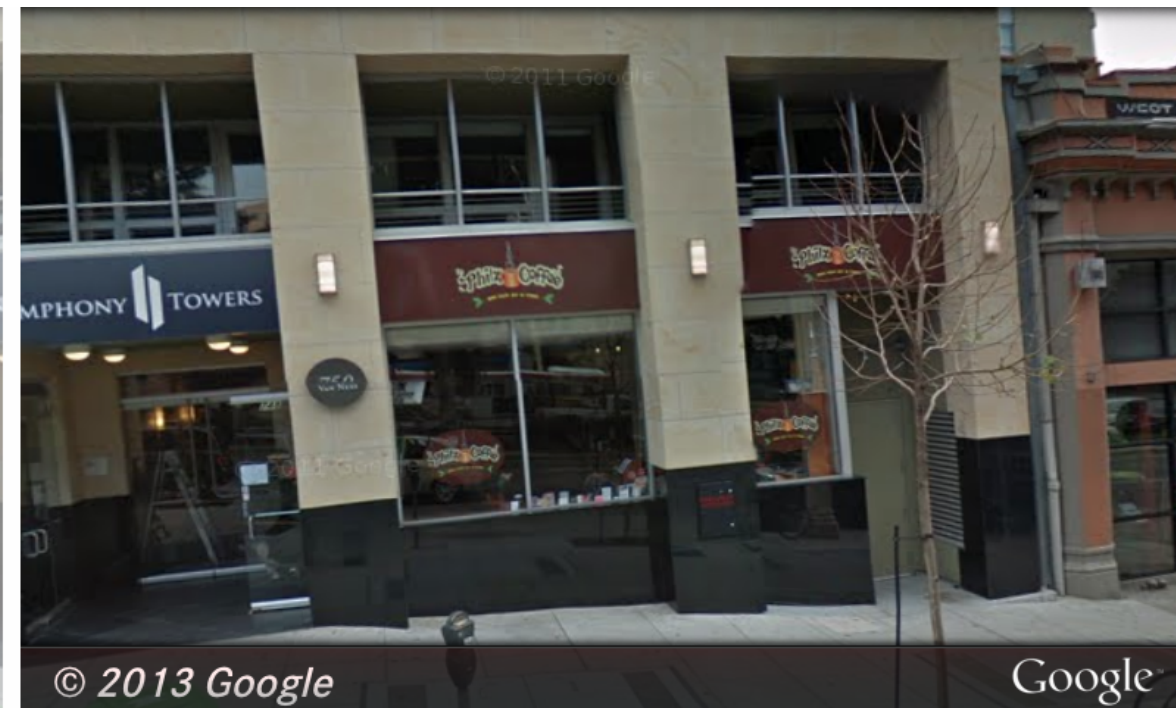
- Place Details API
- Star Ratings, Price Ratings, Business Hours (“Open Now”)
- Vivid Imagery: Google+ Local Photos in Places API, Google Street View



