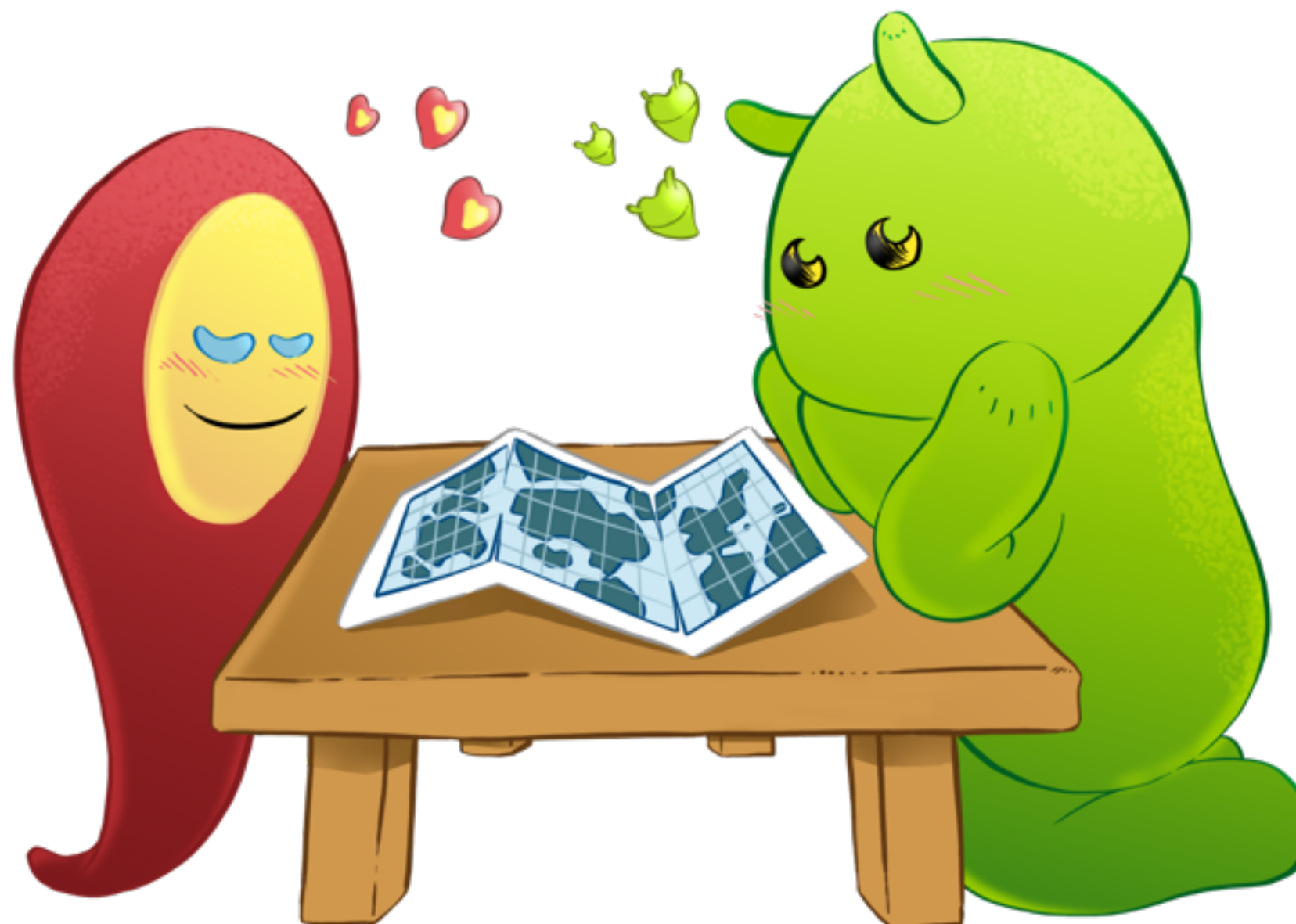




Google
Developers



When Android Meets Maps

Ankur Kotwal
Android Developer Advocate

Chris Broadfoot
Google Maps Developer Relations

Giving users perspective

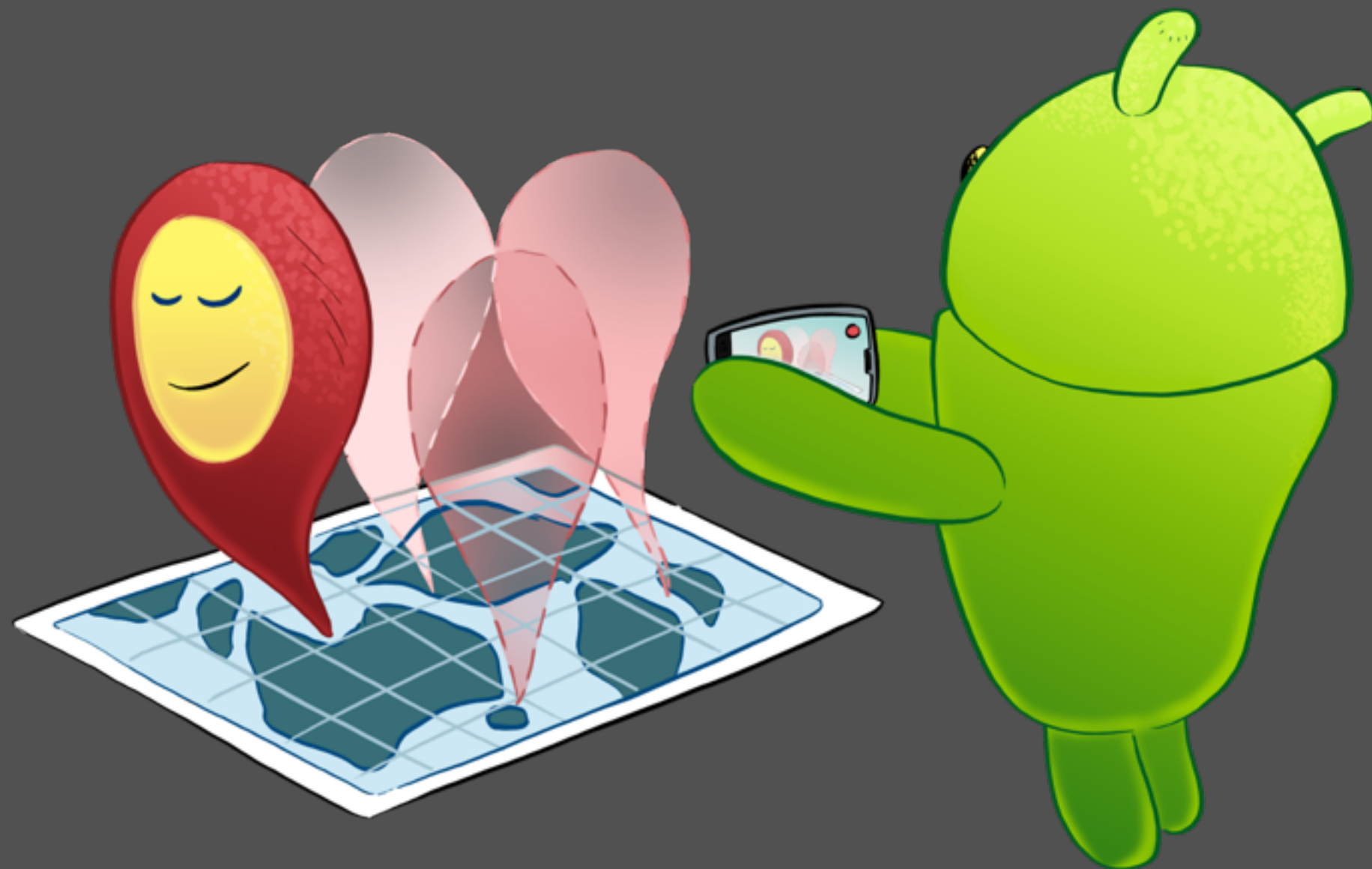
- Building better maps
- Hardware sensors
- Google Maps web services





