Using CASE Tools for GIS Database Design in Arc 8

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Technical Summary
In Arc 8 there are three ways to create geodatabases: loading and moving existing databases to the geodatabase (GDB), using ArcCatalog to create the database structure for the GDB design, and using the Unified Modeling Language (UML) subsystem of Arc 8. In order to utilize the UML subsystem of Arc 8, external Computer Aided Software Engineering (CASE) Tool and Microsoft Repository software must be used to create the GDB structure, or schema.

Loading and moving existing databases to the GDB is the simplest and easiest way to create a GDB, but is does not take full advantage of the power of using a GDB. Defining relationships, validation rules, subtypes, default values, domains, customization and class extensions are all key capabilities of the GeoObject model and should be utilized in the GIS database design.

Using the tools internally within ArcCatalog for the creation of the database schema is a better approach for creating GDB designs. In order to fully benefit from key capabilities of the GeoObject Model, this approach is the only "out-of-the-box" means for implementing a GDB design. Domains, subtypes and other key capabilities usually need to be defined prior to adding features into the feature datasets. In order to refine, develop, or modify a design for a GDB a lot of trial and error is involved which can be a time-consuming process.

Using CASE Tools for generating, testing, and managing GDB designs is the most efficient method for developing, refining, and maintaining GDB designs. Since the GDB is being developed for Arc 8, it is necessary to use ESRI object models to build the schema upon. For example, to build a simple edge feature class the new class must inherit its characteristics from the following hierarchy:

Row > Object > Feature > NetworkFeature > EdgeFeature > SimpleEdgeFeature

Once the new feature class is set, a subclass is created that holds a link, or relate item to tie the subclass to the other information in the GDB and also subtype field. From the subclass, subtypes are defined using an integer value. In other words, a water service line subclass can have subtypes named Active, CurbOnly, and Abandoned with type values of 1, 2, and 3 respectively. The same process is followed for other feature classes such as simple junction features, complex junction features etc. Default attribute values are assigned in the subtypes. Domain values are also set using CASE Tools. Domains are defined as special classes within CASE Tools and they are used for limiting the possible values for an attribute. There are three types of domains: Coded Value, Range and String. Once the Visio Enterprise object diagram is completed and checked for errors, the new schema is exported as a UML to Microsoft Repository. The UML is automatically saved in the Microsoft Access .mdb file type.

Now it is time use ArcCatalog's Schema Creation Wizard to translate the UML into a GDB schema. The wizard may need to be added to the toolbar through Tools>Customize>Commands. Before running the wizard a GDB with its spatial reference and X/Y Domain set must exist for the schema to go in. Using the Schema Creation Wizard requires some experimenting to understand the process. For creating simple network features it is best to create the Geometric Network to complete the schema creation process. Once the new schema is created in the GDB, delete the Geometric Network and recreate it within the standard ArcCatalog tools. This is the most reliable approach to successfully creating the Geometric Network when working with Arc 8.0 PreRelease. The newly created Domains are stored directly under the GDB root and applied to the entire GDB. Now that the empty GDB schema is created, the new layers can be added manually with ArcMap or using the simple data loader in ArcCatalog or ArcTools.

Abstract: Designing and testing GIS Database Designs for Arc 8.0 can be a time consuming process. By utilizing Computer Aided Software Engineering (CASE) Tools the process can be expedited and managed in a much more efficient manner. This session will introduce the process of using CASE Tools (in this instance Visio Enterprise and Microsoft Repository) to develop, test and manage Arc 8.0 Database Designs.