

County of Fairfax, Virginia

QUEBEC
MARCH 2008

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CGI Quebec's Business Unit which is CGI's worldwide excellence center in GIS counts many large-scale achievements involving ESRI technologies and offers to its members a technological innovation center where these technologies are available for expertise experimentation and development.



COUNTY OF FAIRFAX, VIRGINIA

PROJECT TITLE	DATES	EFFORTS M-D
Urban Development Information Systems (UDIS) - Architecture	September 2005 to December 2005	133
Integrated Parcel Lifecycle System (IPLS) -- Development Phase I	February 2006 to May 2006	323
Integrated Parcel Lifecycle System (IPLS) -- Development phase II & III	September 2006 to July 2007	351

ARCHITECTURE

The County of Fairfax has been using a system called Urban Development Information Systems (UDIS) to help produce statistical analysis of population, gross floor area, underutilized land, vacant land and population forecast for the next 30 years.

UDIS was a mainframe system that was non-geographical, meaning that it did not take advantage of GIS technologies to produce analysis and reports.

CGI was involved to produce a system architecture that would help the County of Fairfax take advantage of GIS technologies by creating a map based application using such technologies. The architecture CGI put together for the County called for the use of ArcGIS and Oracle Spatial to manage the base data and to generate all the analysis and maps.

The new system is called Integrated Parcel Lifecycle System (IPLS) and manages all the information the County has for assessment, permits, inspections, rezoning and site plans at the parcel level. This new system executes its analysis at the parcel level, instead of large area polygons such as census block groups and thus, can produce much more accurate results for the County.

DEVELOPMENT

The development of IPLS was done in three phases. The first phase was the creation of the application that would replicate, or effectively extract data from five different databases and insert the extracted data in the IPLS database model.

The second phase was the creation of an application to generate what was called derived data. An example of derived data was to use the permit information and assessment information to generate a population count for each parcel of the 350,000 parcels contained in the County.

The third phase was the creation of analysis tools and map generating tools. Those were built to help the County determine the errors in the data supplied by the different departments. There was also the creation of tools to create forecast data, such as the forecast population for up to 30 years in the future.

Among all the tools built that operated at the parcel level, the more noticeable are:

IPLS is accessible two ways, directly at the database level from any SQL browser or from ArcGIS to produce statistical and mapping analysis. The fire department, police department, parks and recreation, storm water, transportation, and other agencies are able to utilize the IPLS database to extract precise information about population, daytime population, gross floor area, and much more.

At the architecture phase, CGI helped the County put in place different ways for the different agencies to exchange information and data required to sustain the IPLS project. A new database model to house the IPLS information was also generated.

- Generate the household count
- Generate housing unit count
- Generate the population count
- Generate the population density map
- Generate the forecast household count
- Generate the forecast population count
- Generate the inventory of office structure
- Generate the inventory of vacant land planned for commercial and industrial use
- Generate the inventory of wholesale and warehouse storage facilities
- Generate the inventory of non-residential gross floor area
- Generate the inventory of underutilized residential parcels
- Generate the ratio of sale versus assessed values
- Generate the inventory and map the underutilized residential land

IPLS made use of an Oracle relational database where all geometries were saved as Oracle spatial geometries. This allowed application such as SAS and other report or analysis tools to spatially query the IPLS database without having to go through the IPLS desktop application.

The IPLS desktop application was built as an ArcGIS extension to allow users to create data, manage spatial data, and produce mapping data with statistical and forecasted information stored in the IPLS database.

All the tools were built with Visual Basic.Net 2005. The data importation tools allowed the IPLS administrator to manage the data importation schemas without the need to modify or recompile the tools. Each data loading process was configurable via an administration utility that manages data mapping between source information (remote systems) and the IPLS database model. Data source ranges from text file, access files, personal geodatabases (PGDB), Oracle tables and views to information stored in ArcSDE.