Journey to San Francisco

Demo



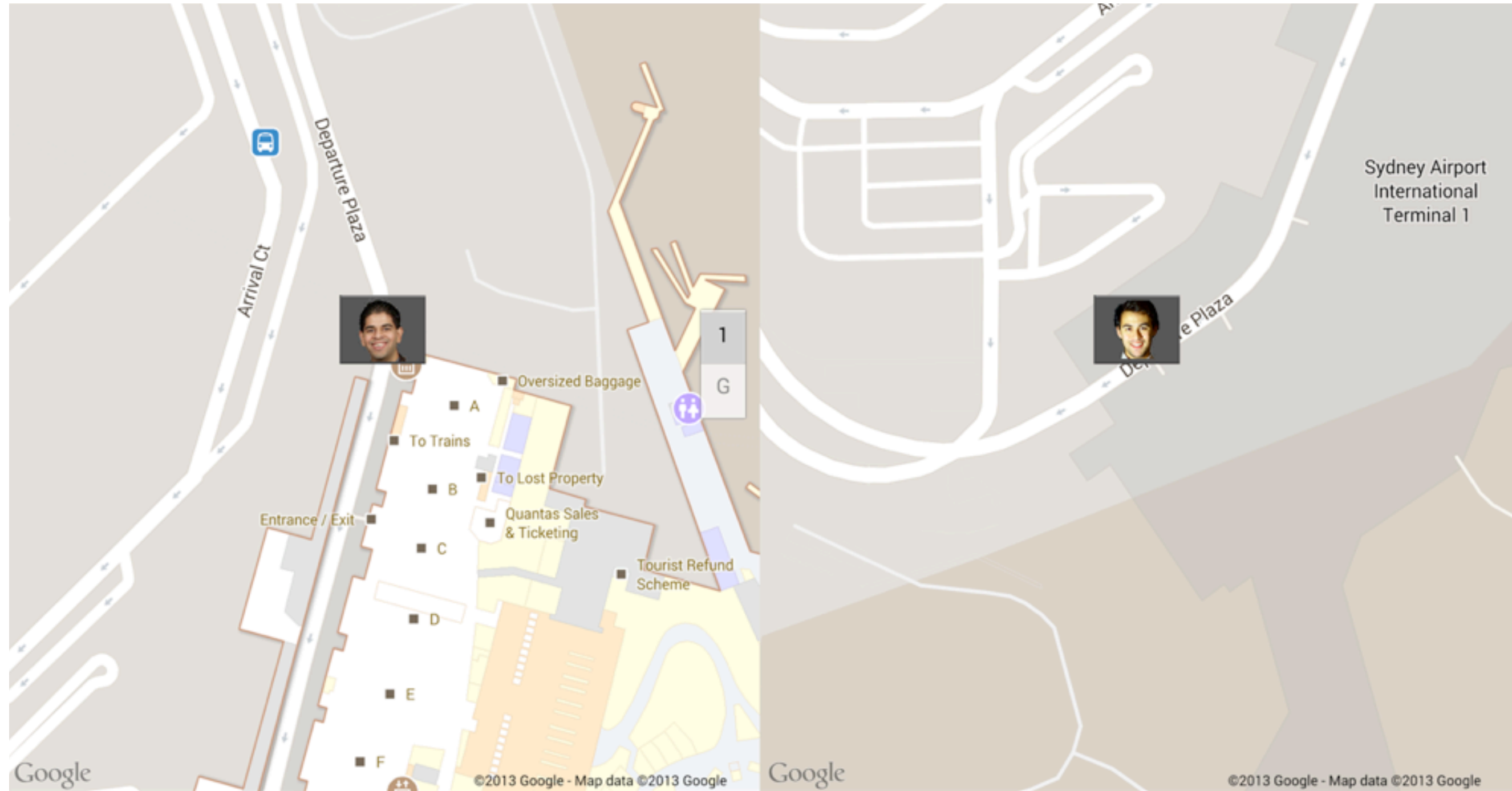
Google Play services



I/O 2013 Presentation
What's new in Google Play services



MapFragment



MapFragment

```
<?xml version="1.0" encoding="utf-8"?>
<com.googleio.onezerofour.journey.AppLayout
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    xmlns:android="http://schemas.android.com/apk/res/android">

    <fragment android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:name="com.google.android.gms.maps.MapFragment"
        android:id="@+id/map1"/>

    <fragment android:layout_width="wrap_content"
        android:layout_height="match_parent"
        android:name="com.google.android.gms.maps.MapFragment"
        android:id="@+id/map2"
        android:layout_alignParentRight="true"/>
</com.googleio.onezerofour.journey.AppLayout>
```



Marker Animations

```
Handler handler = new Handler();
final long start = SystemClock.uptimeMillis();
final Interpolator interpolator = new LinearInterpolator();
animator = new Runnable() {
    @Override
    public void run() {
        long elapsed = SystemClock.uptimeMillis() - start;
        double t = interpolator.getInterpolation((float) elapsed / duration);
        double lat = t * endLatLng.latitude + (1 - t) * startLatLng.latitude;
        double lng = t * endLatLng.longitude + (1 - t) * startLatLng.longitude;
        marker.setPosition(new LatLng(lat, lng));
        if (t < 1.0) {
            mHandler.postDelayed(this, 16); // Post again 16ms later.
        }
    }
};
handler.post(animator);
```



Marker Animations

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        }
    }
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```



