Putting It All Together: the ESRI Product Line

Natalie Vines
Instructor
Overview

- ESRI has several software products to meet the various GIS needs of its users.
  - Which product or products is the right one for the job?

- This session will clear the air by using scenarios and case studies to describe which product fits certain needs.

- Audience input and questions
ArcGIS: A family of software

Refer to “What is ArcGIS 9.2” at http://support.esri.com
Which Desktop license is right for me?

- Karen needs to organize her forest study data
  - Aerial photos and DRGs
  - Several individual rasters – JPG, SID, and TIF
  - Mosaic some
  - Add some to a raster catalog
  - Internal use
  - Total size is only 2-3 GB

- Susan is a GIS Analyst for a state DoT
  - Answer simple spatial questions involving queries, overlays, buffers and summaries
  - Automate and document repetitive tasks
Which Desktop license is right for me?

- **Billy works in the assessor’s office for a rural county**
  - automate plat maps and legal descriptions to create lot lines and parcel boundaries for his entire county from scratch
  - enter in each segment of the parcel boundaries using distances, directions, and metes and bounds

- **Mike is a GIS Manager for a small city**
  - his employees typically need access to the basic GIS tools
  - periodically require more advanced analysis and data management tools
  - They have five employees and an annual GIS budget of about $25k
ArcGIS Desktop Functionality

**ArcInfo** = **ArcEditor** +
Advanced Cartography
Workstation ArcInfo, Coverage editing and tools
Full Geoprocessing and analysis (289 tools)

**ArcEditor** = **ArcView** +
Advanced GDB behavior: Topology, Geometric networks,
Feature linked annotation, Relationship classes, Enterprise
Geodatabase editing
Advanced Editing/COGO tools
Advanced Geoprocessing (236 tools)

**ArcView**
ArcMap, ArcCatalog
Display, analyze, manage, and store
vector, raster and tabular data
Basic Geoprocessing (204 tools)

See the ArcGIS Desktop 9.2 Functionality Matrix
ArcGIS Desktop and licensing

http://support.esri.com - Search for “Desktop 9.2 Functionality Matrix”

<table>
<thead>
<tr>
<th>Geoprocessing</th>
<th>ArcReader</th>
<th>ArcView</th>
<th>ArcEditor</th>
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<tbody>
<tr>
<td>Core Analysis</td>
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<tr>
<td>Buffer</td>
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<td>Multiple Ring Buffer</td>
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<tr>
<td>Spatial Join</td>
<td>X</td>
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<td>X</td>
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<tr>
<td>Summary Statistics</td>
<td></td>
<td>X</td>
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<td>Table Select</td>
<td>X</td>
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<td>Union</td>
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<tr>
<td>Environment</td>
<td></td>
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<tr>
<td>String Together Geoprocessing Tools Using a Visual Modeling Environment (ModelBuilder*)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Use Contents Geoprocessing Tool View</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Use Index Geoprocessing Tool View</td>
<td>X</td>
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<tr>
<td>Use Search Geoprocessing Tool View</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Use Favorite Tools Geoprocessing Tool View</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Create and Share New Geoprocessing Tools Using Models or Scripts</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Which Desktop license is right for me?

- **Karen, forest study**
  - Raster database of images, mosaicking, raster catalogs
  - ArcView

- **Susan, DoT**
  - Basic analysis, repetitive tasks
  - ArcView

- **Billy, assessor’s office**
  - Parcel creation and editing from legal descriptions
  - ArcEditor

- **Mike, small city**
  - Manages 5 employees with different functionality needs
  - ArcView + ArcInfo

FedUC 2008 Tech Sessions
ArcGIS Extensions

- Specialized functionality that plugs into ArcGIS applications
  - 3D Analyst
  - Spatial Analyst
  - Network Analyst
  - ArcGIS Schematics
  - Business Analyst
  - PLTS
  - Data Interoperability
  - Geostatistical Analyst
  - Tracking Analyst
  - ArcGIS Publisher
  - Survey Analyst
  - ArcScan (incl w/ArcEditor)
  - Maplex (incl w/ArcInfo)
Do I need to use an ArcGIS extension?

- Dave is working on a public safety project
  - Visibility and line-of-sight analysis for train tracks and streets
  - Incorporate a hillshade and visualize the results in 3D
  - 3D Analyst
Do I need to use an ArcGIS extension?

- Maggie is an analyst in an undeveloped area and needs to:
  - Create stream networks to determine where new roads should go
  - Determine site suitability for new structures
  - Spatial Analyst

- Travel Cost analysis
- Viewsheds
- Stream Network and Watersheds
Do I need to use an ArcGIS extension?

