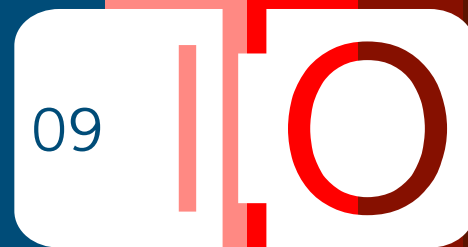


Google™





Building Advanced 3D Geographical Applications for the Web with the Google Earth API

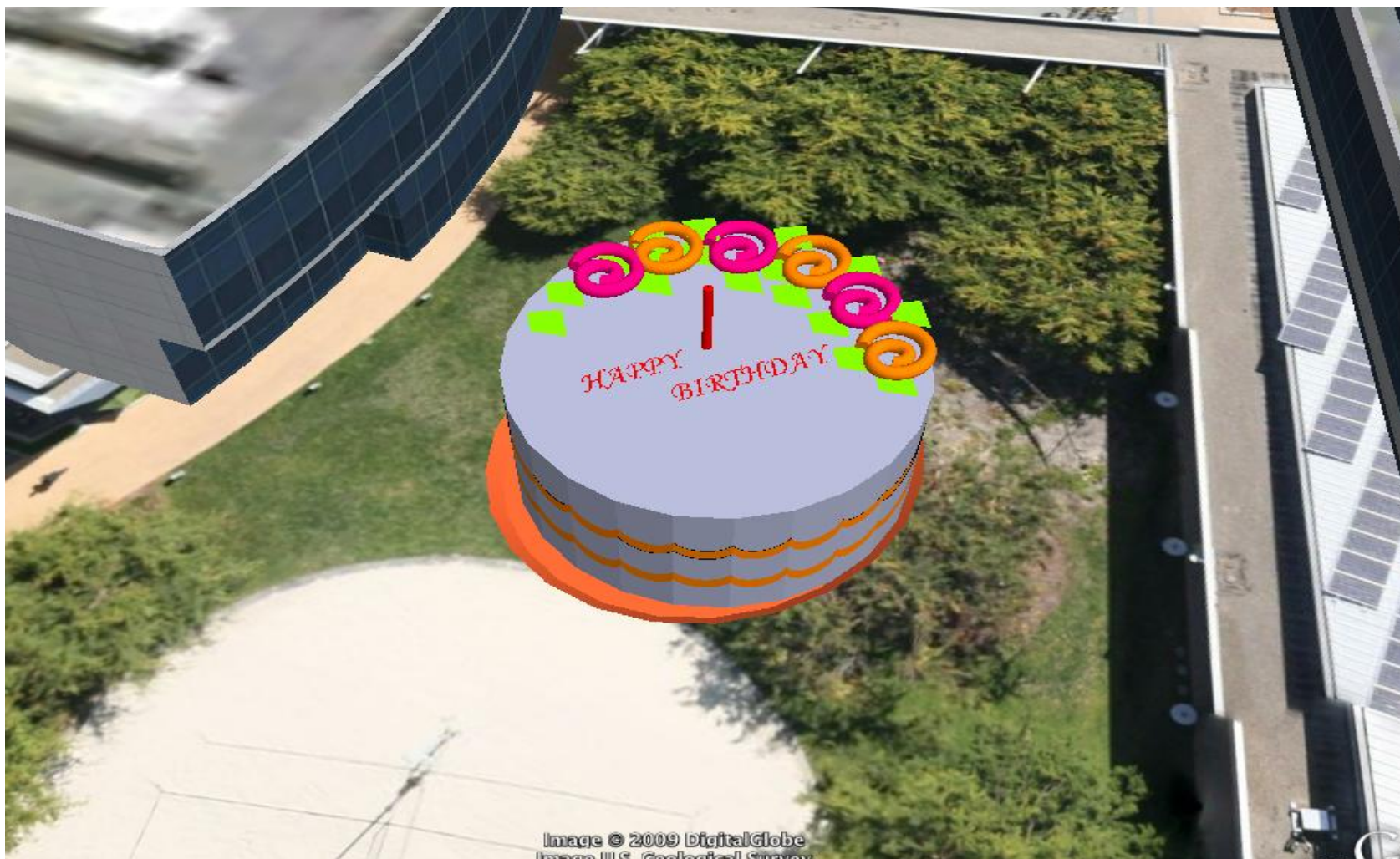
Roman Nurik
May 28, 2009

Post your questions for this talk on Google Moderator:
code.google.com/events/io/questions



tinyurl.com/earthapi-io2009-links

Happy 1st Birthday, Earth API!