# Google+ Local Photos



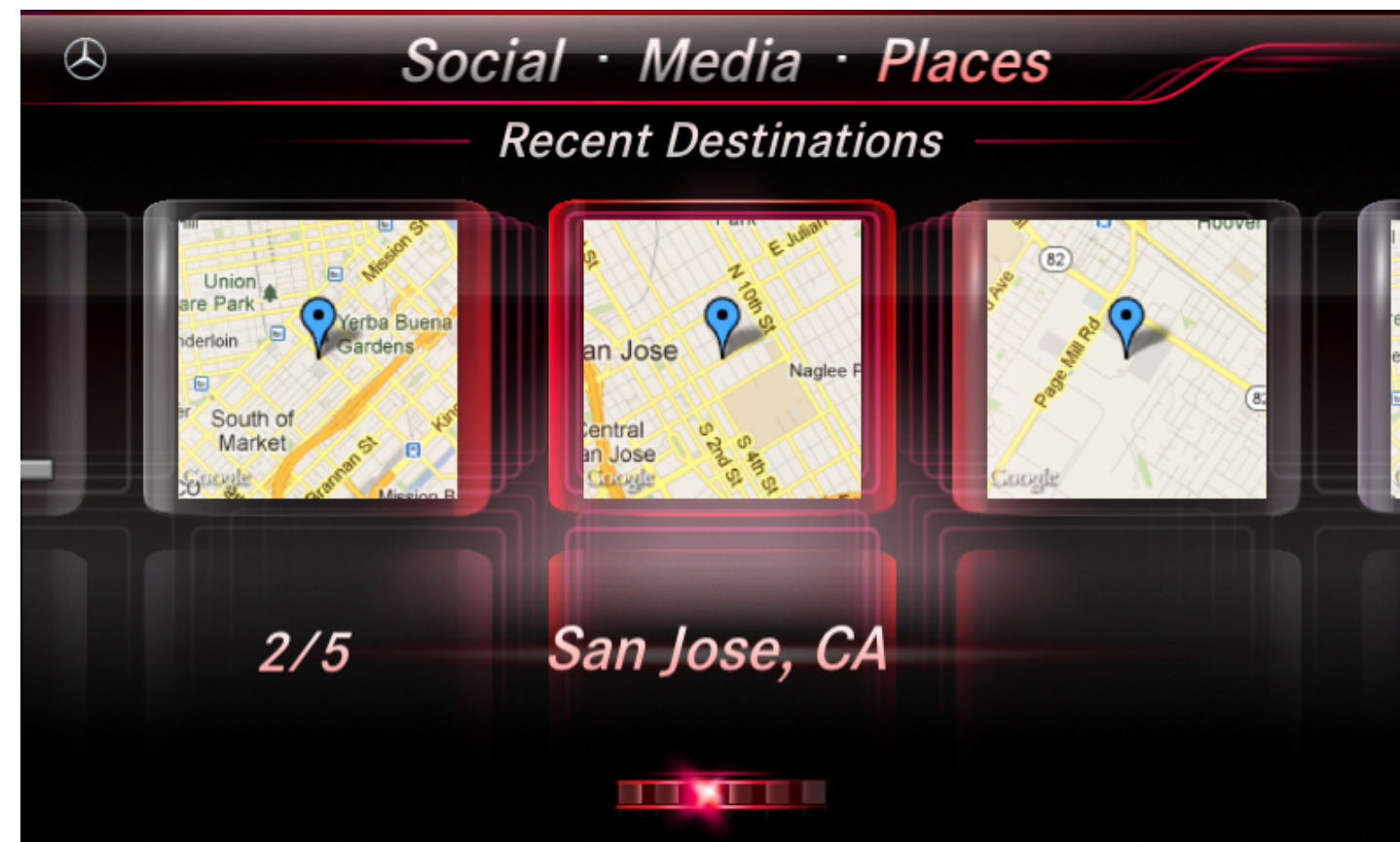
# Google Street View





# Blending Online Data with Offline Maps

1. Don't count on having a network connection
2. Map data can be different or incomplete
3. Be careful with geocodes and reverse geocodes