- A large school district needs to
  - Develop more efficient bus routes and reassess bus zones
  - Determine which students live close enough to walk or far enough to bus
  - Previously, this was determined by straight line distance, but **Network Analyst** provides a better way to calculate this
A utility company needs to

- Maintain both geographic and schematic views of all its infrastructure, and keep them in sync
- Monitor connectivity and disconnectivity (outages) and perform traces
- **ArcGIS Schematics**
The Nuances of Networks

- Mateo needs to perform route analysis
  - to the best path from Point A to B to C
  - along a transportation network for his delivery trucks
  - *Network Analyst extension*

- Lana needs an efficient way to store her water/gas/electric network data
  - maintain connectivity
  - perform analyses
    - looking for disconnected features
    - locate customers up or downstream from outages and breaks
  - *Geometric Network in the geodatabase (ArcEditor)*
Large Scale Projects

- Torrance works for the FAA
  - create professional-looking airspace maps using aeronautical charts

- A county tax assessor
  - Purchased data from a vendor
  - Missy needs to check it for errors and quality
  - The deliverables are so big, she feels overwhelmed and doesn’t know where to begin or how to error check

- Lucy works in public health on a mosquito control project
  - Create map books annually for the inspectors and pesticide truck operators
  - It’s a major task that consumes a great deal of time

- Juan manages field crews at a large water utility
  - Large database in place already
  - Needs an easy way to assign work orders, keep track of who is doing what and check the work before it goes into the database
Production Line Toolset (PLTS)

- Streamlines your production process
- Enhances the quality of your map products

- PLTS is a set of software components that work within ArcGIS Desktop
  - Can purchase all together (PLTS Foundation)
  - or individually (PLTS Components)
  - or as a solution (a set of components for very specific tasks)
Aeronautical Solution

- Torrance should consider the PLTS Aeronautical Solution
- This is a set of components & extra tools that were built exactly for users like him

- Other solutions exist for Defense, Mapping Agency, Nautical and Intelligence
GIS Data ReViewer

- Missy should look into the GIS Data ReViewer
- This extension helps perform QA/QC checks on data
  - Tools for finding errors
    - Check data yourself and document anomalies
    - Set the GIS Data ReViewer to check for errors
  - Tools for fixing errors
  - Tools for verifying error fixes
Map Production System (MPS) - Atlas

- Lucy could easily create a map book using MPS-Atlas tools
- MPS-Atlas helps create high-quality, high-volume maps
- Automate the map book or atlas creation process
Job Tracking for ArcGIS (JTX)

- JTX can make Juan’s job easier by simplifying job management and tracking
- JTX provides tools for
  - allocating resources
  - tracking the status/progress of jobs
  - Automatically recording job activity history to give managers a built-in log of the job’s progress and how it was completed
GIS for Business

- Bella is in the circulation department of a major metropolitan newspaper
  - Works with the advertising department to determine the demographics of an area
  - Matches their advertisers’ needs to appropriate areas
  - Needs basemap information and demographic data, but is not in a position to collect or maintain this data herself
Business Analyst

- Provides GIS and packaged data such as imagery, demographic information, business information and street data
- Wizards help you perform sophisticated business analysis quickly and easily
- Can be used to recognize patterns, analyze your market, understand your customers and much more
Get out in the field with mobile GIS solutions

- Finn manages the Public Works Dept. for a small city
  - Handle sign requests, complaints, inspections, installations
  - Five people on his team go out in the field during the day and check data back in each night
  - $5k per year to budget for these tasks

- Kevin is heading up a statewide stewardship management project and needs to streamline data collection
  - Dozens of workers, not very GIS savvy
  - Need an easy-to-use but robust application to edit directly into their database, update and receive updates in the field
  - The state has $50k to budget for these and similar tasks
Mobile GIS: ArcPad and the Mobile SDK

- Collect, update, and edit data out in the field
- Sync with database using wireless or by checking in changes when finished

<table>
<thead>
<tr>
<th>ArcPad Application</th>
<th>ArcGIS Mobile SDK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customizable standalone application</td>
<td>SDK to create custom mobile GIS applications</td>
</tr>
<tr>
<td>Uses check-out/check-in process</td>
<td>Data is cached; updated directly using WiFi, Smartphone data service, or Active Sync</td>
</tr>
<tr>
<td>Suited for Windows Mobile or CE, or XP/2000</td>
<td>Suited for Smartphones, Pocket PCs, Tablets, Windows</td>
</tr>
<tr>
<td>Data collection and editing functionality</td>
<td>Part of ArcGIS Server; robust functionality, real time updates</td>
</tr>
</tbody>
</table>
Mobile GIS: Some Alternatives