Agenda

1. Quick Refresher (What is the Earth API?)
2. “My Earth” demo
3. New utility libraries
4. Animations, effects, and user interaction
5. Other recent developments
6. Q&A



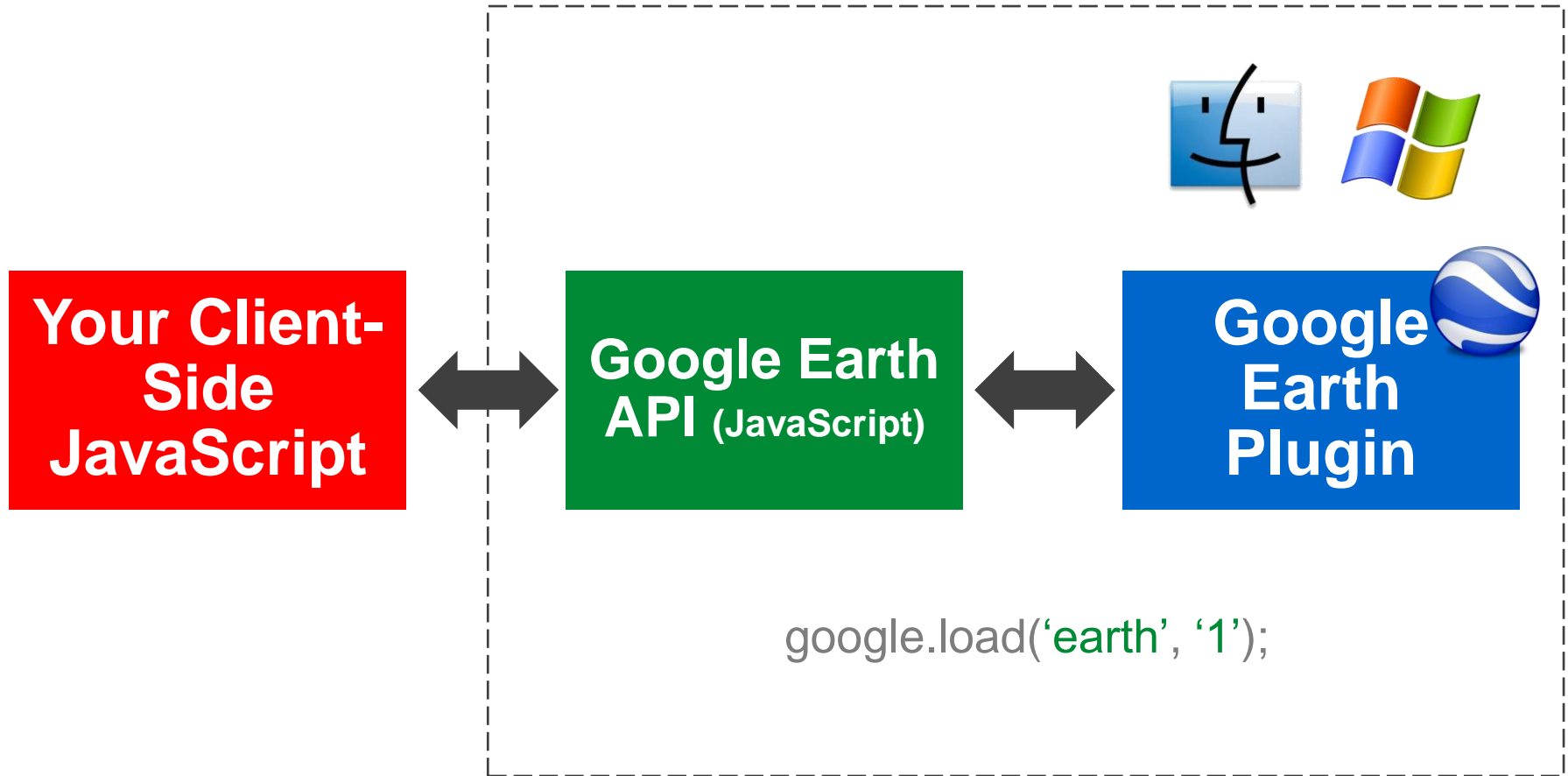
Quick Refresher



Hello Earth Demo

The **Google Earth API**
allows developers to control
the Google Earth Plugin
via **JavaScript**.

The **Google Earth Plugin** is a **browser plugin** that brings the power of **Google Earth** to the web.



We've come so far!

- Mac support
- KML Tour playback
- Underwater terrain
- Mars mode
- Enterprise server connectivity

And 80 samples in the demo gallery!



A new type of 3D geo app



“My Earth” demo

The screenshot shows a web browser window titled "sandbox - My Earth". The address bar contains "Google". The page header includes the "My Earth" logo and the text "3D My Maps client powered by the [Google Earth API](#)". On the right, it says "You are logged in | [Logout](#)".

The main interface features a 3D map of a mountainous region. A purple polygon is drawn on the map, with a red volcano icon placed inside it. Labels on the map include "Maybe a volcano" and "Chickens w/ Large Talons".

On the left side, there is a sidebar with a search bar containing "sandbox" and "Done" and "Save" buttons. Below the search bar is a list of items:

- [Maybe a volcano](#)
I really dunno but Google would be a good place to look.
- [Chickens w/ Large Talons](#)
- [Untitled Line](#)
- [Cordoning off the area](#)
Just cordoning off the area

A pop-up window is open over the volcano icon, allowing for editing. It has a "Title" field with "Maybe a volcano" and a "Description" field containing the text: "I really dunno but Google would be a good place to look." The window also includes "Delete" and "Close" buttons.

At the bottom of the map, there is a copyright notice: "Image © 2009 DigitalGlobe" and the "Google" logo with "Terms of Use" link.

At the bottom right of the page, it says "This is a sample. © 2009, Google".

What does it do?

Edit your My Maps data in the 3D Google Earth Plugin environment

- Basic feature CRUD
- Drag/drop placemarks
- Edit line, polygon vertices
- Customize icons, line styles, fills

How does it work?

- New Earth API **open source utility libraries**
 - Animation, effects
 - Feature editing
 - Faux controls using screen overlays
 - jQuery
-
- Google Map Data API w/ JS client library (backend)

New open source* utility libraries

- **geojs**
 - Common geo math and geometries
- **earth-api-utility-library** (GEarthExtensions)
 - Creating KML objects the JSONic way
 - Take the pain out of common operations (feature by id, dom walk, clear features)
 - Animations/effects framework
 - 1-liner draggable placemarks and line strings

* **Apache 2.0 license**

GEarthExtensions

...

```
<script src="http://earth-api-utility-  
library.googlecode.com/svn/trunk/extensions/dist/extensions.  
pack.js"></script>
```

...

```
var ge;
```

```
var gex;
```

```
function init() {  
    google.earth.createInstance('map3d', function(inst) {  
        ge = inst;  
        gex = new GEarthExtensions(ge);  
    });  
}
```

Creating placemarks – the old way

```
// create icon style for the placemark
var icon = ge.createIcon('');
icon.setHref('http://maps.google.com/mapfiles/kml/' +
             'paddle/red-circle.png');
var style = ge.createStyle('');
style.getIconStyle().setIcon(icon);

// create a point geometry
var lookAt = ge.getView().copyAsLookAt(
    ge.ALTITUDE_RELATIVE_TO_GROUND);
var point = ge.createPoint('');
point.setLatitude(lookAt.getLatitude());
point.setLongitude(lookAt.getLongitude());

// create the point placemark and add it to Earth
var pointPlacemark = ge.createPlacemark('');
pointPlacemark.setName('Hello World');
pointPlacemark.setDescription('Foo');
pointPlacemark.setGeometry(point);
pointPlacemark.setStyleSelector(style);
ge.getFeatures().appendChild(pointPlacemark);
```



Creating placemarks with GEarthExtensions

```
gex.dom.addPointPlacemark(gex.util.getLookAt(), {  
  name: 'Hello World',  
  description: 'Foo',  
  stockIcon: 'paddle/red-circle'  
});
```



“Oh my, how very expressive!”