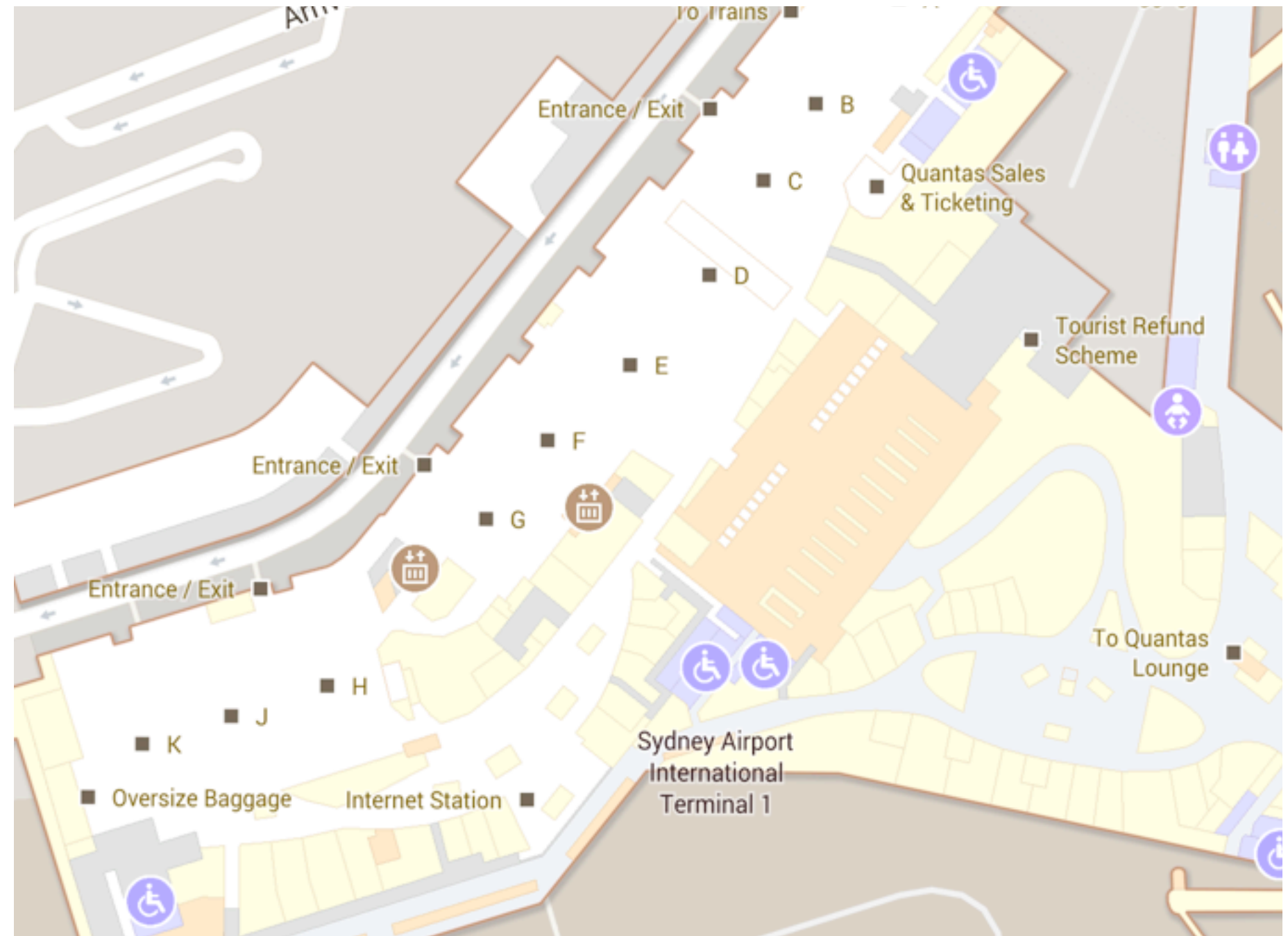
Polyline, Polygons and Circles

- Create complex shapes



Indoor Maps

- Automatically displayed
- One Fragment at a time
 - Switch with hide/show

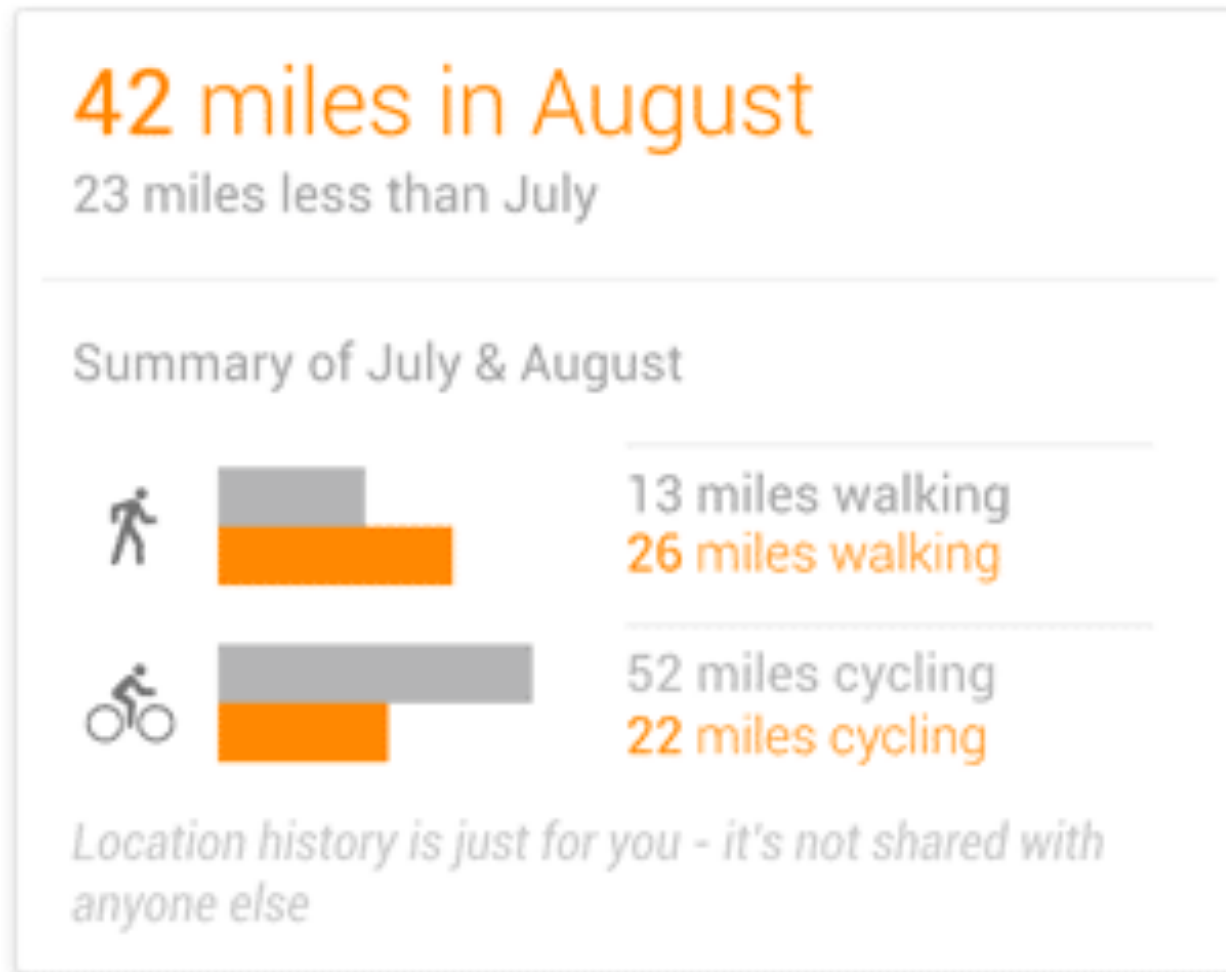


I/O 2013 Presentation

The Next Frontier: Indoor Maps



Activity Recognition



I/O 2013 Presentation

Beyond the Blue Dot: New Features
in Android Location

I/O 2013 Codelab

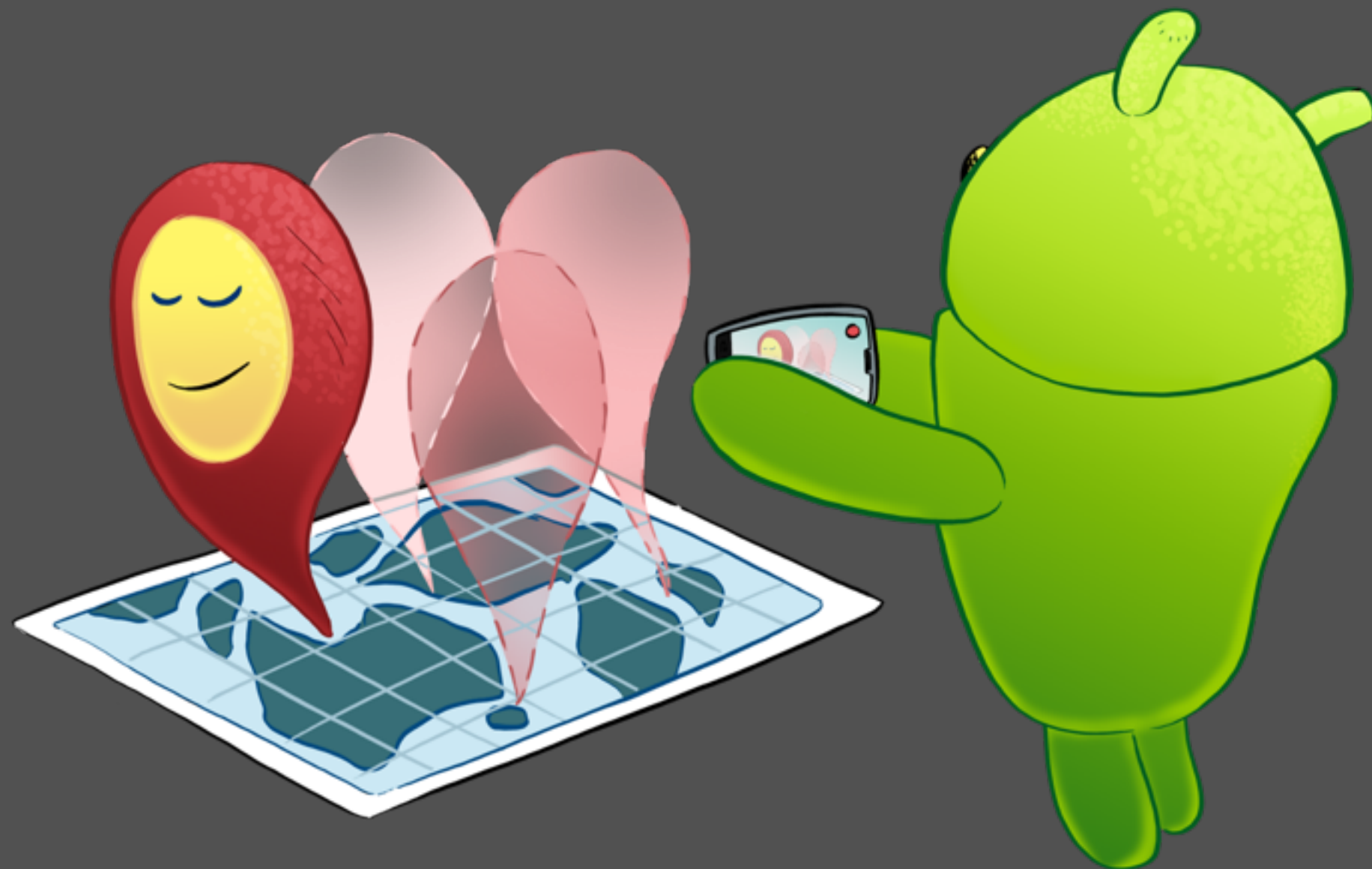
Android Location Based Services





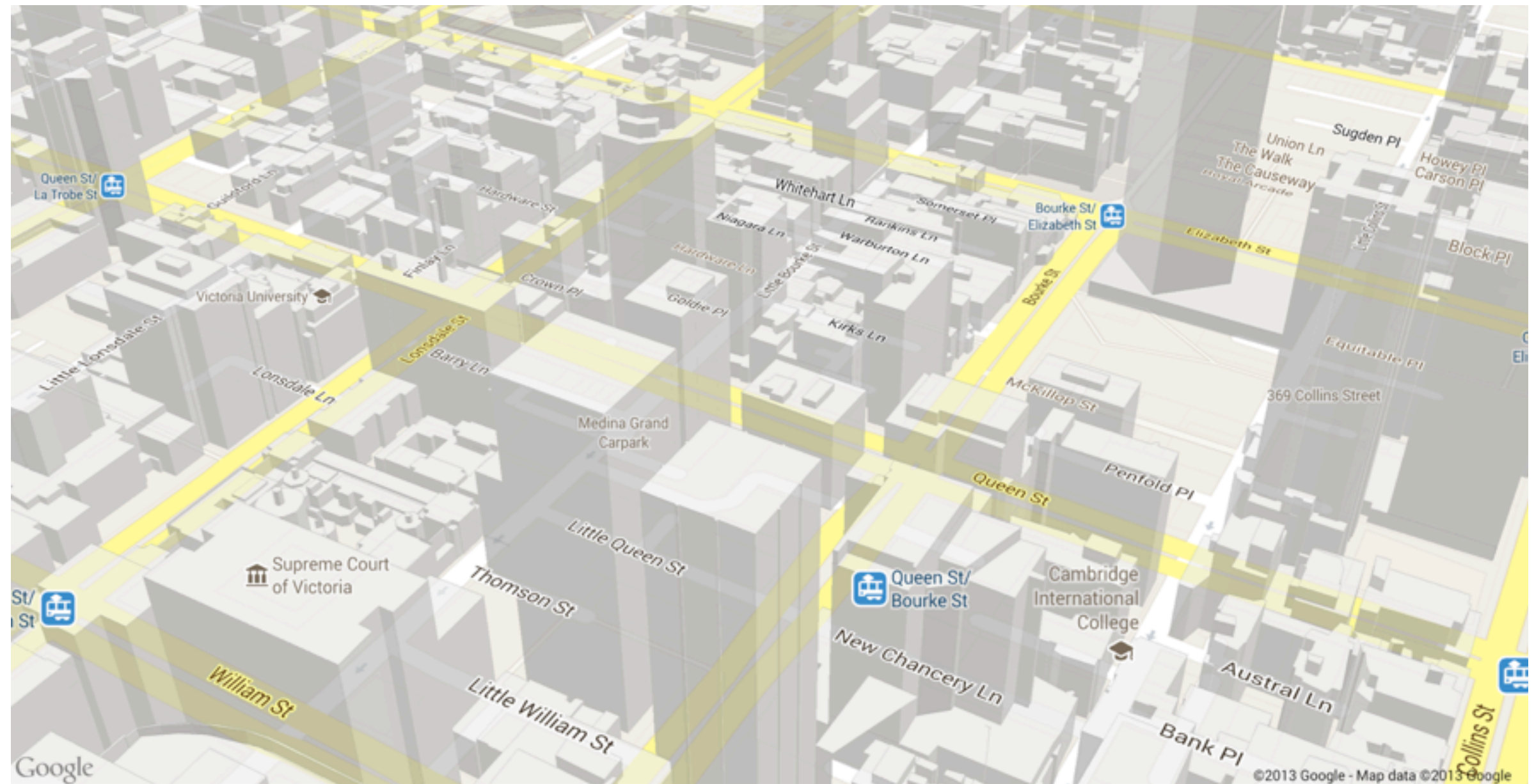
Tour of San Francisco

Demo



Camera

- Panning, zoom, tilt, bearing
- Vector maps
- 3D buildings
- Animation



Camera Animations

```
CameraPosition cameraPosition = new CameraPosition.Builder().
    target(latLng).
    zoom(zoom).
    tilt(tilt).
    bearing(bearing).build();
CameraUpdate cameraUpdate = CameraUpdateFactory.newCameraPosition(cameraPosition);

mMap.animateCamera(cameraUpdate, duration, new GoogleMap.CancelableCallback() {
    @Override
    public void onFinish() {
        callback.onAnimationComplete();
    }

    @Override
    public void onCancel() {
        callback.onAnimationComplete();
    }
});
```