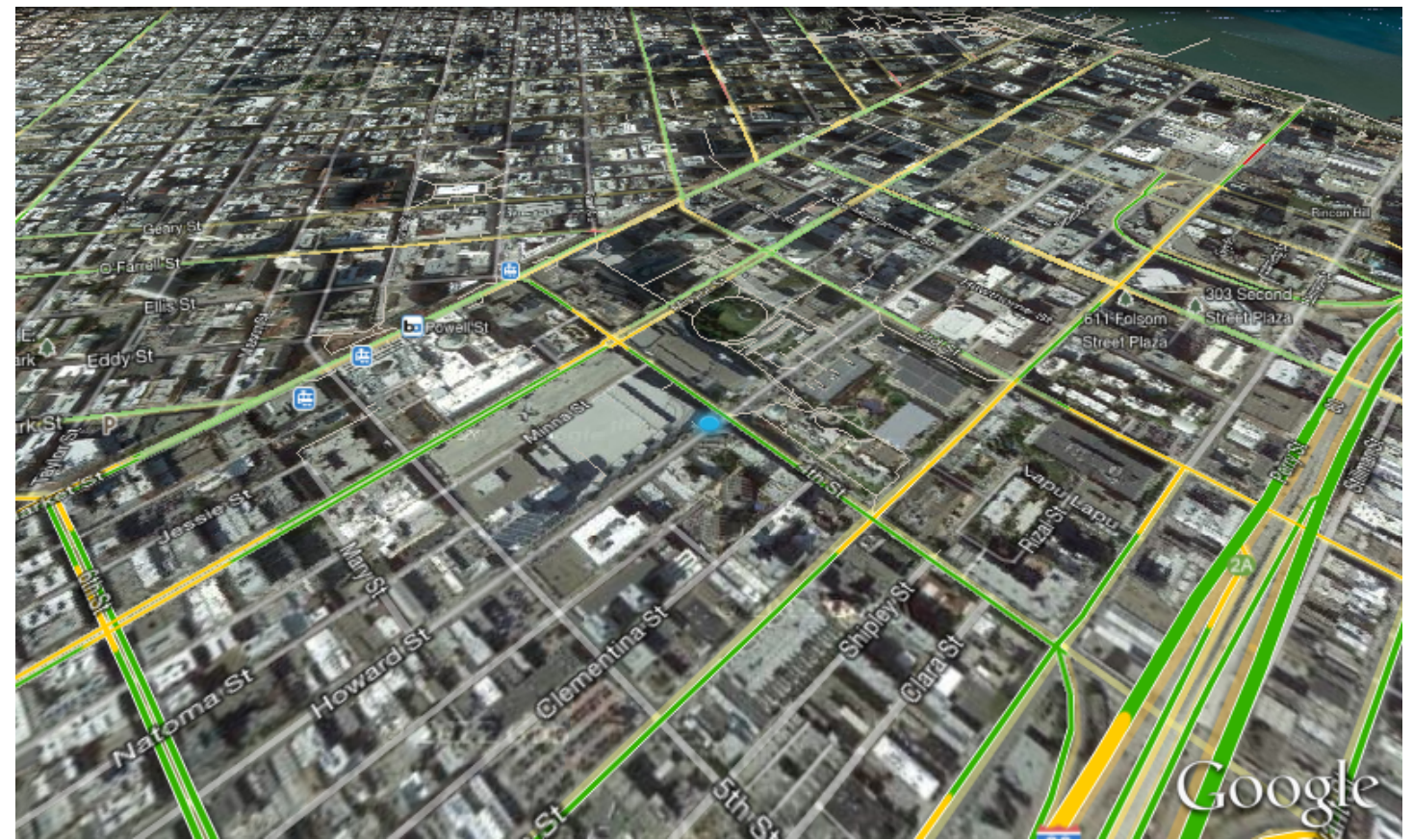