- **ArcPad**
- **ArcGIS Mobile SDK**
- **ArcGIS Engine applications**
  - Create custom mobile applications using ArcGIS Engine
- **ArcGIS Desktop (ArcEditor or ArcInfo license)**
  - Disconnected editing
- **ArcReader**
  - Publisher extension required to publish maps but free for the user
  - Customizable using ArcObjects
  - Has basic “markup” capabilities
  - Some agencies are currently implementing it in their vehicles
Case Study: Storing and serving large volumes of imagery

- Jason at the City of Mesa, Arizona, wanted to set up a server to access all of the city’s imagery over the web
  - 400 GB of imagery
  - Planned to load into enterprise GDB and serve out using ArcIMS
  - Encountered problems with loading data: altered format, timely

Solution: Image Server

- Installed Image Server in less than an hour
- Built a service using 400 GB of data overnight
- Image files are not altered in any way; original image is served out
- Images were ready the next day to serve out on the web
- Data display and retrieval is very fast
Storing and serving imagery: Image Server

- Efficiently manages, accesses and serves large amounts of file-based imagery

- Image processing on-the-fly
- Multiple products served from one image
- Reduces time between image acquisition and distribution
Sharing Your Geographic Data

- Daisy works for a large state environmental protection department and needs to create a Web site to
  - Allow the public to search the agency’s geographic data
  - Produce maps from their home computers
  - Allow the public to complete simple tasks, like finding their address or measuring distances on the map

- Ollie spends a lot of his day creating maps requested by city employees
  - He is the only full-time GIS staff member and hardly has time to devote to GIS maintenance task
  - If only there were a way to create an internal website that helped city employees create their own maps and make edits, if necessary

- Rocky works at a big electric distribution company
  - They have a large amount of GIS data
  - Over 100 GIS Technicians who need to enter new work orders
  - How can he store this much data and still let all those people access it at one time?
Introducing ArcGIS Server

- ArcGIS Server meets two major GIS needs:
  - Data Management
  - Web Mapping Applications
- ArcGIS Server comes in three levels:
What are the three levels of ArcGIS Server?

<table>
<thead>
<tr>
<th>Feature</th>
<th>Advanced</th>
<th>Standard</th>
<th>Basic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiuser Geodatabase</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Web-based Replication</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Web Mapping</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Globe Server</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Web-based Geoprocessing</td>
<td>✔️</td>
<td></td>
<td>Limited</td>
</tr>
<tr>
<td>Web-based Editing</td>
<td>✔️</td>
<td></td>
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</tr>
</tbody>
</table>
Which level is right for me?

- Daisy needed to make a publicly accessible website so the public could search & view her agency’s data.

- Ollie needed to make an internally accessible website so his fellow city workers could search, view and possibly edit their data layers.

- Rocky needed to set up a database that could accommodate a large amount of data and many simultaneous editors.
ArcGIS Server Upgrade Paths

- Does some of this sound familiar?
- Is it possible you already have this software?
- Have you ever heard of ArcSDE or ArcIMS?

Provided As Part of Maintenance

9.1
- ArcGIS Server
- ArcIMS
- ArcSDE

9.2
- Advanced
- Standard
- Basic
How do people view my published map?

- Using a web browser, they could simply type in your URL or follow a link from your website.

- If they already have ArcGIS Desktop, they could view your map in ArcMap.

- They could download & use ArcGIS Explorer.
What’s ArcGIS Explorer?

- It’s a free, easy to use program available for download. It brings GIS to everyone!
- Enable corporate geoprocessing tasks
- ArcGIS Explorer can use maps/tasks served by ArcGIS Server as well as data stored locally
Using online content – ArcGIS
Online

- Online services hosted by ESRI
  - Utilizes caching for fast performance

- Available services
  - Pre-built 2D and 3D base maps
  - Reference layers
  - Tasks
Availability of ArcGIS Online services

- **Standard services**
  - Free to ArcGIS Desktop users
  - Free to ArcGIS Server users during development and testing
    - Subscription required for deployment with ArcGIS Server

- **Premium services**
  - Subscription service for all ArcGIS users
  - Includes high resolution imagery

- **Content sharing program**
  - Share your services with other ArcGIS Online users
Storing Your Geographic Data

You’ll probably need to store or maintain many different layers to ensure your projects are successful.

- Street centerlines
- Water laterals
- Customer locations
- Flood zones
- Power poles
- Aerial photographs
- Contour lines
- Active oil/gas leases
- Cell phone towers
- First responder stations
- Animal habitats
- Aquifer protection areas
- Encampments
- and many more…

What’s the best way to do that?
Meet the Geodatabase

- A geodatabase isn’t necessarily a “product,” rather it’s a way to store geographic data.