Camera Animations

```
CameraPosition cameraPosition = new CameraPosition.Builder().
    target(latLng).
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    public void onCancel() {
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    }
});
```



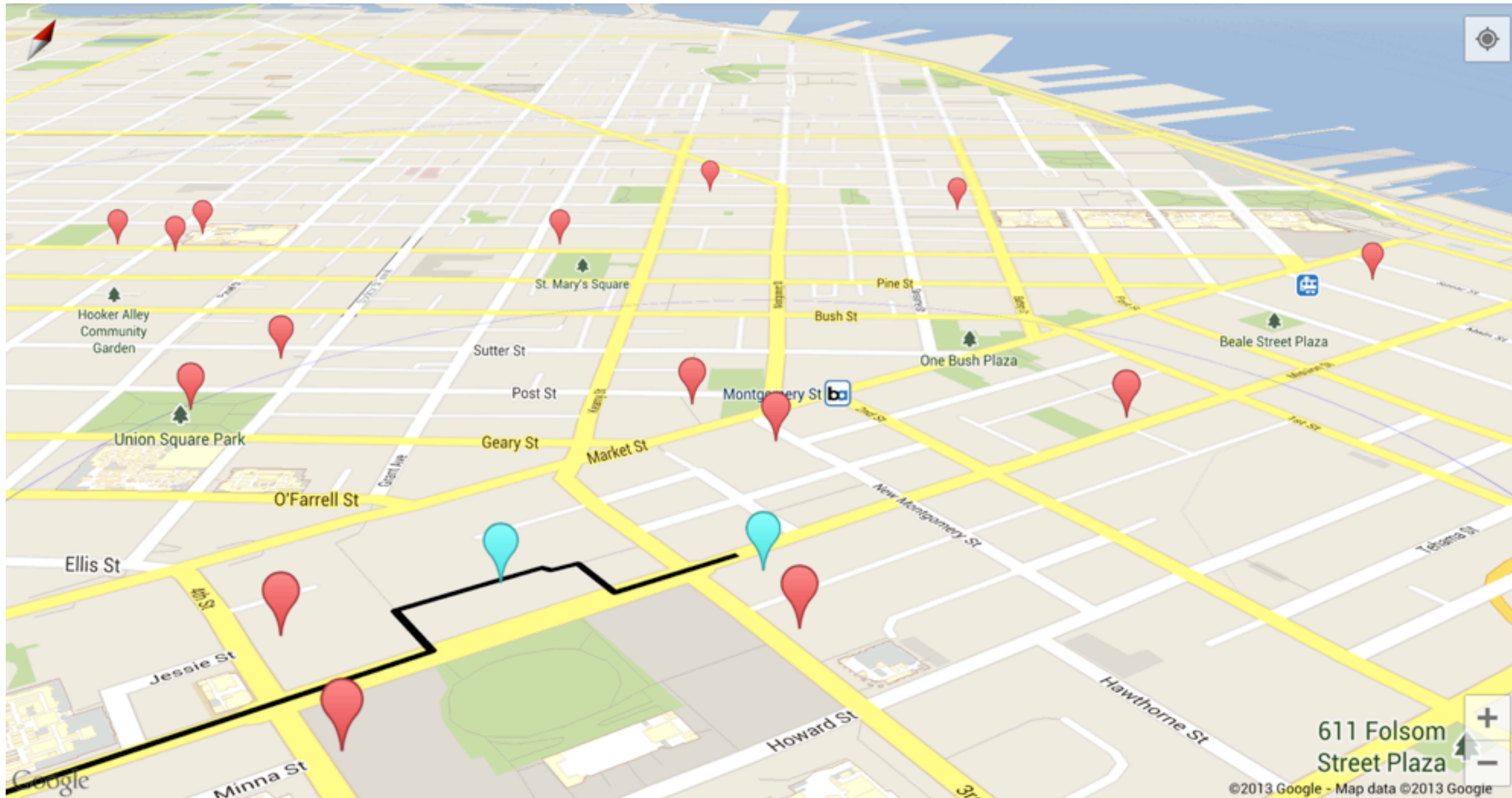


Traveler in a new place

Demo



Magic Camera



Camera

```
Sensor vectorSensor = sensorManager.getDefaultSensor(Sensor.TYPE_ROTATION_VECTOR);  
sensorManager.registerListener(this, sensor, 16000); // ~60hz
```

```
private float[] mRotationMatrix = new float[16];  
private float[] mValues = new float[3];
```

```
public void onSensorChanged(SensorEvent event) {  
    SensorManager.getRotationMatrixFromVector(mRotationMatrix, event.values);  
    SensorManager.getOrientation(mRotationMatrix, mValues);  
  
    mAzimuth = Math.toDegrees(mValues[0]);  
    mTilt = Math.toDegrees(mValues[1]);  
}
```



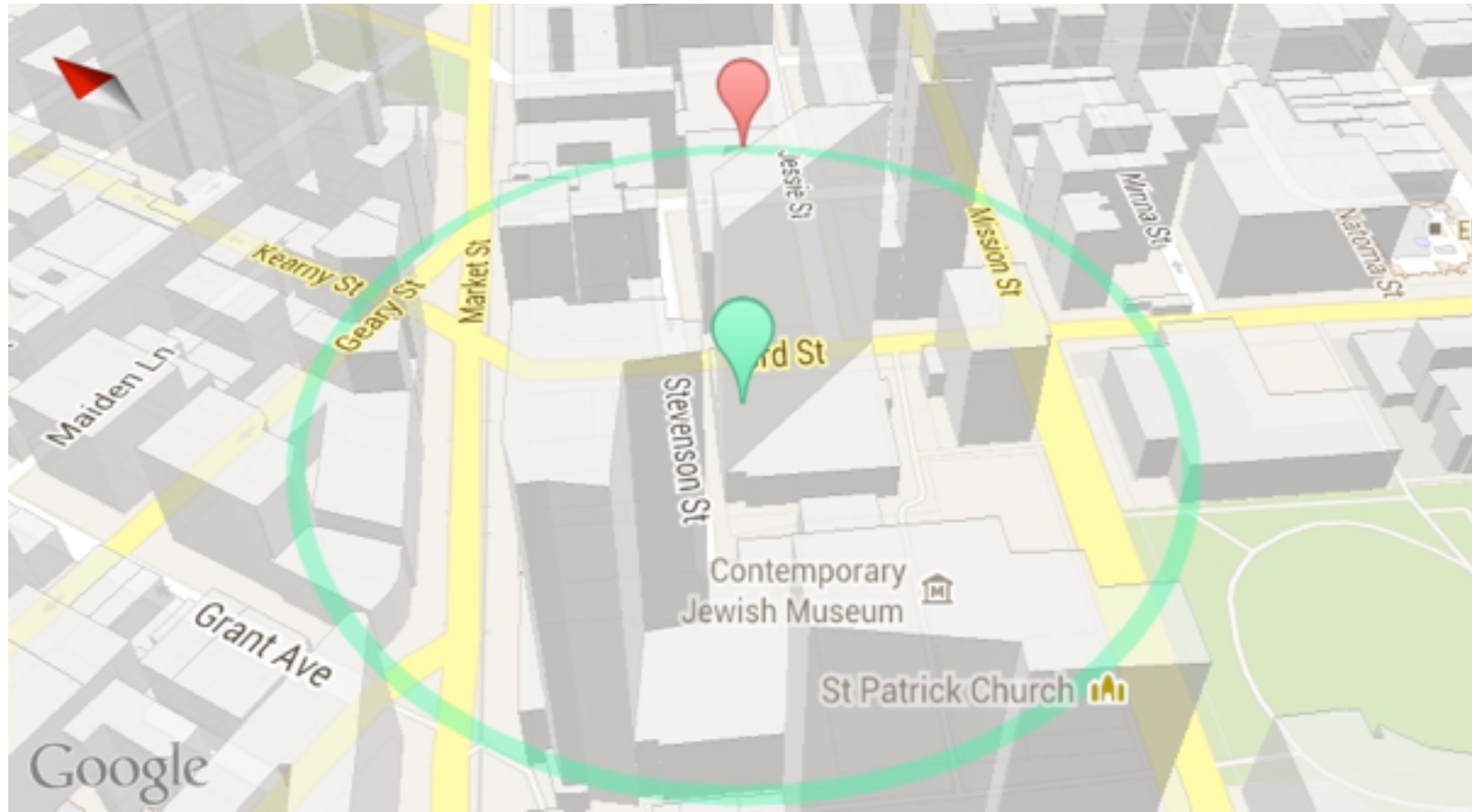
Camera

```
CameraPosition cameraPosition = CameraPosition.builder().  
    tilt(clamp(0, mTilt, 67.5)).  
    bearing(mAzimuth).  
    zoom(13 + 5 * (mTilt / 90)).  
    target(mLatLng).  
    build();
```

```
mMap.moveCamera(CameraUpdateFactory.newCameraPosition(cameraPosition));
```