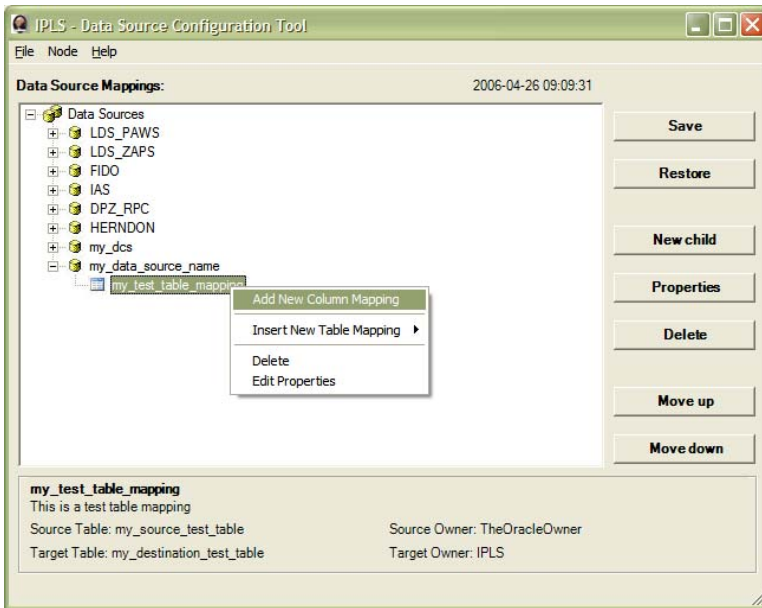
In all, nearly 30 different tasks were analysed, developed, tested, and have been deployed at the client site. The application was first created on ArcGIS 9.1 and Oracle 9i and during the last phase of the project, before the final delivery, the application was migrated to ArcGIS 9.2 and Oracle 10g.

ENVIRONMENT

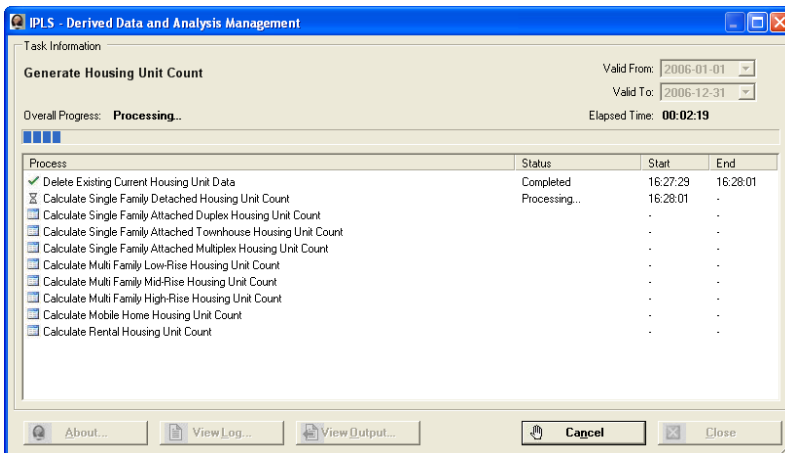
ArcSDE 9.1; ARcsde 9.2; ArcEditor 9.1; arceditor 9.2; arcobject; oracle 9i; Oracle 10g; Oracle Spatial; Visual Basic.NET 2003; visual basic .NET 2005; Visual Studio.NET 2003; visual studio 2005; fxcop; Source Safe; Excel; Visio; Access; Linux OpenSuse 10; Windows XP; Windows 2003, SQL, PL/SQL

SCREEN CAPTURES

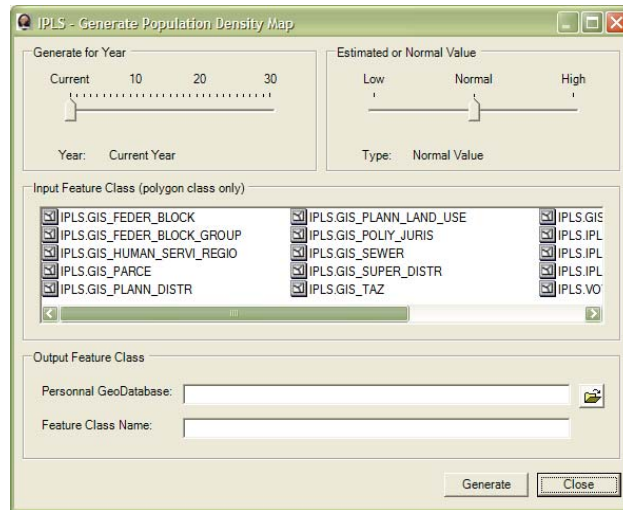
Data mapping configuration tool used to configure source/destination of information:



Tool to generate the population count:



Tool to generate a customized population density from a user custom map:



An example of a density map generated by the IPLS application:

