Describing Geographical Objects

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Abstract

The Keyhole Markup Language (KML) is a way of how placemarks and other geographical features can be described. It is not as powerful or sophisticated as the Geographic Markup Language (GML), but it is easier to understand and use and is support as a data format by a variety of Web-oriented services and applications. Flickr, Google Maps, Google Earth all support KML and can use KML for exchanging geographic datasets.

Geodata on the Web

- GeoRSS (Location and Geocoding) is a simple way of tagging feed entries
  - each entry can be associated with a point on a map (GeoRSS-Simple in its simplest form)
  - the basic data structure is still a feed (probably sorted by date)
- Keyhole (http://en.wikipedia.org/wiki/Keyhole,_Inc.) pioneered consumer-level geospatial imaging
  - founded in 2001 and acquired by Google in 2004
  - Google Maps and Google Earth are based on Keyhole technologies
- Google Earth (http://earth.google.com/) started as a standalone program
  - separate application instead of being an integral part of browsing
    - Google Earth Plug-in (http://google.system.blogspot.com/2008/05/google-earth-browser-plugin.html) and Google Earth API (http://code.google.com/apis/earth/) allow browser integration
    - Plug-Ins (Web Browsers; Plug-Ins (1)) require separate installation (unless they are as popular as Flash)
Keyhole Markup Language (KML)

Map-Based Painting

- KML represents annotations in mapping-oriented applications
  - placemarks
  - images
  - polygons
  - textual descriptions
  - 3D models
- Google Earth extends KML with dynamic features
  - ability to associated time spans with features
  - ability to represent tours (dynamic presentations of features)
KML Tours

Google My Maps

- Based on Google Maps and adds simple drawing features
  - maps are associated with a Google account
  - maps can be private, public, or collaborative
  - maps can be linked to [http://maps.google.com/maps/ms?ie=UTF8&hl=en&msa=0&msid=116962062413210327627.0000011e4245e1bcd7/dz=15] for publishing custom maps
- Extremely limited in its functionality
  - three feature drawing tools: placemarks, lines, polygons
  - allows import of GeoRSS or KML data (KMZ simply is gzipped KML)
  - inability to rearrange painted features
Google My Maps

South Hall KML (1st Attempt)

<?xml version="1.0" encoding="UTF-8"?>
<kml xmlns="http://earth.google.com/kml/2.2">
<Document>
  <name>UC Berkeley Campuses</name>
  <description><![CDATA[]]></description>
  <NetworkLink>
    <name>UC Berkeley Campuses</name>
    <Link>
      <href>http://maps.google.com/maps/ms?ie=UTF8&amp;hl=en&amp;vps=1&amp;jsv=153e&amp;oe=UTF8&amp;msa=0&amp;msid=116962062413210327627.00043de7109aff5329452&amp;output=kml</href>
    </Link>
  </NetworkLink>
</Document>

- Useful because the KML is just a pointer to the real data
- Only useful in online scenarios (access to URI required)
Getting the KML Data

- KML has a feature that allows dynamic access to KML files
- KML handling in offline/import scenarios requires KML content
- KML is XML and XML has special escaping rules
  - markup languages always need "magic characters" (in HTML/XML: < & '
  - copy/paste of XML-encoded strings requires unescaping of these characters
  - Unescaping is a mechanical task and can be done by hand
  - change each "&" into 
  - Web-based services can be used to automate this task
    (use "XML "decode" to "US-ASCII" when using this service)

South Hall KML

```xml
<Placemark>
  <name>South Hall</name>
  <description><![CDATA[South Hall is the oldest building in the UC system and is located in the middle of the UC Berkeley main campus. <br><img src="http://upload.wikimedia.org/wikipedia/commons/thumb/7/70/South_Hall--UC_Berkeley--Panoramic.jpg/800px-South_Hall--UC_Berkeley--Panoramic.jpg" style="width:231px" src="http://www.cheesebikini.com/cam/art/mjg%28j66klnf.jpg">
  <styleUrl>#style20</styleUrl>
  <Polygon>
    <tessellate>1</tessellate>
    <coordinates>
      -122.258682,37.871521,0.000000
      -122.258499,37.871559,0.000000
      -122.258339,37.871159,0.000000
      -122.258530,37.871109,0.000000
      -122.258682,37.871521,0.000000
    </coordinates>
  </Polygon>
</Placemark>
```
KML vs. GeoRSS

- Different focus (based on the language origins)
  - GeoRSS is a feed of entries (with some geospatial annotations)
  - KML is a set of features intended as a map overlay
- Different application scenario
  - GeoRSS is published from a continually updated collection
  - KML often is a static set of features (or a "static" tour)

KML Applications

KML as "Poor Man's GIS"

- KML can be easily exported from various geospatial data sources
  - sophisticated systems have richer data formats
  - KML is better used as an "export format," not as a "native format"
- Increased availability of mobile devices produces geospatial data streams
  - KML as the smallest common denominator among these
**UCB Campus KML in Google Maps (16)**

![UCB Campus KML in Google Maps](image1)

**UCB Campus KML in Google Earth (17)**

![UCB Campus KML in Google Earth](image2)
Conclusions

- Geospatial data is important and gets more important
- GeoRSS and KML are two simple data formats for geospatial data
- GeoRSS build on a more solid foundations (dynamic collections)
- KML is mostly a static and standalone data format