Offset Camera Target



Offset Camera Target

```
CameraPosition cameraPosition = CameraPosition.builder().  
    tilt(clamp(0, mTilt, 70)).  
    bearing(mAzimuth).  
    zoom(13 + 5 * (mTilt / 90)).  
    target(SphericalUtil.computeOffset(mLatLng, TARGET_OFFSET_METRES, mAzimuth)).  
    build();  
  
mMap.moveCamera(CameraUpdateFactory.newCameraPosition(cameraPosition));
```

github.com/googlemaps/android-maps-utils



Places API (Web Service)

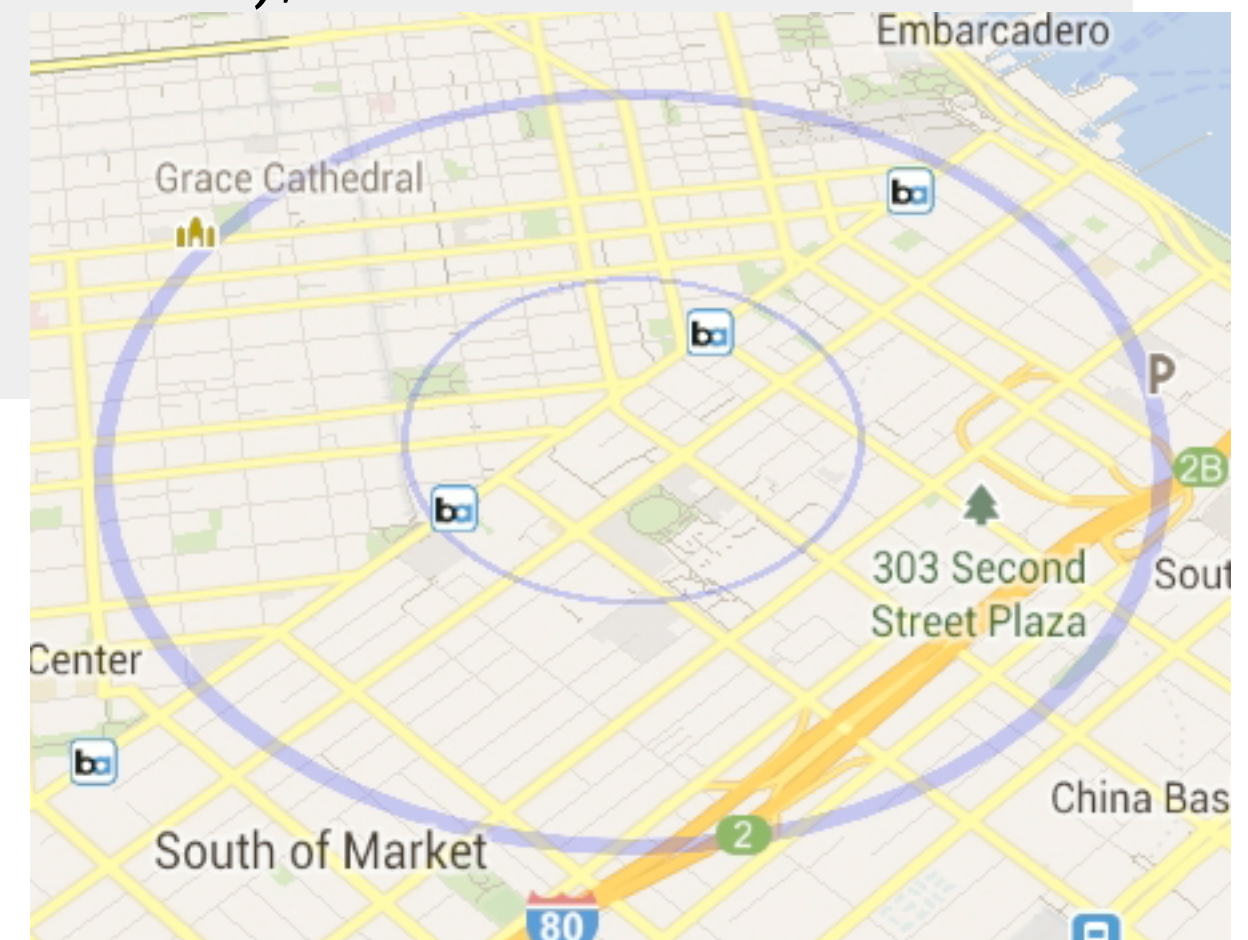
[https://maps.googleapis.com/maps/api/place/nearbysearch/json?sensor=true &location=37.776098,-122.414075 &radius=1000 &types=establishment &key=...](https://maps.googleapis.com/maps/api/place/nearbysearch/json?sensor=true&location=37.776098,-122.414075&radius=1000&types=establishment&key=...)

```
{
  "html_attributions" : [],
  "results" : [
    {
      "geometry" : {
        "location" : {
          "lat" : 37.7796340,
          "lng" : -122.420470
        }
      },
      "icon" : "http://maps.gstatic.com/mapfiles/place_api/icons/generic_business-71.png",
      "id" : "e85c76a85efe8fe85bf7ed7d1de0721a841bd311",
      "name" : "Herbst Theater",
      "photos" : [ ... ],
      "rating" : 4.20,
      "reference" : "...",
      "types" : [ "establishment" ],
      "vicinity" : "401 Van Ness Avenue, San Francisco"
    },
    ...
  ]
}
```



