



# Empowering your Workforce with Google Maps

June 28, 10:15am–11:15am

Dave Day and David Owens



The Question We Want To Help Answer:

# Where's my stuff?

- where are my people, vehicles, and other mobile objects?
- what are they doing?
- how can they be more effective?



**1.3 billion  
mobile workers by 2015**



# **Google Maps Coordinate & Google Maps Tracks API**





# Google Maps Coordinate

## Google Maps Coordinate: What is it?



A web and mobile application that helps enterprises manage their mobile workforce.

And an API, too!



## Google Maps Coordinate: Where's my stuff?

Jobs — the work to be done

Team — the people who use Coordinate to do work



# Google Maps Coordinate: Show me!

Google Maps Coordinate

Jobs [+Add job](#) [See job history](#)

Show **Incomplete** | [Unassigned](#)

Sort by [Creation time](#) | [Job name](#) |

[Scheduled time](#)

**James Lick's: 2G Chocolate, 1G Vanilla**

Assigned, [unscheduled](#)

Bryant Street and 4th Avenue, San Francisco

Assigned to [Dave Owens](#)

**China Basin Specialty Treats: 3G**

**Peanut Butter Lemon Swirl**

Assigned, [unscheduled](#)

2nd Street at King Street

Assigned to [Dave Owens](#)

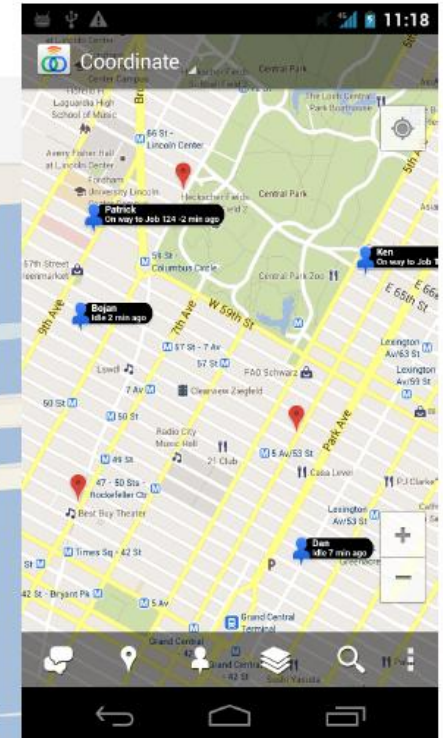
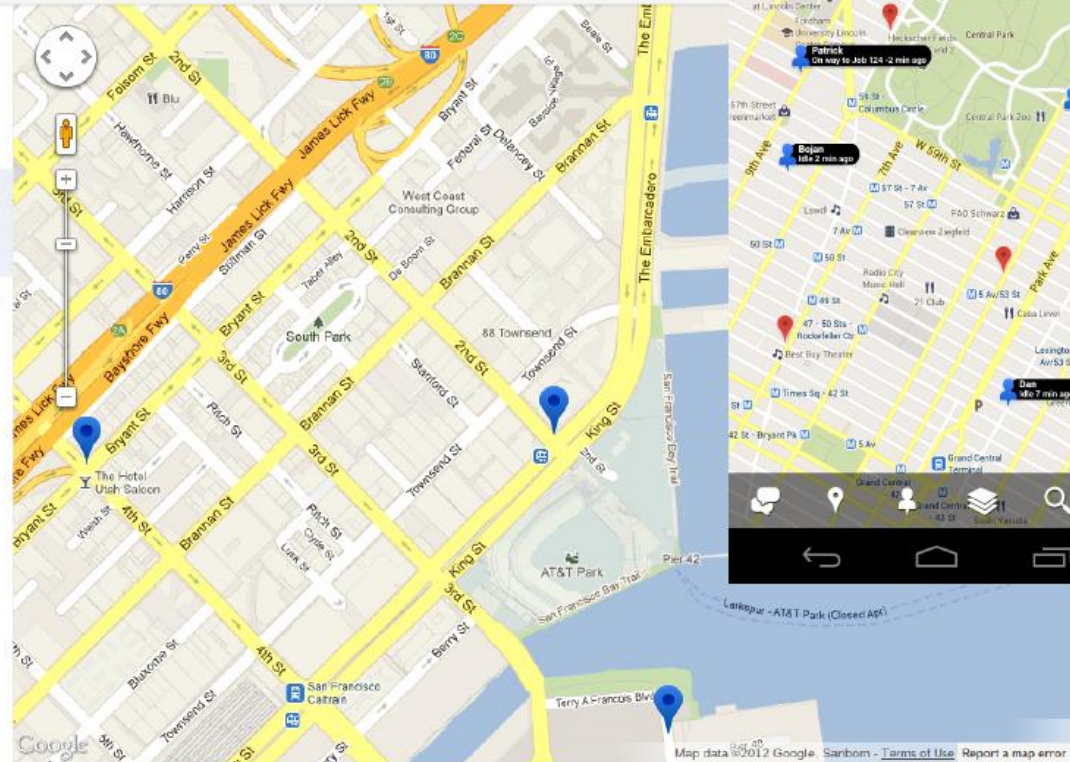
**Pier 48 Ice Cream: 2G Rocky Road**

Assigned, [unscheduled](#)

48 Pier, San Francisco, CA

Assigned to [Dave Day](#)

[Send Feedback](#)





## Google Maps Coordinate: With it users can...



- communicate with your workforce
- see all of their locations on a map
- pinpoint assets and assign jobs
- notify and update instantly
- report and review





# Google Maps Coordinate API

# Google Maps Coordinate API

OAuth2, REST API that allows integration of Google Maps Coordinate with existing systems.

- create and assign jobs
- track progress of jobs
- report over job history



# Google Maps Coordinate: Creating a job

**POST** /coordinate/v1/teams/<TEAM>?  
title=Job&address=Somewhere&lat=45&lng=55

JSON

```
{
  "kind": "coordinate#job",
  "id": "16726",
  "state": {
    "kind": "coordinate#jobState",
    "location": {
      "kind": "coordinate#location",
      "lat": 45.0, "lng": 55.0, "addressLine": [ "Somewhere" ]
    },
    "title": "Job"
  }
}
```



# Google Maps Coordinate: Assigning a job

POST

/coordinate/v1/teams/<TEAM>/jobs/16726?assignee=dave@icecream.com

JSON

```
{
  "kind": "coordinate#job",
  "id": "16726",
  "state": {
    "kind": "coordinate#jobState",
    "assignee": "dave@icecream.com",
    "location": {
      "kind": "coordinate#location",
      "lat": 45.0, "lng": 55.0, "addressLine": [ "Somewhere" ]
    },
    "title": "Job"
  }
}
```



# Google Maps Coordinate: Listing jobs

**GET** /coordinate/v1/teams/<TEAM>/jobs?  
minModifiedTimestampMs=1340836532257

JSON

// Data job data including a continue token for paging



## Google Maps Coordinate API

**How will you use it?**





# Google Maps Tracks API



*Where's **all** my stuff?*

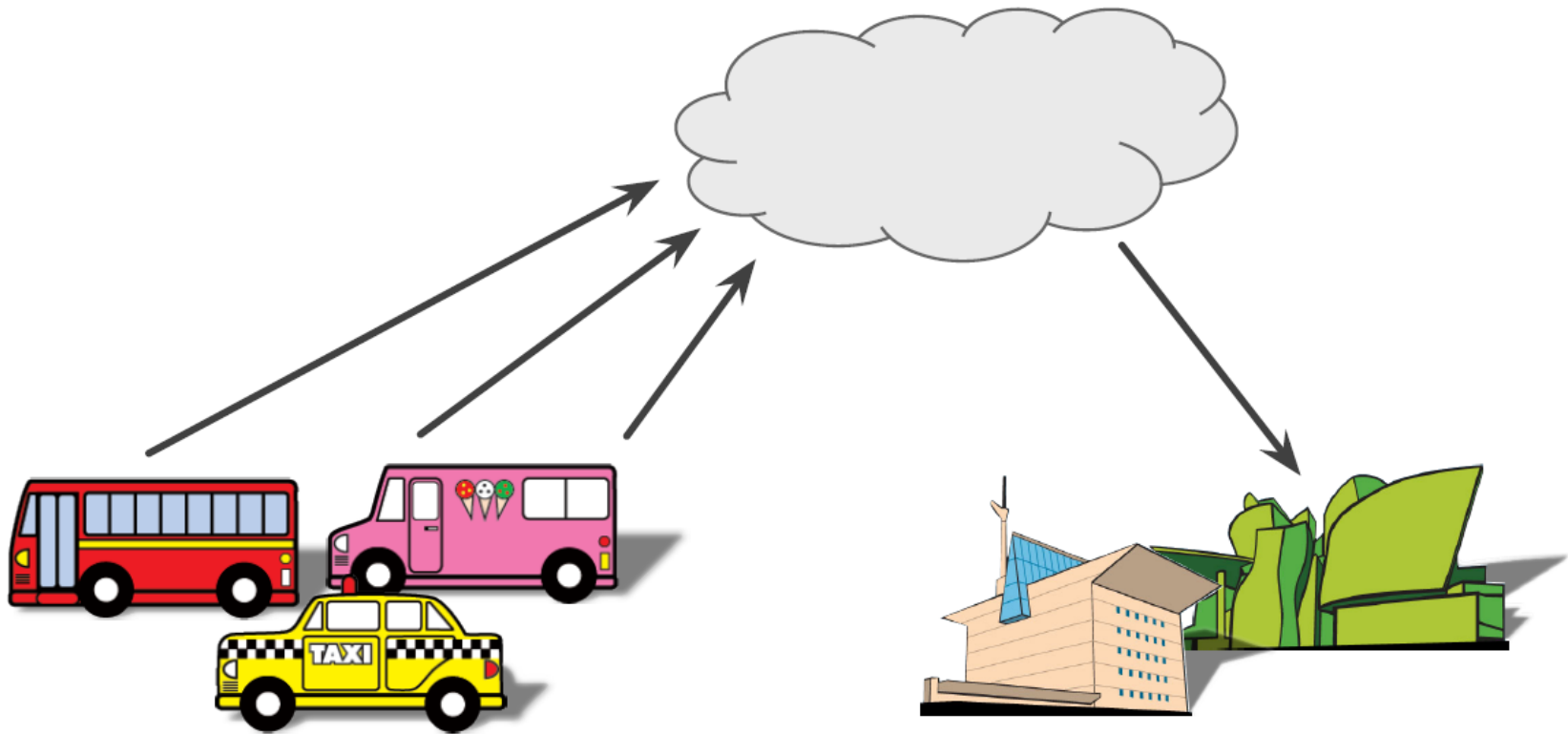


**1 000s of entities**

**1 000 000s of points**



# Keeping your Location Data in Google's Cloud



Vehicle images Andre Adams/Shutterstock.com; throughout  
Retro Building Cartoons [CC BY 3.0](https://creativecommons.org/licenses/by/3.0/) "Dan" [www.freevector.com/retro-building-cartoons/](https://www.freevector.com/retro-building-cartoons/)  
[creativecommons.org/licenses/by/3.0/](https://creativecommons.org/licenses/by/3.0/)

## **It is**

- a location data store
  - specialised
  - secure
  - scalable
- an HTTP API

## **It ain't**

- a generic, relational database
- an end-to-end solution



# Securing the Google Maps Tracks API

- . Authentication using OAuth2
- . All requests over SSL
- . All location data is stored encrypted
- . Fully consistent data storage



# The First Building Blocks



**entity**

**crumb**

**track**



# Creating an entity

**POST** /tracks/v1/entities/create

JSON

```
{
  "entities": [
    { "name": "Fred's ice-cream experience", "type": "AUTOMOBILE" },
    { "name": "The Susie Soft Serve", "type": "AUTOMOBILE" }
  ]
}

{
  "entityIds": [ "0123456789abcdef", "1337cafeba5eba11" ]
}
```



# Recording crumbs

**POST** /tracks/v1/crumbs/record

JSON

```
{
  "entityId": "1337cafeba5eba11",
  "crumbs": [{
    "location": { "lat": -33.860, "lng": 151.211 },
    "timestamp": 431014090,
    "metadata": {
      "freezerTemp": "-6.2"
    }
  }, ..., ]
}
```





# Recording crumbs

**POST** /tracks/v1/crumbs/record

```
{
  "entityId": "1337cafeba5eba11",
  "crumbs": [{
    "location": { "lat": -33.860, "lng": 151.211 },
    "timestamp": 431014090,
    "metadata": {
      "freezerTemp": "-6.2"
    }
  }, ..., ]
}
```

