North Carolina Geospatial Data Archiving Project (NCGDAP)
Key Issues and Findings in Work to Date (July 2005)

Findings: Geospatial Metadata “In the Wild”

Digital Geospatial Metadata Standards

In the U.S., most GIS data and much remote sensing data are documented using the Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata, which has been a federal standard since 1994. The FGDC Metadata Guidelines, as it is often referred to, encompasses a broad range of descriptive, technical, and administrative elements. The collection of geospatial metadata was mandated by the U.S. Executive Order 12906, which instructed federal agencies to document new geospatial data beginning in 1996. The standard was also widely adopted by state agencies as a means to exchange content through the National Spatial Data Infrastructure (NSDI). Creation of FGDC metadata is now common at the local agency level. In North Carolina, the NCGDAP Metadatum Outreach Program works to further the development of geospatial metadata at the county, city, and regional level.

Issues: Managing Time-Versioned Content

Many of the vector data layers to be acquired are subject to frequent update. County cadastral (land parcel) datasets, for example, are typically updated on a daily or weekly basis. Such time-versioned content, if preserved, can form the basis of time series analysis such as land use change analysis.

Version-handling over time, however, can be quite difficult to manage within the archive. Not only does the management of a serial data set require close attention to storage structure and data migration processes, but experience in the content domain has shown that some resources only a few years old have already lived in two or three repository environments. Users may locate serial components not only separated from the parent collection in the archive, but also in a system environment incompatible with older components of the collection.

Comparison of Wake County, NC parcels and street centerlines near Falls Lake and I-540
March 5, 1997 (left) and Feb. 22, 2005 (right).

Findings: Spatial Database Technology Advancement and Proliferation

Spatial Database Technology Overview

A spatial database stores geographic features and attributes in a relational database management system. Multiple layers may be stored in a single database, which may have two elements such as topology, visualization, semantics, and content. Within the spatial domain, the ESRI Geodatabase format is a prominent example of this approach to data management. The rigid project modeling, with regard to the ESRI Geodatabase was rather constant, keeping certain elements or aspect of data layers like most presentation factors fixed. Exclusion of the software functionality, such as layers or content, did not always fit, because database design should not be dependent on proprietary database standards.

Agency Use of ESRI Geodatabases

Until recently, spatial databases were relatively new in the project domain, but they have taken root in the last five years. The most prominent example was the NCGDAP Geodatabase Development Team to manage geospatial data. According to the NC GIS 2003 Local Government GIS Data Inventory, 10% of all survey data from NC local government agencies are in a geodatabase format.

Modifications to Project Geodatabase Strategy

The initial project strategy with regard to the ESRI Geodatabase was rather constant, keeping certain elements or aspect of data layers like most presentation factors fixed. Exclusion of the software functionality, such as layers or content, did not always fit, because database design should not be dependent on proprietary database standards.

Objectives

• Normalizing metadata to meet internal workshare requirements, project archival specifications, and compatibility with FGDC metadata content standard
• Consistency among different metadata_except_technical scenarios
• Metadata not always representative of data set
• Project requires technical metadata record

Geodatabase Normalization

Metadata Inclusion of ESRI Profile Elements

Technical Challenges

Technical Challenges

In addition, other project requirements included interoperability, accessibility, and archival. A major challenge included maintaining data format compatibility with an archive development approach; archive Geodatabases of unlimited size

Possible Archival Approaches

Image-based Approaches

Raster data may be grouped into bands or bands of data, or data may be stored as image data. This includes the study of single images, image data within an esri format of other supported formats, and user-specific image data. Because of the variables available in this type of data, and the potential for automation, efficient capture and archival of these formats poses a significant challenge.

Presented by: Steve Morris, Rob Farrell, Jim Tuttle, Jeff Essic, and James Jackson Sanborn