Geodatabase Essentials – Part I: What is the Geodatabase?
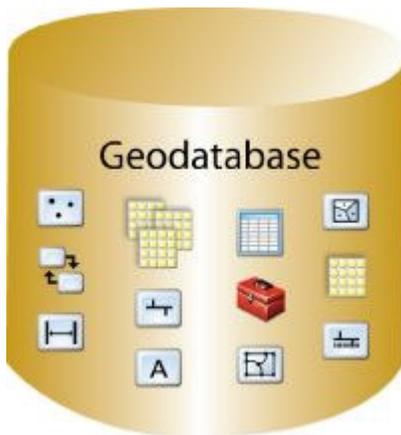
What is the Geodatabase?

The geodatabase is the native data storage and data management framework for ArcGIS. Why would you want to use a geodatabase? Because it acts as an organizational tool to store and manage your data, and is also the gateway into advanced GIS capabilities.

The geodatabase is a container which houses a collection of various geographic datasets.

Geodatabases support all of the different types of data that can be used by ArcGIS. Also, there is a complete set of conversion tools available so you can easily migrate existing geospatial data into the geodatabase.

At face value the fundamental ArcGIS datasets are tables, feature classes, and rasters. These and other more complex datasets, such as topologies and geometric networks, are all contained within the geodatabase. The geodatabase can also add advanced capabilities to these datasets and model behavior. Some examples of this are:

- Data Validation using domains and subtypes
- Multiuser editing environment through versioning
- Topologies to enforce the integrity of your spatial data
- Networks to model and analyze flows
- Terrains for modeling surfaces and Lidar data management
- Distributed geodatabase replication
- Managing historical archives of your data

There are 3 types of geodatabases: Personal, File, and ArcSDE.

Personal Geodatabases

Personal geodatabases were first introduced in ArcGIS 8.0 and are designed for a single user working with smaller datasets. They are stored and managed in Microsoft® Access™, which ties them to the windows platform.

One thing a lot of users like about the personal geodatabase is the ability to manage the tabular data using Access.

Access based personal geodatabases work well for small datasets and they support all the features of the geodatabase model such as topologies, raster catalogs, network datasets, address locators, etc…. They are single user and therefore do not support versioning and long transactions.

File Geodatabases

File geodatabases, introduced at ArcGIS 9.2, store datasets in a file system folder and are portable across operating systems. They are suitable for single user projects and small workgroups with one editor and multiple readers. Although they do not support versioning, it is possible to have multiple editors with a file geodatabase, providing they aren't editing the same feature datasets, feature classes or tables.

The file geodatabase is optimized for use in ArcGIS so it provides very fast data use and storage, and can scale to over 1 terabyte in size. Also, the File geodatabase allows you to optionally compress your vector data, reducing the memory footprint used by its storage without affecting performance.

ArcSDE Geodatabases

ArcSDE geodatabases manage spatial data within an RDBMS such as DB2, Informix, Oracle, SQL Server, PostgreSQL and SQL Server Express. Through this architecture, ArcSDE offers a multi-user editing environment and can manage extremely large datasets. ArcSDE geodatabases also support version-based workflows such as geodatabase replication and archiving that are not supported with file and personal geodatabases.

Organizations requiring the full suite of geodatabase functionality and a geodatabase with the capacity for extremely large, continuous GIS datasets that can be edited and accessed by many users should use an ArcSDE geodatabase.

More information.

An overview of the geodatabase
http://webhelp.esri.com/arcgisdesktop/9.2/index.cfm?TopicName=An_overview_of_the_geodatabase

Types of geodatabases
http://webhelp.esri.com/arcgisdesktop/9.2/index.cfm?TopicName=Types_of_geodatabases