Before: Federated Model – “Portalpalooza”

HydroPortal → ArcGIS Online → Data.gov → NOAA Geoplatform → OER YouTube → NOAA YouTube

NCDG → NGDC → NCDDC OER → NOS

CSC SECART → NODC → IOCM → CMGDS USGS.gov

A → B = A searches B
We are undergoing a paradigm shift here at Esri, from desktop and server enterprise solutions into a Software as a Service (SaaS) model in the cloud. This in many ways is a game changer for us in forcing the issue of much better front-end mapping *and* spatial analysis on the web. Could this be a case where cyberGIS is more accessible than GIS, as Mike pointed out??

Real paradigm shift and value of cyberGIS is in exposing geospatial data and analysis to the non-GIS community. Sharing spatial data with scientists from other domains, Citizen scientists

The cloud for science? Yes, especially “use-inspired” science

**Why GIS in the cloud?**

Simplify IT for deploying scalable services
Reliability
- Easily distribute GIS Servers across data centers worldwide
- Store your data safely
Hide complexity of computational / analytical services
Elastic computing
- Adjust (in minutes) the capacity of your GIS Server according to demand
- Manage many machines more easily
Elastic billing
- Pay as you go
Cheap Bandwidth
- Cloud front
Organizations Rapidly Adopting This Platform

- Building Local-State-Global Networks

Cloud GIS

US Government

Indonesia SDI

World Bank

NGOs – Data Basin

Abu Dhabi

Eye on Earth Network

UNEP Live
- Must provide an easier path scientists to deploy successful services
- Must foster collaboration with those outside of the traditional GIS community – spatial modeling in cloud for this purpose? Shared decision making
- Must simplify the end user experience for scientists to focus more on analysis/interpretation, less on web authoring, database administration, hardware
Convergence of Technologies...

Imagery

LiDAR

Full 3D GIS

Hosted Services
“King Kong”

- Match worldwide imagery coverage to street and topo coverage
- Raw imagery production workflow / pipeline
- Global land area = 178 million sq km

Esri and PCI Geomatics

Thought I’d throw this in especially with Shawn’s and Mark’s observations about imagery
Project Metrics

- Initial scope = 50 million sq km
- Select “best of” 2 million+ Ikonos scene archives
- 302,765 scenes acquired, processed

**152 Tb total raw data**

- 325 Tb total derived data (pan sharpened images, orthophotos, tiles, caches)
Sheer volume of data processed and made easy to use
Work was done in parallel in the cloud, serial processing would have probably taken years
Multiple Farms & Lustre File Systems Isolate I/O and Provide Horizontal Scalability
3D Object Models from Imagery

Multiple Registered or Unregistered Images

Photogrammetric, Probabilistic and Computer Vision Methods

• Shadow detection and removal
• Methods to correlate pixels in images to points in dense point clouds

True 3D Object Models

• “Pulling” out primitives from a variety of geometries
• Image segmentation and classification

From R&D in Esri Professional Services, 3D team
We segment our images into superpixels. Superpixels are perceptually meaningful decompositions of the image which take the images from the structure imposed by the sensor grid. The borders of pixels represent information from the sensor grid while the borders of superpixels better represent data within the image. We use a computationally-efficient open source library. Super pixels pick up different features at different scales. Building and shadow outlines persist across different superpixel scales, so this is great for ultimately extracting realistic 3D objects (as voxels or octrees).
STEVE KOPP already mentioned on Monday.
In the spirit of crowdsourcing/VGI of authoritative content from the community that Esri then hosts free in the cloud and for which you retain ownership and for which you are acknowledged.
STEVE KOPP already demoed a couple of these on Monday
EXTREMELY EASY, EXTREMELY FAST, right-click to “Share as…”
Allows users to easily share their geoprocessing workflows (tradecraft) as packages and as services.

A package consists of the tool, the data used by the tool, and the environment settings used by the tool, and thus meant for sharing from professional to professional.

Geoprocessing services allow users to share the associated map service displaying the results of the analysis, leverage geoprocessing models that run on the server.