JSON



# Retrieving a track

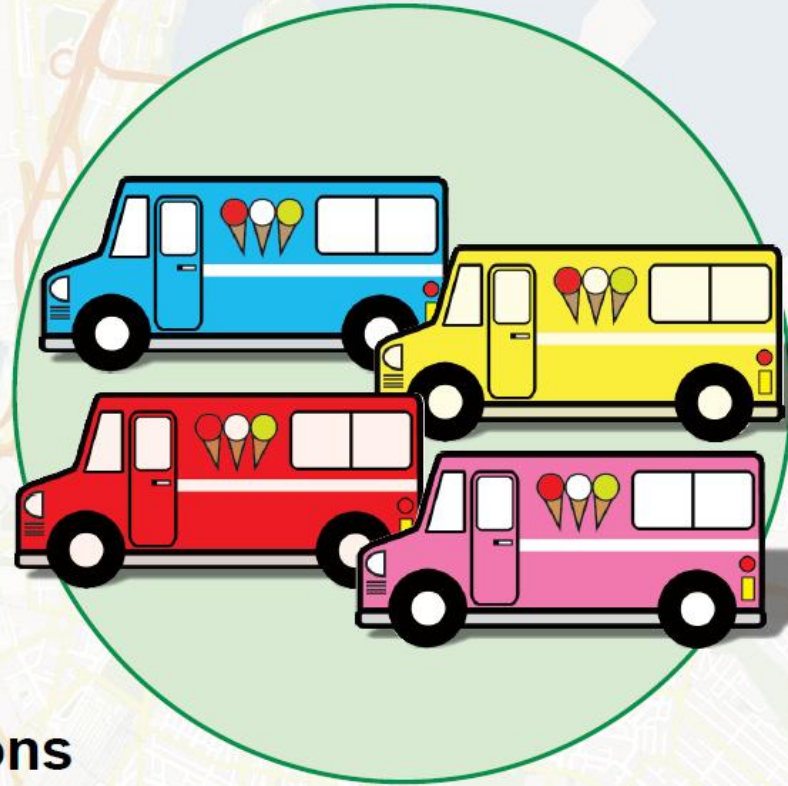
**POST** /tracks/v1/crumbs/gethistory

```
{  
  "entityId": "1337cafeba5eba11",  
  "timestampMax": 431604740,  
  "timestampMin": 431000000,  
  "numSamples": 137  
}
```

JSON



Let's get it together



**collections**

# Creating collections

**POST** /tracks/v1/collections/create

```
{  
  "collections": [  
    { "name": "Trucks with sprinkles" },  
    { "name": "Trucks with musical sirens" }  
  ]  
}
```

JSON



# Creating collections

**POST** /tracks/v1/collections/create

JSON

```
{
  "collections": [
    { "name": "Trucks with sprinkles" },
    { "name": "Trucks with musical sirens" }
  ]
}

{
  "collectionIds": [ "1333333333333337", "01248163264128" ]
}
```



# Creating collections

**POST** /tracks/v1/collections/addentities

```
{  
  "collectionId": "1333333333333337",  
  "entityIds": [ "0123456789abcdef", "1337cafeba5eba11" ]  
}
```

JSON



# Retrieving live locations

**POST** /tracks/v1/crumbs/getrecent

```
{  
  "collectionId": "1333333333333337"  
}
```

JSON



# Retrieving live locations

**POST** /tracks/v1/crums/getrecent

JSON

```
{
  "collectionId": "1333333333333337"
}

{
  "results": [
    { "entityId": "0123456789abcdef", "crumb": { ... } },
    { "entityId": "1337cafeba5eba11", "crumb": { ... } }
  ]
}
```





**Setting boundaries**



# Creating a geofence

**POST** /tracks/v1/geofences/create

```
{  
  "geofences": [{  
    "name": "Ice-cream district",  
    "polygon": { "loops": [ ... ] },  
  }]  
}
```

JSON

# Creating a geofence

**POST** /tracks/v1/geofences/create

```
{
  "geofences": [{
    "name": "Ice-cream district",
    "polygon": { "loops": [ ... ] },
  }]
}

{
  "geofenceIds": [ "0102040810204080" ]
}
```

JSON



# Creating geofences

**POST** /tracks/v1/geofences/addcollections

```
{  
  "geofenceId": "0102040810204080",  
  "collectionIds": [ "1333333333333337", "01248163264128" ]  
}
```

JSON



# Retrieving recently active geofences

**POST** /tracks/v1/geofences/getrecentlyactive

```
{  
  "collectionId": "1333333333333337"  
}
```

JSON



# Retrieving recently active geofences

**POST** /tracks/v1/geofences/getrecentlyactive

```
{  
  "collectionId": "1333333333333337"  
}  
  
{  
  "results": [{  
    "entityId": "0123456789abcdef",  
    "geofenceId": "0102040810204080",  
    "crumb": { ... } },  
  ]  
}
```

JSON





**entity  
crumb  
track  
collection  
geofence**



**Where to next?**

**Google Maps Coordinate**  
[maps.google.com/coordinate](https://maps.google.com/coordinate)

**Google Maps Tracks API**  
[g.co/mapstracksapi](https://g.co/mapstracksapi)





# Thanks for listening!

Empowering your Workforce with Google Maps