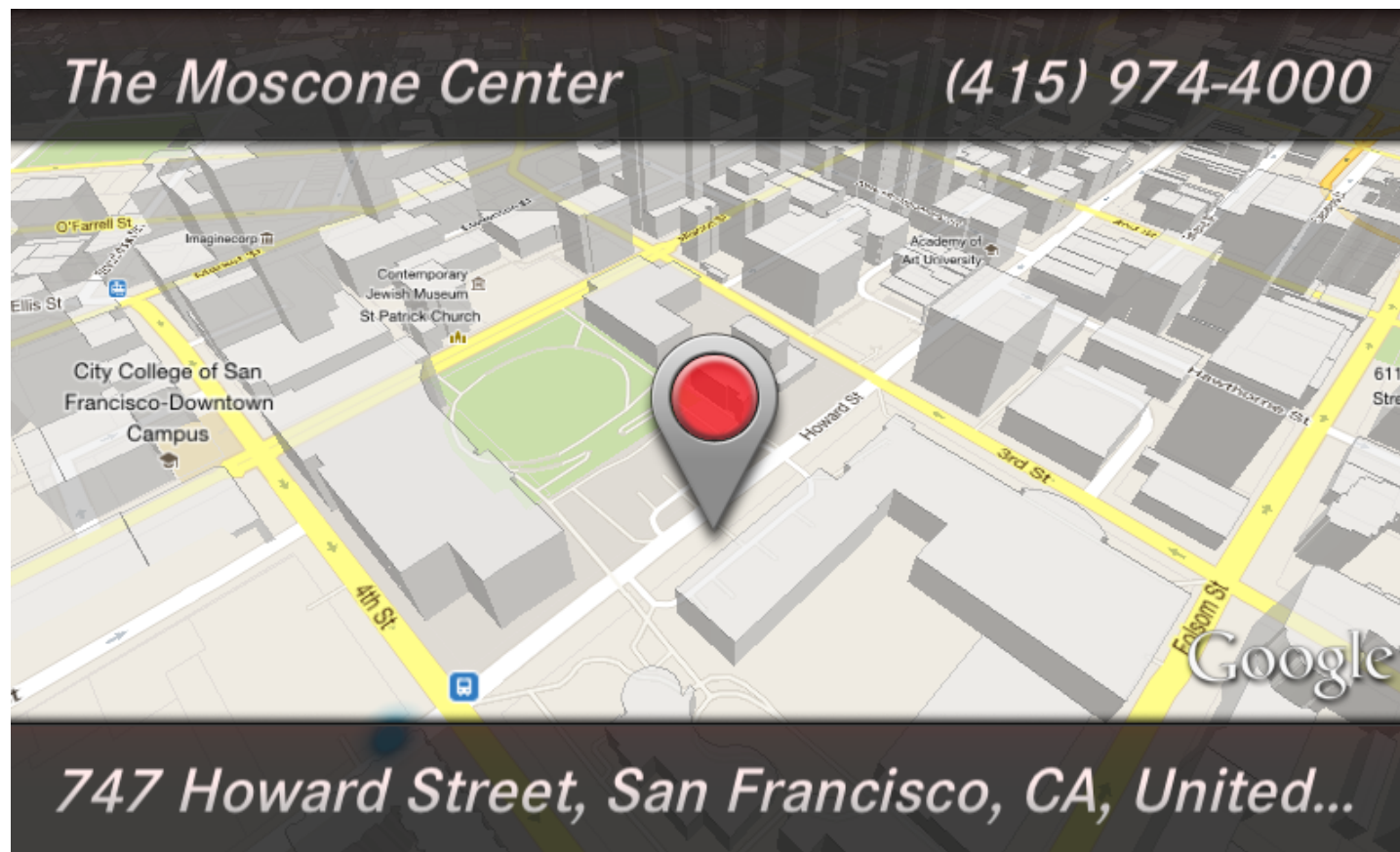