Visualizing the search radius

```
valueAnimator.addUpdateListener(new ValueAnimator.AnimatorUpdateListener() {  
    @Override  
    public void onAnimationUpdate(ValueAnimator valueAnimator) {  
        float animatedFraction = valueAnimator.getAnimatedFraction();  
        mCircle.setRadius(animatedFraction * PLACES_SEARCH_RADIUS);  
        mCircle.setStrokeWidth(1 + animatedFraction * 7);  
    }  
});
```



Directions API (Web Service)

`https://maps.googleapis.com/maps/api/directions/json
?sensor=true &mode=walking
&origin=37.776098,-122.414075 &destination=37.769281,-122.414892`

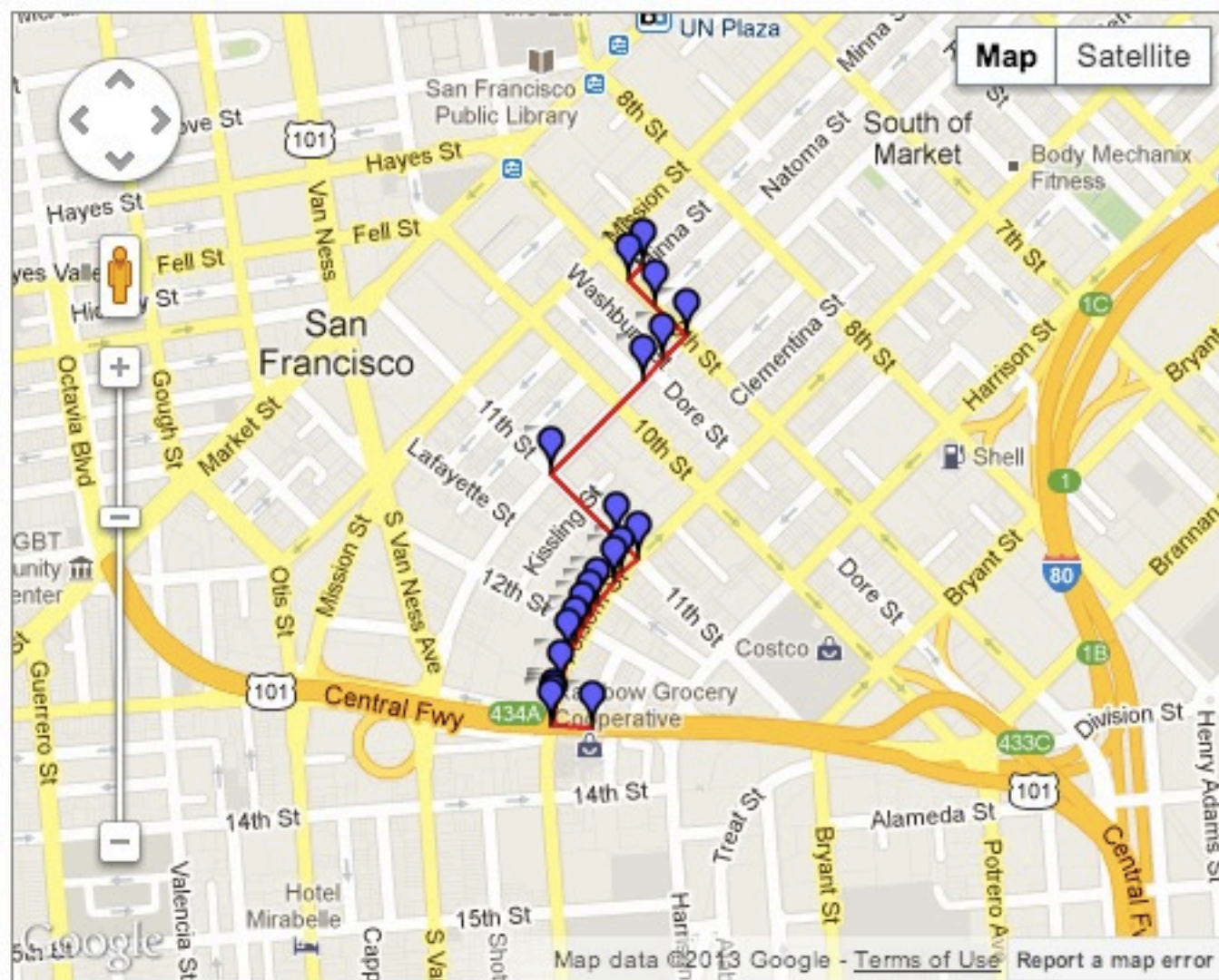
```
{  
  "routes" : [  
    {  
      "legs" : [  
        {  
          "distance" : { "text" : "0.6 mi", "value" : 1009 },  
          "duration" : { "text" : "12 mins", "value" : 730 },  
          "steps" : [ ... ]  
        }  
      ],  
      "overview_polyline" : {  
        "points" : "_cqeFf~cjVf@p@fA}AtAoB`ArAx@hA`GbIvDiFv@gAh@t@X\\|@z@`@Z\\Xf@Vf@VpA\\tATJ@NBBkC"  
      },  
      "summary" : "Howard St and Folsom St",  
      "warnings" : [  
        "Walking directions are in beta. Use caution - This route may be missing sidewalks or pedestrian paths."  
      ],  
      ...  
    }  
  ]  
}
```



Decode Polyline

List<LatLng> PolyUtil.decode(String encodedPolyline)
github.com/googlemaps/android-maps-utils

_cqefF~cjVf@p@fA}AtAoB`ArAx@hA`GbIvDiFv@gAh@t@X\|@z@`@Z\Xf@Vf@VpA\tATJ@NBBkC



Locations list

```
(37.776,-122.41396) Level: 3  
(37.775800000000004,-122.41421000000001)  
(37.77544,-122.41374) Level: 3  
(37.77501,-122.41318000000001) Level: 3  
(37.774680000000004,-122.41360000000002)  
(37.774390000000004,-122.41397) Level: 3  
(37.77310000000001,-122.41559000000001) L  
(37.772180000000006,-122.41442) Level: 3  
(37.7719,-122.41406) Level: 3  
(37.77169,-122.41433) Level: 3  
(37.77156,-122.41448000000001) Level: 3  
(37.77125,-122.41478000000001) Level: 3  
(37.771080000000005,-122.41492000000001)  
(37.77093,-122.41505000000001) Level: 3  
(37.77073,-122.41517) Level: 3  
(37.77053,-122.41529000000001) Level: 3  
(37.770120000000006,-122.41544) Level: 3  
(37.769690000000004,-122.41555000000001)  
(37.769630000000001,-122.41556000000001) L  
(37.76955,-122.41558) Level: 3  
(37.76953,-122.41488000000001) Level: 3
```

Summary

- Take control of the view
- Innovate using sensors
- Rich data with web services

