Philadelphia, Pennsylvania

Introduction

"And thou, Philadelphia, the virgin settlement of this province, named before thou wert born, what love, what care, what service, and what travail has there been, to bring thee forth."

William Penn

William Penn understood geography and knew how to apply it to city planning. Penn's crowning achievement, the city of Philadelphia, was a milestone in the history of urban design. Designed and constructed in the early 1680s, the city incorporated lessons learned from the problems of English cities.

Penn designed the city's streets in a logical, rectangular grid pattern, uncommon for European and colonial towns at the time. He allowed for ample space with streets wider than those in London, plenty of town squares, and room to expand as the city grew. Space between homes and other buildings was ensured not just for aesthetic value, but to prevent the spread of fire and disease.

By 1700, the City of Brotherly Love was already the second most populous urban area in the American colonies. Penn had planned for the city's expansion, and expand it did.

Today, William Penn still oversees Philadelphia in the form of a 37-foot tall statue atop the city's historic City Hall building. Inside City Hall and in other municipal buildings, city employees who also understand geography are carrying on Penn's vision of Philadelphia as one of the finest urban centers in the world.

An Enterprise GIS is Born

The city of Philadelphia has a history with geographic information system (GIS) technology dating back to 1992 when the city began building a GIS to map and record its land information and infrastructure. The city's GIS program was implemented without a citywide implementation plan. Instead, the city started with some strong fundamental concepts and a set of standards set out by a task force made up of commissioners and deputy commissioners from the major departments. The task force provided general guidance and sanctioned standards that included hardware, software, a coordinate system, accuracy, database structure, and land records data.

As GIS developed in the city, management structure evolved to support it. The first GIS efforts were managed by those early adopting organizations such as the Planning Commission and the Streets Department. Staff to support the first GIS efforts in the city were internally generated. Existing staff with expertise in planning, engineering, or information technology who had an interest in GIS were cross-trained in this new technology and over time formed the core of the GIS professionals in the city today. Coordination and cooperation were achieved through staff-to-staff contact supported by some early policy decisions on software standards that imposed consistency among these individual efforts.

As more development occurred and more departments became involved in GIS, the ad hoc task force gave way to the creation of the GIS Services Group (GSG) at the Mayor's Office of Information Services (MOIS) to manage the enterprise aspects of the city's GIS. The MOIS, formed in 1993, took responsibility for enforcing the standards and coordinating the technology, while the individual departments were responsible for creating and maintaining their own specific data sets.

Over time, new staff with more formal training were hired for entry-level positions. Specific civil service classifications were created for a new series of positions that now range from GIS manager down to GIS trainee.
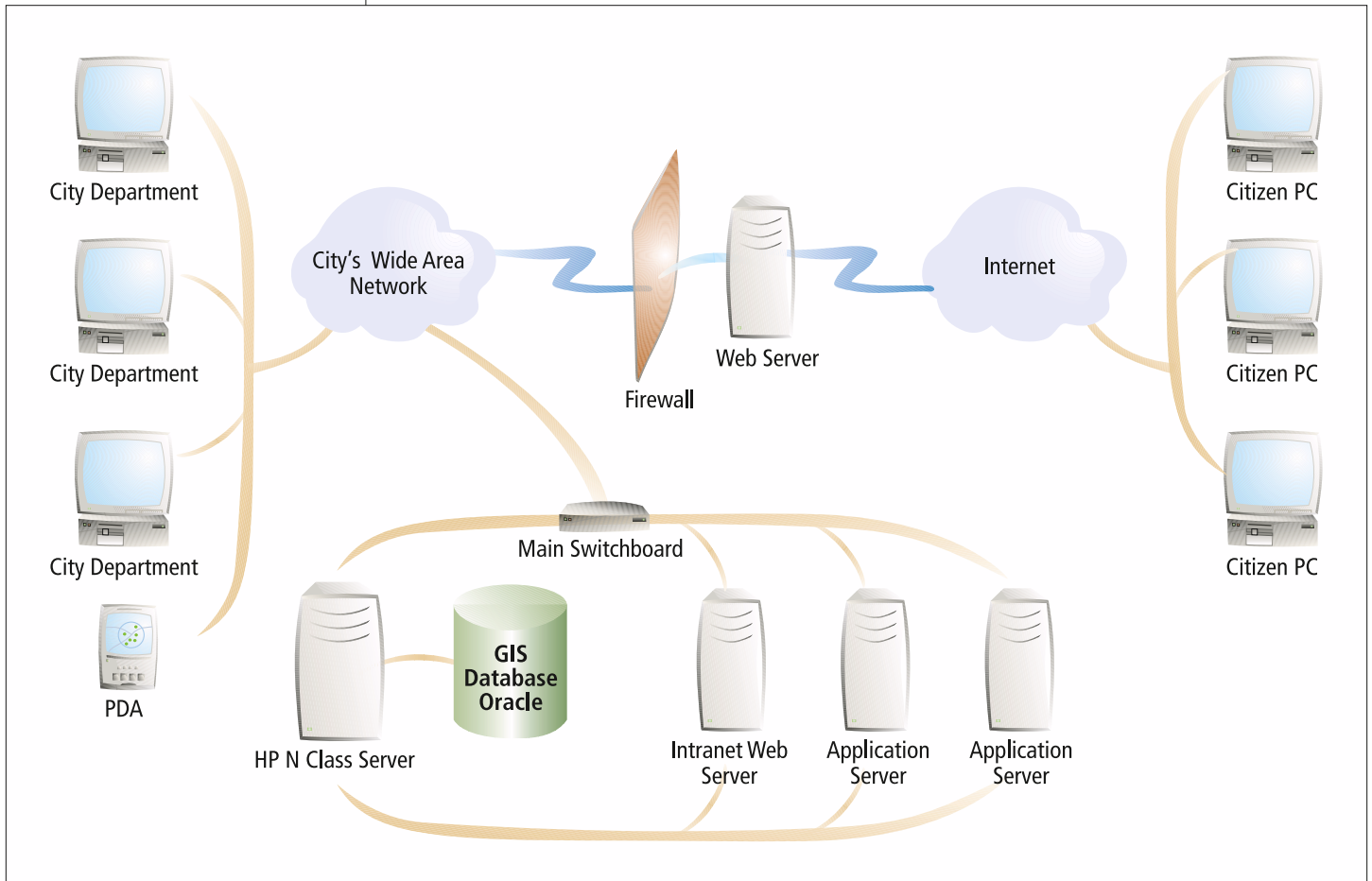
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Staff development and training were accomplished both through on-site training and by sending staff to more intensive courses offered by ESRI and others. This ongoing training program continues today. In recent years, the GSG has coordinated the acquisition of new software and provided advice and technical assistance to those departments acquiring their own GIS. Increasingly important functions for the GSG have been assisting in managing the network connectivity (needed to provide departmental access to the spatial data warehouse) and facilitating data exchange among departments.