When you publish a map service with a tool layer, you can add that map service as data in ArcGIS Explorer to expose the functionality of the model. The workflow is to configure a task in ArcGIS Explorer based on the geoprocessing service that was created from the tool layer.
Climate Wizard, climatewizard.org

- View historic temperature and rainfall maps for anywhere in the world
- View state-of-the-art future predictions of temperature and rainfall around the world
- View and download climate change maps in a few easy steps
Esri Application Prototype Lab built this part of the wizard to interactively view and compare various Future Climate Models and Scenarios. Documentation on this web site excellent.
- Must foster collaboration with those outside of the traditional GIS community – spatial modeling in cloud for this purpose? Shared decision making
SeaSketch is Esri’s big marine spatial planning tool effort where we are collaborating very closely with the Will McClintock lab at the University of California at Santa Barbara to develop the next generation of MarineMap. Many of you are familiar with the MarineMap decision-support tool developed to support California’s Marine Life Protection Act. SeaSketch is all about Collaborative GeoDesign for Coastal Marine Spatial Planning and will incorporate a much larger suite of spatial analytics, including spatial dimensions of tradeoffs among potentially conflicting resources, services, sectors, and times. Core functions are comprised of real-time map and threaded discussions, shared views of design sketches on maps. Prototype was shown at 2012 Esri UC, initial beta testing by NZ Dept of Conservation, and then full core functions completed by October 31, 2012. Users will be able to seasketch.org to use this Software as a Service platform. The website is based on ArcGIS API for JavaScript and leverages ArcGIS Online and the Esri Ocean Basemap.
Biological-economic model of tradeoffs between ecosystem services in relation to potential management strategies

Tourism, conservation, energy development, lobster fishing, whales, etc.

- Must simplify the end user experience for scientists to focus more on analysis/interpretation, less on web authoring, database administration, hardware
User experience here has been so easy for non-GIS and non-hydro people to understand. FIMI getting “inundated” with requests from projects to include results into the site.

In the dialog circled in red is a slider control that the user can move up and down for different river depths, more formally referred to as gage heights. Hydrologic models have been run for the study area at many depth intervals to model flood inundation. As you move the slider up and down, the map is updated to show the inundated area.

For the **citizen**, the simple question is “is my house in or out”, or “at what gage height is my house wet”? For **first responders** they can look at which streets are flooded and reroute themselves when traveling to a call for help.

For the **emergency response planner**, the depth slider is also connected to modeled affects in the highlighted rows for things like the number of people displaced by the flood and the total cost of the flood.
20+ USA Demographic Maps
1000's of Maps Published by Esri User Community
Maps Published by Your Organization
### Mapping Your Data from within MS Excel

#### Table Example:

<table>
<thead>
<tr>
<th>Store ID</th>
<th>Store Name</th>
<th>Address</th>
<th>City</th>
<th>State</th>
<th>Zip Code</th>
<th>Sales Volume</th>
<th>No. of Employees</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>25th Avenue Pizza &amp; Deli</td>
<td>256 10th Ave #1</td>
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<td>10001</td>
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<tr>
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<td>10010</td>
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<td>4</td>
</tr>
</tbody>
</table>
Mapping Your Data from within MS Excel
Can then publish this out to ArcGIS Online as an “intelligent web map service.” As you update the spreadsheet, the web map automatically updates.
Making cyberGIS more accessible to our colleagues as well as to policy-makers and citizens

Think of the power of telling Mark’s 30-second elevator speech about a mega Eq as a story map.
Communities Across Many Application Domains

- resources.arcgis.com
Great exemplar
World Water ONLINE
Linking water data, maps and models everywhere

http://worldwateronline.org

Committed to Open Standards

esri
KISTERS
Pioneering Technologies
OGC
USGS
CUAHSI
GeoServer
GEO.DATAGOV
Mark Gahegan’s idea of STICKY CYBERGIS?
Again, from Esri standpoint, real paradigm shift and value of cyberGIS is in exposing geospatial data and analysis to the non-GIS community; sharing spatial data with scientists from other domains; citizen scientists
Thank You

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