- Usually, you create geodatabases with ArcCatalog.

- Geodatabases come in five different flavors, choose the flavor that best suits your needs.
Which geodatabase is right for me?

- Josh works for an energy company
  - Much of their well, lease and production data is already stored in a Microsoft Access database
  - He wants to store their geographic data alongside the existing information and link the two parts together

- Quentin is employed at the City of Norman
  - He works with five other GIS staff members
  - Their job is to maintain the City’s geographic data
  - They don’t have an enormous amount of data or a big budget, but all six of them need to edit the City’s data at the same time
Which geodatabase is right for me?

• Lulu works for a small electric cooperative
  • She is the main GIS staff member
  • Occasionally others use the GIS database as well
  • They have a fair amount of data to store, although Lulu is the only person authorized to edit their data

• Riley is a park ranger at a lake managed by the US Army Corps of Engineers
  • He uses his geodatabase to make maps and complete projects
  • Edits are only done by the district office that oversees his lake
  • He needs a low-cost geodatabase that can receive updates “pushed down” by the district GIS supervisors via their network
Roy is the GIS manager at a large civil engineering/consulting company

- They have many GB of data to store, including aerial photographs and lots of vector data
- He needs a geodatabase that will hold a lot of data and accommodate a lot of users at the same time
- He also requires the geodatabase to be as secure as possible
- He needs to make backup copies of the database
# Geodatabase specifications

<table>
<thead>
<tr>
<th></th>
<th>Size/Hardware limits</th>
<th>Multiuser editing?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal</strong> (Access)</td>
<td>2 GB limit</td>
<td>No</td>
</tr>
<tr>
<td><strong>File</strong></td>
<td>Each table = 1 TB</td>
<td>No</td>
</tr>
<tr>
<td><strong>Personal</strong> (ArcSDE)</td>
<td>4 GB limit</td>
<td>No</td>
</tr>
<tr>
<td><strong>Workgroup</strong></td>
<td>4 GB limit</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Enterprise</strong> (SQL Server, DB2, Oracle, Informix)</td>
<td>No size limit</td>
<td>Yes</td>
</tr>
</tbody>
</table>

- **Personal (Access)**: 2 GB limit, No multiuser editing, up to 1 GB RAM, uses only 1 CPU.
- **File**: Each table = 1 TB, No multiuser editing.
- **Personal (ArcSDE)**: 4 GB limit, No multiuser editing, up to 1 GB RAM, uses only 1 CPU.
- **Workgroup**: 4 GB limit, Yes multiuser editing, up to 10 connections, all of which may edit.
- **Enterprise**: No size limit, Yes multiuser editing, works with SQL Server 2005 Express.

*Works only with SQL Server 2005 Express*
Product Scenario #1

The Sooner Energy Company
- 6 GIS analysts and 2 GIS managers
- Need to start incorporating 3D analysis and terrains into their work
- Right now, everyone keeps their own data on their own computers
- The rest of the company (~100 employees) could benefit from the opportunity to view and perform simple spatial analysis

What should they do?
Product Scenario #1

- 2 ArcInfo licenses for GIS managers
- 6 concurrent ArcView licenses for GIS analysts
- Concurrent 3D Analyst extension
- ArcGIS Server Standard for Workgroups
  - 10 user connection limit for database
  - Internally accessible web mapping site
Product Scenario #2

- A medium-sized city would like to implement ArcGIS for their several departments: Planning, Water, DoT, etc…
  - They have been using GIS (mostly Workstation) for 20 years and want to look into the newer products

- Their needs:
  - ~ 20 employees need access to the GIS software for editing, analysis and mapping
  - Reduce redundant data by using a centralized database
  - Dozens of non-GIS employees city-wide would benefit from GIS-related web applications to perform geocoding and routing analyses for tasks such as reading meters and querying city data
  - They’d like the public to be able to view and browse certain datasets online
What software should this city look into?

- Desktop mapping, editing, and analysis needs for 20 people
  - *ArcGIS Desktop*
    - ArcEditor or ArcInfo for editing in the central database
    - ArcView could be used for basic mapping
    - A combination of license levels would be recommended

- A centralized database that everyone can access
  - Multiuser editing, backup, security

- GIS web application for the public to search for city information based on home address (311 system)

- GIS web applications for employees (routing, analysis etc…)

  *ArcGIS Server*
  (Advanced with Network Extension)
Wrap-up: Where to go for more information

- ESRI product overviews: http://www.esri.com
- ESRI training options: http://training.esri.com
- Contact your account manager at your regional office
Wrap-up

- Any questions?
- Thank you for attending, and Good Luck!

Natalie Vines
Instructor