Organization

Philadelphia has built one of the largest integrated geographic information systems in the United States. Within the Mayor's Office of Information Services, the GIS Services Group supports the core functions of the overall city GIS program and is empowered to direct and coordinate the city's enterprise GIS efforts through the Mayor's cabinet and the Information Technology Governing Committee. Some of the key GSG functions include (1) coordinating the acquisition of new GIS software, (2) providing advice and technical assistance to those departments acquiring GIS hardware, (3) defining and enforcing standards, (4) fostering coordination and collaboration among GIS departments, (5) managing network connectivity needed to provide departmental access to the spatial data warehouse as well as facilitate GIS data exchange among GIS departments, and (6) developing systems and applications for citywide use.

The GSG consists of the director of enterprise GIS, a GIS manager, a senior analyst, and a geodatabase developer/administrator. The director of enterprise GIS is responsible for coordinating GIS efforts throughout the city and providing direction and support to other city departments. The departments, however, use their own staffs of varying sizes to build and maintain data as well as develop applications specific to their needs. This distributed and coordinated approach is successful because of the degree of communication and collaboration that exists among departments that are major users of GIS technology.

Major participating departments include the Planning Commission, the Police Department, the Streets Department (Sanitation and Transportation Divisions), the Water Department, the Department of Licenses and Inspections, and the Records Department. Many other departments are using GIS in a limited fashion and exploring the potential of GIS to meet their needs. These include the Office of Housing and Community Development, the Department of Human Services, the Department of Public Health, the Fire Department, the Fairmount Park Commission,
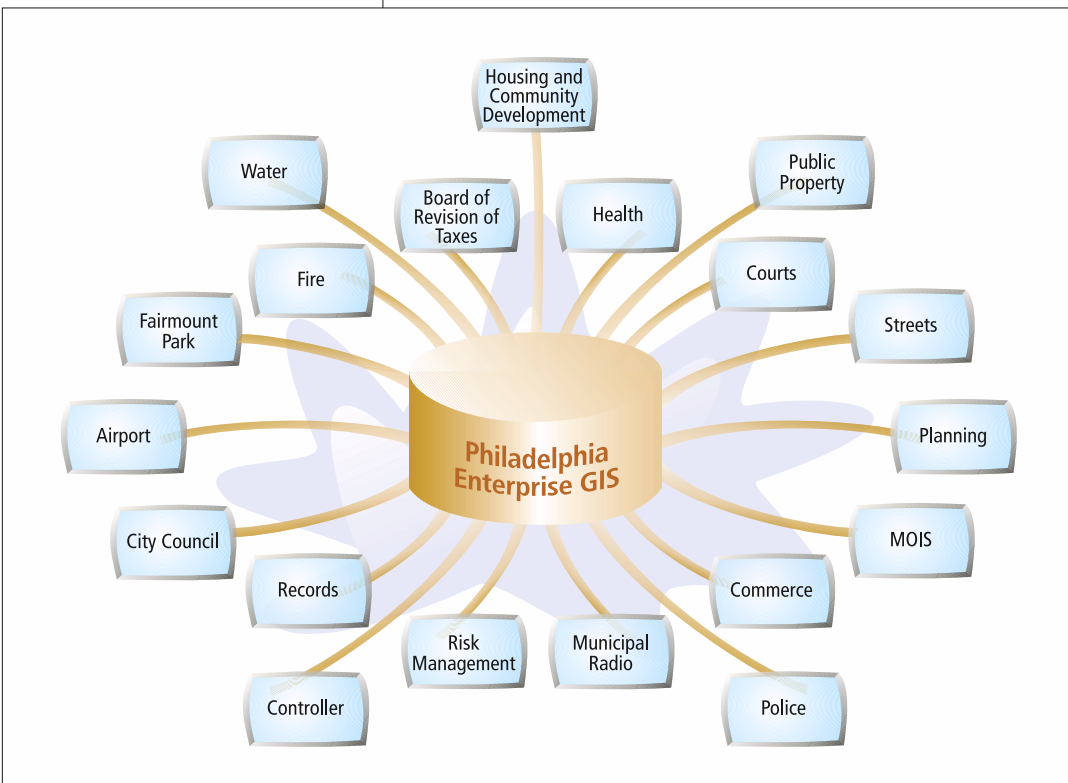
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▶ Benefits

- Ability to provide streamlined and centralized services to internal and external customers
- Cost savings by reducing the current duplication of data maintenance activities
- Integration of GIS in daily operation, planning, and management of major city departments
- Improved delivery of cartographic and geographic record information via Web-based and wireless applications to the public, city employees, and other special interest groups
- Data sharing among city users through the development of spatial data warehouse
- Improved data accuracy and integrity through the establishment and enforcement of standards