# Unique Maps

# Google Maps SDK for iOS

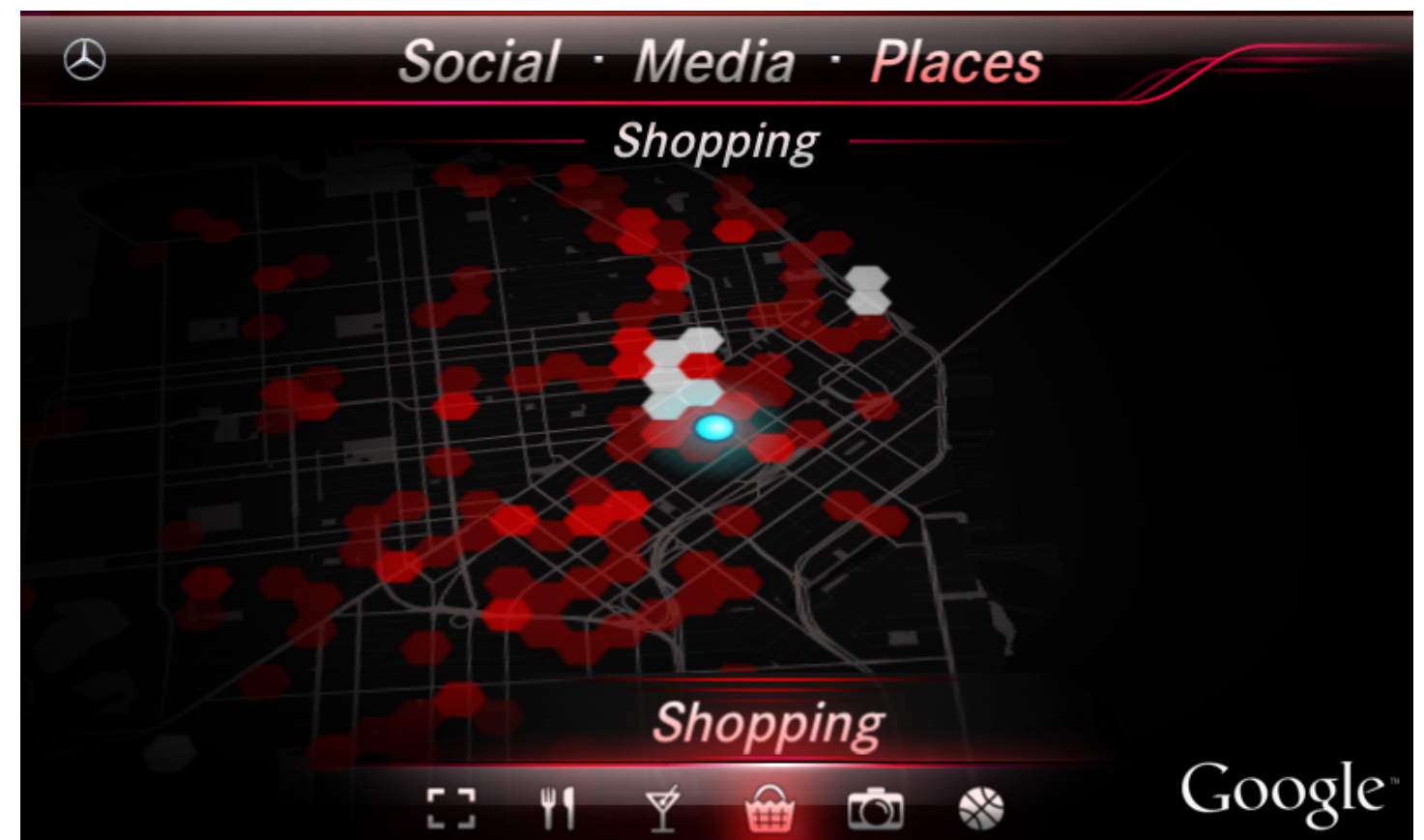
- Simple to use SDK for a basic map component
- 3D Buildings, Traffic layer, Map types
- Advantages over other Map frameworks





# Heatmap Concept

- Google Places API Radar Search
- Stylized JavaScript Maps v3 in an embedded web browser
- Quickly switch between multiple layers of data on the same map





# Setting GroundOverlay with Base64 encoded image

Google Maps JavaScript API v3

```
var imageBounds = new google.maps.LatLngBounds(new google.maps.LatLng(sw_lat,sw_lng),  
                                                new google.maps.LatLng(ne_lat,ne_lng));  
  
var imageData = 'data:image/png;base64,iVBORw0KGgoAAAANSUhEUgAAAD ... K5CYII=';  
  
var overlay = new google.maps.GroundOverlay(imageData, imageBounds);  
  
overlay.setMap(map);
```

JS

- Once the JavaScript Map is loaded, these calls can be made locally even if network drops out!
- No need to save the image data to disk and reference a local URL





<Thank You!>

*Please see our demo at the Google Maps Sandbox!*

More info at: <http://drivestyleapp.com>

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Mike Cheng: [mike.cheng@daimler.com](mailto:mike.cheng@daimler.com)