Walking the DOM (Depth-first search)

```
function getFeatureById(id) {
  var foundFeature = null;

  gex.dom.walk(function() {
    if (this.getId() == id) {
      foundFeature = this;
      return false; // end the walk
    }
  });

  return foundFeature;
}
```



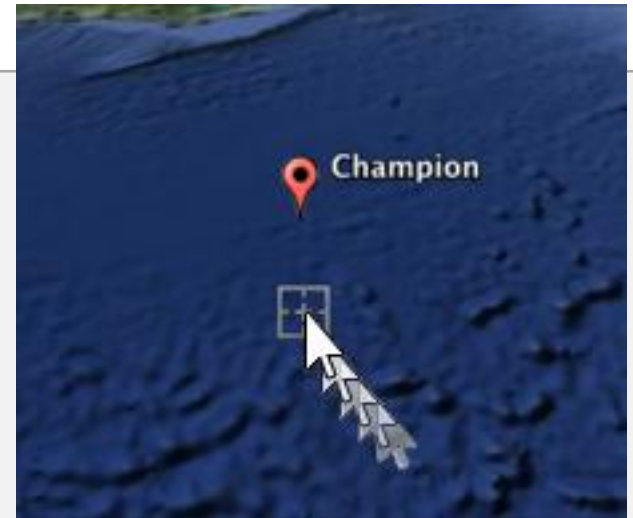
Animation, effects, and interaction



Draggable Placemarks ([demo](#))

Uses animation/effects framework for bounce

```
gex.edit.makeDraggable(placemark, {  
  dropCallback: function() {  
    alert('Yay!');  
  },  
  draggingStyle: {  
    icon: {  
      stockIcon: 'paddle/red-circle',  
      hotSpot: { left: '50%', bottom: 0 }  
    }  
  },  
  targetScreenOverlay: {  
    icon: 'http://maps.google.com/mapfiles/kml/' +  
      'shapes/cross-hairs.png',  
    overlayXY: { left: '50%', top: '50%' },  
    screenXY: { left: 0, top: 0 },  
    size: { width: 32, height: 32 }  
  }  
});
```



Animation framework (**GEarthExtensions.fx**)

bounce(placemark)

animateProperty()

new TimedAnimation()

Hidden

AnimationManager_

Hidden

GEPlugin.frameend event

Animation framework (**GEarthExtensions.fx**)

bounce(placemark)

animateProperty()

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Hidden

AnimationManager_

Hidden

GEPlugin.frameend event

Low level effects with animateProperty

```
var point = placemark.getGeometry();

gex.fx.animateProperty(point, 'latitude', {
  duration: 250, // 1/4 a second
  delta: 0.05,
  easing: 'out',
  callback: function() { // chain together animations
    gex.fx.animateProperty(point, 'latitude', {
      duration: 250, // 1/4 a second
      delta: -0.05,
      easing: 'in',
      callback: function() {
        alert('Done!');
      }
    });
  }
});
```

Animation framework (**GEarthExtensions.fx**)

bounce(placemark)

animateProperty()

new TimedAnimation()

Hidden

AnimationManager_

Hidden

GEPlugin.frameend event

Custom animations with TimedAnimation

```
gex.util.takeOverCamera();
var lookAt = gex.util.getLookAt();
var startLon = lookAt.getLongitude();

var anim = new gex.fx.TimedAnimation(5000, function(t) {
    lookAt.setLongitude(startLon + t / 100);
    ge.getView().setAbstractView(lookAt);
}, function() {
    // upon completion, relinquish camera control
    gex.util.takeOverCamera(false);
});

anim.start();
```

Editable lines and polygons

- Edit a line string:

```
gex.edit.editLineString(placemark.getGeometry());
```

- Edit a polygon's outer boundary:

```
gex.edit.editLineString(placemark  
    .getGeometry().getOuterBoundary());
```

Editable lines and polygons, contd.