- Easy access to spatial data for city employees through the development of various desktop applications
- Generation of new commercial opportunities through the use of the Internet
- Identification of potential revenue sources

the Board of Revision of Taxes, the Department of Public Property, the Managing Director's Office, the Philadelphia Prison System, and the Department of Recreation.

Interest in and use of GIS have not been limited to city departments. Within the region are numerous state and federal agencies collecting and maintaining spatial data and deploying applications. Educational institutions as well as civic and nonprofit organizations are using GIS for teaching and research and in support of their individual missions. The University of Pennsylvania has established a cartographic modeling lab to provide GIS services to researchers, students, and organizations; Temple University has done likewise. Community development corporations rely on GIS for planning and implementation of sophisticated neighborhood and community revitalization programs. GIS has become mainstream; the software is affordable and a larger number of individuals have GIS skills. As a result, there is significant demand on the city to share data. This demand will expand as more and more data becomes available.

Philadelphia's GIS is coordinated at the enterprise level, citywide. The city benefits from a group of dedicated professionals who understand and are excited by the possibility of using the technology to improve the delivery of city services. GIS technologies are integrated into the day-to-day activities of a number of city departments and are providing real and measurable benefits.

System Design

ESRI software and extensions
- **ArcGIS 8.x**
- **ArcInfo 7.x**
- **ArcView 3.x**
- **ArcSDE 8.x**
- **ArcIMS 3.x and 4.x**
- **ArcGIS 3D Analyst**
- **ArcPress**
- **ArcGIS Publisher**
- **ArcGIS Spatial Analyst**

Enterprisewide System:

ArcSDE Server
Operating System: HP-UX 11.0
Server Configuration: 4x550 MHz RISC processors, 2–4 GB RAM, HP-XP 256 Disk Array with 666 GB presented as 97.4 GB logical drives.
DBMS: Oracle8i (v.8.1.6)

Internet ArcIMS Server
Operating System: Windows 2000 Advanced
Server Configuration: 6x700 MHz Xeon, 2 GB RAM

Intranet ArcIMS Server
Operating System: Windows 2000 Advanced
Server Configuration: 2x550 MHz Xeon, 512 MB RAM

Number of Layers: More than 125 defined feature data sets containing planimetrics, cadastres, features, and others
Type of Data: The ArcSDE Server stores data from the Board of Revision of Taxes; GIS Services Group; Planning Commission; Licenses and Inspections; and Police, Recreation, Streets, and Water departments.
Size of Database: 100 GB raster data, 25 GB vector and tabular data