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Old Dogs – New Tricks
ArcIMS and Google Earth

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Outline

- XML Hell: XML/AXL/KML
- Approach A: Export geography from ArcGIS/ArcIMS
- Approach B: On-the-Fly KML Generation
- Approach C: Incorporate ArcIMS Image Service into Google Earth
- Approach D: Going the ‘Other Way’ ?
- Other People’s Experiences

XML

- XML (eXtensible Markup Language)
- Kinda Like HTML (tag-based)
- Universal language for moving data, especially between disparate systems
- BTW: It’s how ArcGIS stores MetaData

<welcome>Welcome to the world of XML!
</welcome>

AXL

- Arc eXtensible Markup Language
- ESRI flavor of XML that's used to define maps and other things within ArcIMS
- Map AXL is kinda like an ArcView 3.x .apr file or ArcGIS .mxd file

Example of AXL (ArcXML)

```
<ARCXML version="1.0.1">
    <CONFIG>
     <MAP>
      <PROPERTIES>
       <ENVELOPE minx="1205720.821336" miny="21567.090219"
   maxx="1585746.941891" maxy="307341.899475" name="Initial_Extent"/>
       <MAPUNITS units="FEET"/>
       <BACKGROUND color="0,0,210" transcolor="255,255,255"/>
      </PROPERTIES>
     <WORKSPACES>
      <SHAPEWORKSPACE name="shp_ws-0"
   directory="\\wildfire\plibrary2\recreatn\shapes\arc"/>
     </WORKSPACES>
     <LAYER type="featureclass" name="Trails" visible="true" id="8">
      <DATASET name="trail" type="line" workspace="shp_ws-0"/>
       <SIMPLERENDERER>
       <SIMPLELINESYMBOL width="2" color="156,50,235" type="solid"
   captype="round"
       </SIMPLERENDERER>
     </LAYER>
    </MAP>
   </CONFIG>
   </ARCXML>
```

KML

- XML-based language for Google Earth
- Keyhole Markup Language (KML)
- Can store pointers to data, symbology, and also raw data
- Main mechanism to create an unholy alliance between ArcIMS and Google Earth

Points

```
<Placemark>
  . . .
  <Point>
    <coordinates>
      -90.86948943,48.254500,0
    </coordinates>
  </Point>
</Placemark>
```

Polygons

```
<?xml version="1.0" encoding="UTF-8"?> <kml
    xmlns="http://earth.google.com/kml/2.0"> <Placemark> <name>The
    Pentagon</name> <LookAt> <longitude>-77.055801391781 42</longitude>
    <latitude>38.870832443487</latitude> <range>742.0552506670548</range>
    <tilt>48.09646074797388</tilt> <heading>59.888655617382 25</heading>
    </LookAt> <Polygon> <extrude>1</extrude>
    <altitudeMode>relativeToGround</altitudeMode> <outerBoundaryIs>
    <LinearRing> <coordinates> -77.05788457660967,38.87253259892824,100 -
    77.05465973756702,38.872910162817 03,100 -
    77.05315536854791,38.87053267794386,100 -
    77.05552622493516,38.868757801256,100 -
    77.05844056290393,38.86996206506943,100 -
    77.05788457660967,38.87253259892824,100 </coordinates> </LinearRing>
    </outerBoundaryIs> <innerBoundaryIs> <LinearRing> <coordinates> -
    77.05668055019126,38.87154239798456,100 -
    77.05542625960818,38.871678903440 77,100 -
    77.05485125901024,38.870765353977 92,100 -
    77.05577677433152,38.870086865814 46,100 -
    77.05691162017543,38.870544469633 51,100 -
    77.05668055019126,38.87154239798456,100 </coordinates> </LinearRing>
    </innerBoundaryIs> </Polygon> </Placemark> </kml>
```

To Learn More about KML:

- http://code.google.com/apis.html

Approach A

- (On the Fly) Generate KML file that contains relevant geography, labels, symbology, etc. and display it in Google Earth
- KML coords need to be geographic (lat/long)
- Beware Big Data
- Consider Generalization
- Good Example: City of Portland
  - http://www.portlandmaps.com/google.cfm

KML Server

- Server can be written in ColdFusion, PHP, Perl, Python, ASP, ASP.Net, etc.
- Server returns .KML file with a MIME type of:

application/vnd.google-earth.kml+xml kml

application/vnd.google-earth.kmz kmz

Approach B

- Bulk Convert Geographic Data into KML

Creating KML from Shapes

- Variety of Tools to Convert Shapes to KML
  - DoGoogleEarth
  - Export to KML 2.1
  - Shape 2 KML 1.0.3
  - KML Home Companion
  - ArcGoogle v9.1
  - Safe Software (FME)
- Beware of Big Data

Approach C

- Create KML with reference to an ArcIMS Image Server
- BTW: Image Servers Don’t Just Serve Imagery
- Nice Example:

http://www.mapdex.org/GE_KML_LINK.cfm?servername=hercules.kgs.ku.edu&mapservice=lawrence_Imagery

ArcIMS Image Service in Google Earth

Image Overlays

```
<?xml version="1.0" encoding="UTF-8"?>
<kml xmlns="http://earth.google.com/kml/2.0">
  <GroundOverlay>
    <description>Overlay shows Mount Etna erupting on July 13th, 2001.</description>
<name>Large-scale overlay on terrain</name>
<LookAt> <longitude>15.0246893757116</longitude>
    <latitude>37.6739516794167</latitude>
    <range>30350.36838438907</range> <tilt>58.3122865289705</tilt>
    <heading>-16.5581842842829</heading> </LookAt>
    <visibility>0</visibility> <Icon>
    <href>http://bbs.keyhole.com/ubb/z0302a1700/etna.jpg</href> </Icon>
    <LatLonBox id="khLatLonBox751">
    <north>37.9190419268166 5</north>
    <south>37.4654338859813 7</south>
    <east>15.3583265374220 6</east> <west>14.6012836974670 4</west>
    <rotation>0</rotation> </LatLonBox> </GroundOverlay>
</kml>
```

Passing Info to Your KML Server

```
<Url>
    <href>http://www.example.com/geotiff/NE/MergedReflectivityQComposite.kml</href>
    <refreshMode>onInterval</refreshMode>
    <refreshInterval>30</refreshInterval>
    <viewRefreshMode>onStop</viewRefreshMode>
    <viewRefreshTime>7</viewRefreshTime>
    <viewFormat>BBOX=[bboxWest],[bboxSouth],[bboxEast],[bboxNorth],
    [lookatLon],[lookatLat],[lookatRange],[lookatTilt],[lookatHeading]</viewFormat>
  </Url>
```

Alternative D: XXX

- How about the other direction?
- Displaying Google Earth imagery from ArcIMS or ArcGIS desktop?

Other People's Experiences

Stay Tuned …

- ESRI working with Google on future things
- Developer Conference in March, User Conference in Summer
- ArcExplorer 2.0 ??
- ArcGIS Server ??