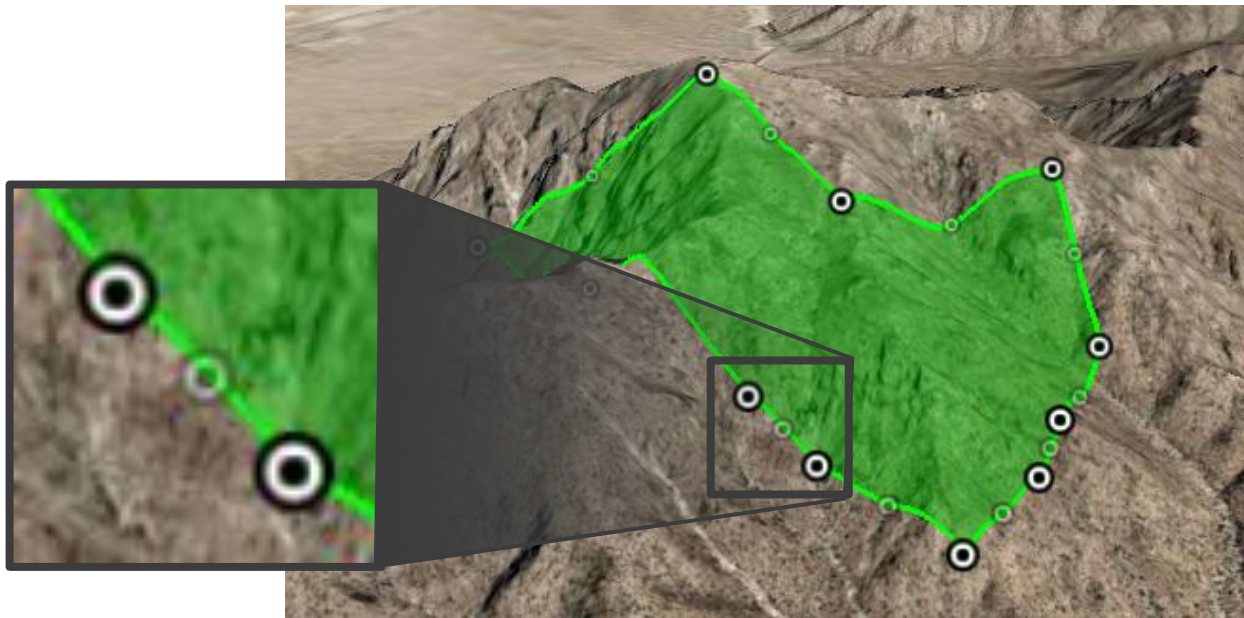
```
gex.edit.editLineString (placemark  
    .getGeometry().getOuterBoundary());
```



Each coordinate is a draggable placemark

Editable lines and polygons, contd.

```
gex.edit.editLineString (placemark  
    .getGeometry().getOuterBoundary());
```



Each coordinate is a draggable placemark

Overlaid controls / HUD

Two options:



	Click events	Fast visual performance	Mouse cursor customization	Alpha-transparency	Dynamic text	Browser consistency
Screen overlays	✓	✓		✓	*	✓
IFRAME shims	✓		✓		✓	*

* possible but difficult



Other recent developments
with awesome demos!!



New and improved Maps API integration ([video](#))

G_SATELLITE_3D_MAP



- [Beefy demo](#)
- [GGeoXml demo](#)

Embeddable KML, everywhere! ([demo](#))



0 lines of JavaScript!

Get Qualified.

<http://code.google.com/qualify>



Gain developer API knowledge. Get Google cred. Make more money.

Designed for professionals who currently develop or want to develop applications that use Google APIs, the Google Qualified Developer program can help you become a more successful developer for free.

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Post your public profile in the [Solutions Marketplace](#) and reach companies around the world who are interested in hiring Qualified Google Developer experts.

Build your expertise.

Access our [Study Guides](#), where you'll find links to existing training resources. Use these materials to expand and hone your Google API knowledge so you can better serve your clients.

Promote your business with Google's name recognition.

The Google Qualified Developer program is available to both [individuals and companies](#). Receive distinction as a skilled professional. Plus, receive the Google Qualified Developer logo and other benefits.

The Google Qualified Developers program also provides convenience and confidence for Google partners and customers in need of development assistance.

Gadgets and **Gadget Ads** and **Maps APIs** are currently supported.

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