

The Geo-Web: Enabling GIS on the Internet

IT4GIS

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In the Beginning

- GIS was independent
- The GIS analyst or manager was typically a one-person shop
- He/she created the data, analyzed the data, and printed the maps

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Along Came the Internet

- The proliferation of networks and the Internet caused a chain-reaction
 - GIS data became *easier* to share
 - Increasingly *larger* datasets were shared
 - GIS data was stored (self-service) on the network



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Old Habits are Hard to Break

- Centralized GIS on the network
 - Clearinghouses
 - One-stop-shops
- Someone was in charge



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But the One-Stop-Shop Broke

- What now?
- Re-invent the one-stop-shop
 - There are now more than 100,000 GIS clearinghouses
 - Each state, large agency, and large company
 - Why so many one-stop-shops?
 - “Data incompatibilities”
 - “Data standards”
 - (Control issues)



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Control Issues and Fallacies

- Protect trade secrets
- Ensure data security
- Retain intellectual property

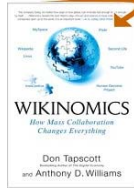


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Prove It!

- IBM
- Boeing
- What do these two examples have in common?
 - Mass-collaboration
 - Open structure
 - De-centralized organization(for more, read “Wikinomics”)

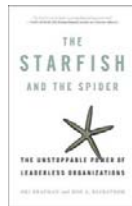


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The Web 2.0

- The Next Generation
 - All about mass-collaboration
 - Mash-ups
 - Synergy
 - Distributed, de-centralized systems(for more, read “The Starfish and the Spider”)



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Collaboration is New?

- *Traditional* collaborations were:
 - A selected team of colleagues
 - Hierarchical in structure
 - Breadth of knowledge relatively narrow
- *Mass-collaboration* is:
 - An open set of contributors
 - De-centralized in structure
 - Breadth of knowledge will be broad

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Web 3.0

- Semantic web
 - coined by Tim Berners-Lee, the man who invented the (first 1.0) World Wide Web.
 - Machine-readable Web pages and semantic metadata
 - Support for future AI applications
 - “Turns the Web into one big database”

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A Grand Experiment

- Can Web 2.0 and 3.0 concepts be applied to GIS and spatial analysis... spatial problems?
- Can the GeoWeb be built and leveraged to provide real-time decision support?
- A step in this direction:
 - Esri's Insights for ArcGIS <https://www.esri.com/en-us/arcgis/products/insights-for-arcgis/overview>

 Insights for ArcGIS
Data analysis powered by location.

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The Role of GIS

- Collect spatial data
- Prepare maps and models
- Perform spatial analyses to discover trends, spatial patterns, and relationships

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The Role of GIS (cont'd)

- Use ArcGIS and web services to make geo-spatial data available to **everyone**
- Transform these data into *actionable information* to communicate with **everyone**
- Help build the Geo-Web

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Focusing our Role in IT4GIS

- ArcGIS and web services



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ArcGIS Enterprise: Architecture



- Requirements:
 - Network connectivity
 - 64-bit Windows Server OS
 - ArcGIS Desktop software
 - ArcGIS for Server software

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ArcGIS Enterprise Requires...



- Server hardware
 - Sufficient hard drive space
 - Consider number of expected hits (transactions) when selecting CPU and cache

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ArcGIS Enterprise: Architecture (cont'd)



- ArcGIS Pro and ArcGIS Enterprise
 - ArcGIS Pro is your *desktop* software
 - ArcGIS Enterprise is your *server* software
 - These software technologies are connected via ArcGIS Portal



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ArcGIS Portal

- Server software providing a user interface
 - AGOL is an instance of Portal
- Installed and configured as part of ArcGIS Enterprise
 - (TIP: Use Esri's Builder tool to make installation/setup easier)
- Designed to support GIS demands of *your* enterprise

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ArcGIS Server is...

- Also part of ArcGIS Enterprise
- Scalable
- Flexible (variety of SDK's [e.g., Java, Flex and HTML5])
- Resulting services are easy for clients to use (*easier* than ArcGIS Desktop)
- Can be used with or without Portal for ArcGIS

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ArcGIS Server can deliver...

- Image services
- Geodata services
- Map services
- Geocoding services
- Indexing/Search services
- WMS Services
- KML Services

New Web Map

Share this map as a new web map to your ArcGIS organization. The data layers in your map will be published as new web layers and included in the web map, along with your basemap and any existing web layers.

New Web Layer

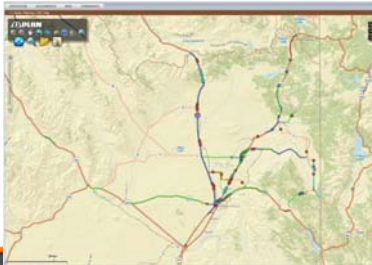
Share all the data layers in this map as a new web layer to your ArcGIS organization.

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Using a Mash-up of Services...

- Map services can be used to deliver **web map applications**



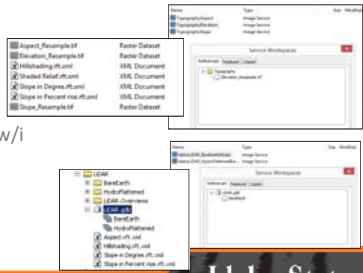
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Image Services

Best Practices

- Serve either a:
 - Single image file (e.g., GeoTIFF), or
 - Raster mosaic dataset w/i FGDB



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Raster Mosaic Datasets

- A great solution to serve raster data
- Performance
 - Response
 - Cache (no longer needed/used)
 - Overview size
 - Developing a map service from these data

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Web Image Layers

- Service produced when publishing raster data from ArcGIS Pro
- Term used for an "Image Service"

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Map Services

- Effectively, Map Services (Web Map or Web Layers) are a type of web service to display an ArcGIS Pro map
- Advantages
 - Can include numerous layers
 - Raster and Vector
 - Retains symbology, scale thresholds, and other settings(note: images with **ColorMaps**, served as image services, will retain symbology also)

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Process of creating an ArcGIS Web Application



1 Author a map
– Using ArcGIS Pro



2 Create *your* project's Web Map or Web Layer Service



3 Create a Web application

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In IT4GIS...

- Our exercise will give you experience with:
 - Image services
 - Map services
 - And later, Web map applications

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Web 2.0 and 3.0 Revisited

- It should be clear how the GeoWeb fits and supports the concept of Web 2.0
- How might it support the semantic web? (Web 3.0)
 - Two minute write!

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Key Concepts

- GIS is everywhere
- The Internet is a great way to deliver GIS
- Today –and in the future- web enabled GIS will be increasingly important
- Students need to know the fundamentals of serving GIS data and maps on the web and the practical application of this technology

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Questions...Assignment



Demo...connecting to Portal

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