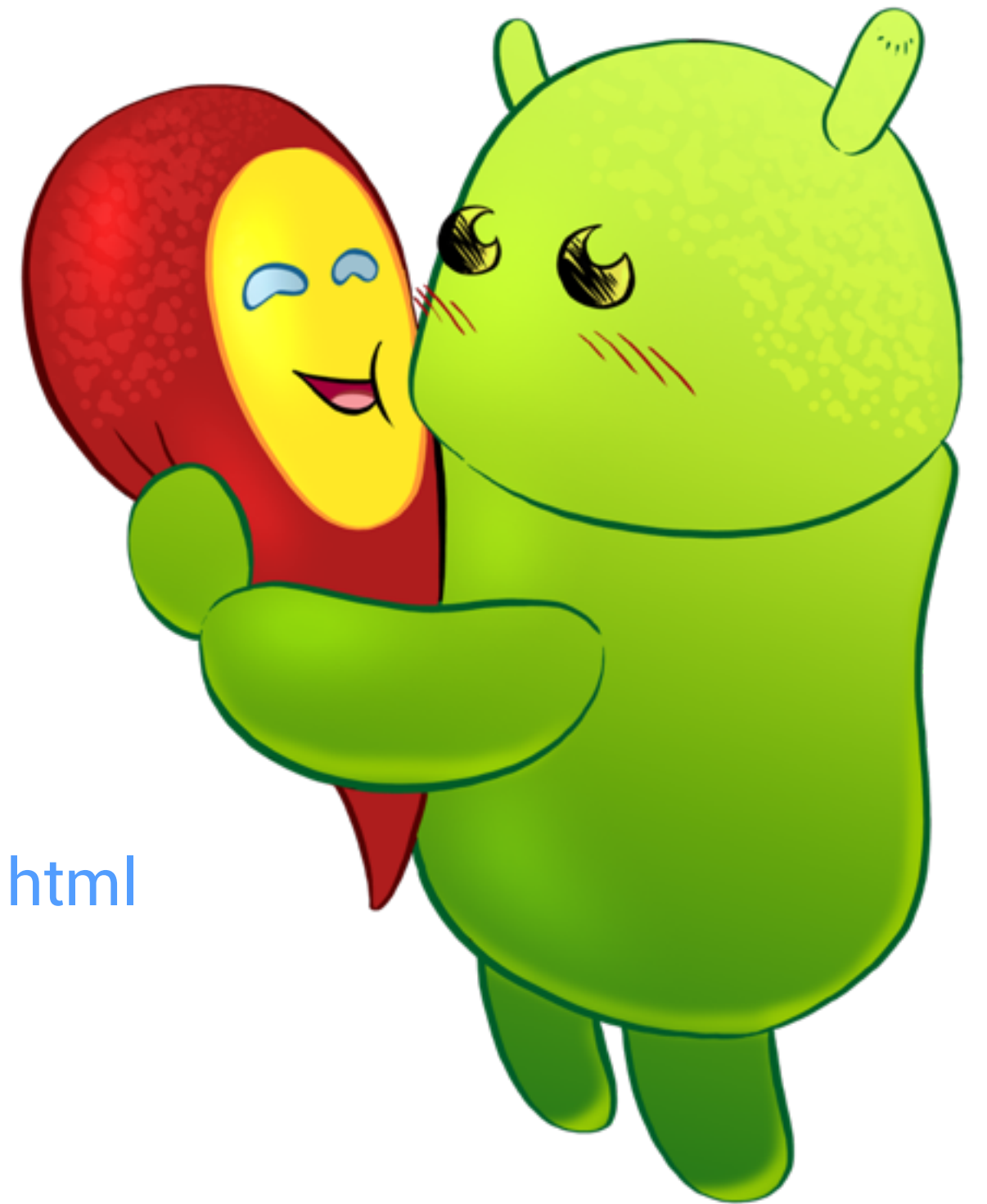
Resources

developer.android.com/google/play-services/maps.html

developers.google.com/maps

github.com/googlemaps/hellomap-android

github.com/googlemaps/android-maps-utils



I/O 2013 Codelab

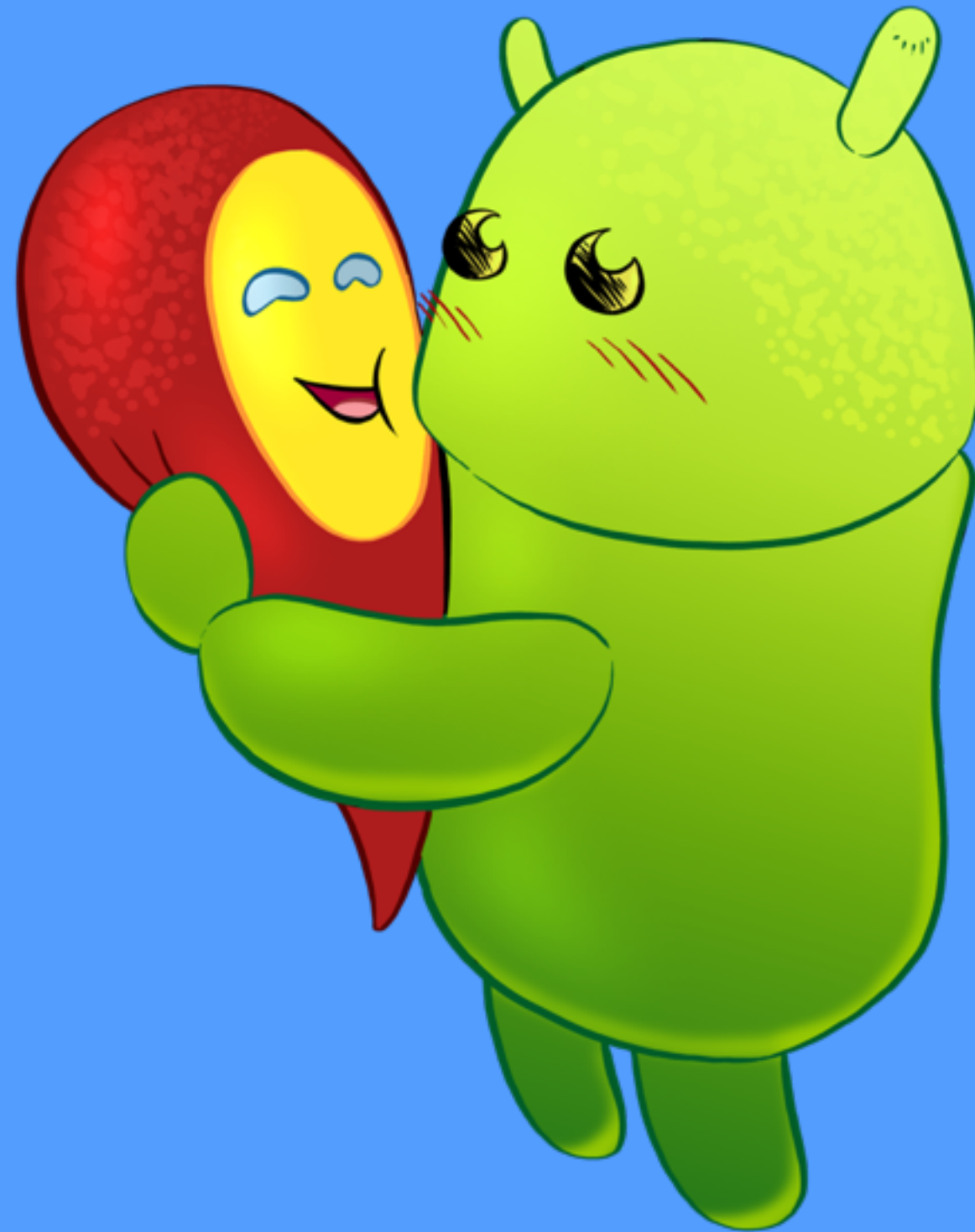
Make your Android app pop with
Google Maps Android API v2



Thank You!

<http://google.com/+AnkurKotwal>

<http://google.com/+ChristopherBroadfoot>



Illustrations by Mike Stevens
mkstvns.com



Google
Developers