City of Charlotte Enterprise GIS Data Model

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Abstract
The City of Charlotte has recently completed development and implementation of an Enterprise GIS Data Model to serve as the high-level framework for managing GIS data assets within the context of providing citizen service. Development of the model was initiated by a recommendation from the City's GIS Strategic Plan to achieve the following goals:

- Identify, model and leverage spatial and related data to improve business practices
- Provide a better way to maintain, manage, and share geographic information throughout the city and county
- Eliminate redundant copies of data accessed by users and applications, thereby increasing efficiency and quality of data

Development of the model was based upon NSDI core themes as well as data initiatives at the State level. Local and regional business drivers such as air quality, urban development and homeland security influenced the final design. The interview and data gathering process was coordinated with the City's Corporate Enterprise Architecture Planning process in order to synthesize the new GIS technology components within traditional information technology best practices.

Introduction
The City of Charlotte is becoming increasingly more dependant on GIS technology to support the overall mission of providing seamless, accessible citizen service. Multiple Key Business Units (KBUs, analogous to departments) and agencies are effectively using GIS to support their day-to-day business needs. In doing so, the potential for--and reality of replication of core GIS functions and data existed. This inefficiency only served to reduce data integrity across KBUs, limit data sharing and access, and needlessly dwindle limited budgets and staff resource time. While the City is more efficient in managing data resources than many other local governments, an opportunity existed for improvement in data management, integrity, redundancy, access, security, and sharing both within the City and with strategic partners such as Mecklenburg County. The design and implementation of the Enterprise GIS Data Model was initiated to expose these opportunities for operational efficiencies.

Purpose
Development of the Enterprise GIS Data Model was a recommendation of the City's GIS Strategic Plan (March 2002) to standardize and document data storage, classification and assimilation. Development and implementation of and Enterprise GIS Data Model would achieve the following goals:

- Identify, model and leverage spatial and related data to improve business practices
- Improve GIS data maintenance, management, documentation and appropriate distribution of geographic information throughout the City and Mecklenburg County
- Eliminate redundant copies of data accessed and maintained by users and applications
- Deliver operational efficiencies and cost avoidance to KBUs and strategic data partners

Vision
The Enterprise GIS Data Model would serve as the high-level framework for managing GIS data assets within the context of providing quality citizen service. The GIS Data Model effort would integrate with the City's Enterprise Architecture Planning (EAP) process to synthesize GIS technology components with traditional information technology best practices. Accurate and reliable "gold standard" data would be easily accessed across KBUs and other data partners.

Process
The design of the Enterprise GIS Data Model was a collaborative process based upon interviews with each KBU and Mecklenburg County; GIS data needs identified in the City's GIS Strategic Plan; information collected for the City's EAP; and currently existing GIS data models in the City. Interviews conducted with the agencies identified GIS data, data relationships, topological relationships, and procedures essential to meeting KBU business drivers. The data model design incorporated Federal Geographic Data Committee (FGDC) core themes for the National Spatial Data Infrastructure (NSDI - geodetic control, orthoimagery, elevation and bathymetry, transportation, hydrography, cadastral, and governmental units) as well as data initiatives at the State level. GIS data stakeholders in the City and County mutually approved the data model design in a series of interactive workshops. Data flow diagrams were also included in the model design to document the migration of data from data custodians/source agencies the City's Spatial Data Warehouse and also addressed redundant server accessibility.

Next Steps
Many City KBUs have regional service areas and interests, including Charlotte Area Transit System (CATS), Charlotte Department of Transportation, Charlotte-Mecklenburg Planning Commission and Charlotte-Mecklenburg Utilities. These departments have the need for regional GIS data to provide services that extend beyond the incorporated limits of the City and Mecklenburg County. At the same time, multiple regional efforts and organizations outside of City operations, such as the Regional Planning Alliance, Charlotte Chamber and Centralina Council of Governments, require and/or collect GIS data to meet their business needs.

A strategic partnership opportunity exists for improving GIS data management, redundancy, access, security, and sharing across the Charlotte region. A *Regional GIS Data Framework* has been proposed to expose these opportunities and provide the

technical and operational framework for sharing the most accurate, seamless, reliable information about shared geography of the Charlotte metropolitan area. The *Regional GIS Data Framework* is envisioned to have policy and operational components that address governance, the business model, data maintenance, data standards and appropriate data access.

The technical component will involve the design and implementation of a *Regional GIS Data Model* to provide the high-level template for aggregating and transforming disparate datasets. The *Regional GIS Data Model* will build on and extend the City's Enterprise GIS Data Model. Environmental and planning layers are envisioned to support current regional efforts to address air quality non-attainment and inter-governmental planning coordination for quality of life initiatives as well as higher-profile business drivers for public safety mutual aid and homeland security. Non-proprietary, open standards are envisioned to ensure interoperability, seamless integration and rapid Internet distribution of GIS data. A hierarchical integration with NC OneMap and The National Map is envisioned for data sharing and access.

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The University of North Carolina Charlotte Urban Institute and Centralina Council of Governments are strategic partners in the Regional GIS Data Framework for the Charlotte metropolitan area.

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