BIOGRAPHICAL INFORMATION

GEOFF ZEISS

Director of Technology
Enterprise Solutions Architect
Autodesk Infrastructure Solutions Division

Specific Responsibilities

Since joining Autodesk in 1999, Geoff has been responsible for enterprise solution architecture in Autodesk's Infrastructure Solutions Division. He works directly with Autodesk's largest customers around the world including, some of the largest communications, utilities, and government organizations, to understand their critical business drivers and model their core business processes in order to design solutions incorporating and customizing Autodesk's products and services to deliver business value.

Past Experience

Geoff Zeiss has more than ten years of experience working with utilities, communications, and public works in the enterprise automated mapping/facilities management/geographic information systems (AM/FM/GIS) market.

Geoff's initial responsibility at Autodesk was for the team that designed and implemented Autodesk GIS Design Server, a three-tier enterprise-scale product that integrates desktop CAD-based mapping with an RDBMS-based GIS data server.

Prior to joining Autodesk, Geoff was Director of Software Engineering at MCI VISION* Solutions, which was acquired in 1999 by Autodesk, Inc. Geoff was responsible for the engineering team which designed and developed VISION*, a three-tier, enterprise-scale product for automating infrastructure management. VISION* supports high concurrency, high volume online transaction processing for complex data models based on a commercial relational database management system (RDBMS). VISION* Solutions became known for developing innovative solutions based on leading-edge technology and, among other innovations, is credited with introducing RDBMS-based spatial data management, long transactions, CAD/GIS integration, and UML-based object modeling into the AM/FM/GIS market. Autodesk GIS Design Server and VISION* are installed in many sites around the world including some of the largest telecommunications and utility companies.

In the course of his career, Geoff has acquired in-depth knowledge and experience in applying advanced technology to developing solutions in the AM/FM/GIS market. As Vice President of Product Development at TYDAC Technologies, he was responsible for technology directions and managed TYDAC's software development group, which designed, developed, and supported TYDAC's desktop mapping and spatial analysis products. Geoff led the team that designed and developed SPANS MAP, one of the first Windows-based desktop mapping products. At the time of Geoff's departure, TYDAC Technologies was one of the top ten GIS companies in the world, with more than 3000 systems installed in over 60 countries.

Educational Information

B.A. Cornell University

Ph.D. McGill University

Professional Memberships

GITA

(2004/April/ 1 page)

Location-enabled Platform Technology and Open Enterprise Infrastructure Management Solutions.

Geoff Zeiss
Autodesk, Inc.
Suite 500, 427 Laurier Ave W
Ottawa, Ontario K1R 7Y2

Xavier Lopez
Oracle Corporation
1 Oracle Drive
Nashua, New Hampshire 03062

Abstract

Multi-vendor, open enterprise solutions are becoming a standard in environments where interoperability and unobstructed access to common data is crucial. Location-enabled platform technology delivered from the commercial database sector provides an open data repository that supports collaborative design and infrastructure management for large enterprises. With this open platform specific location capabilities and data are accessible for the first time via standard SQL and ODBC, JDBC and OLEDB leading many vendors to rely on this technology as a foundation component for general interoperability. Key enabling technologies in this location-enabled platform include basic spatial data management, linear and polygon topology maintenance, support for graph or network data models, long transactions (data versioning and persistent locking), georeferenced rasters and support for grid-based data, linear referencing, routing, and geocoding. Further, because the location-enabled platform manages ALL enterprise data in a secure, highly available environment, key elements of spatial technology can now be used in conjunction with core enterprise business data to improve general operational efficiency. This provides a tremendous business benefit to utility and telecommunications firms. These firms can now rely on best-of breed applications and solutions from multiple vendors, including traditional GIS vendors, but other non-GIS vendors as well.

In this presentation we will discuss these technologies and show how multi-vendor enterprise infrastructure management solutions can be supported on a common, open location-enabled platform.

Integration-centric World

Telecommunications, utility, and public works organizations are under intense pressure to do more with less. The business processes these organizations are required to support are complex and, often because of government legislation are becoming more complex, which means that increasingly they require solutions from multiple vendors. Historically, the geospatial industry has created islands of information where each vendor supports their own file formats and applications. Organizations either lock onto one vendor or use data translation software to translate data from one vendor to that of another.

But the world is becoming increasingly multi-vendor, where organizations increasingly need to run applications from multiple vendors, don't have time to translate data between applications, and have to share common datastores.

In GITA's recent Geospatial Technology Report 2003-2004, which presented the results of a survey by GITA of 204 participating organizations, one of the most interesting aspects of the survey was that the participants were asked if they were using more than a single GIS platform. Between one-third and one-half of all participants were using more than a single platform, and approximately two-thirds of those were sharing data between systems. In the words of Brian Kiernan "this development heralds what some industry analysts refer to as a change from a geo-centric to an integration-centric basis for competition in the industry, and one need look no further than the "partnerships" announced in 2003, including ESRI and Bentley, as well as long-time competitors Autodesk, Intergraph, and MapInfo. Although some stalwarts see doom for companies that have traditionally built all-encompassing solutions, as the saying goes, 'you can't please all the people all the time.' This new paradigm allows software developers to focus on and compete in the areas they know best: truly providing users with best-of-breed technologies and applications." The author goes on to say that "although hardware and software technologies continue to evolve, perhaps the most noteworthy to users is a distinct trend toward multivendor environments." In the public sector, for example, of the respondents, 58% indicated they were using multiple GIS software platforms and sharing data between the systems, and 32% were using only one GIS platform, with 10% using multiple platforms and not sharing data.

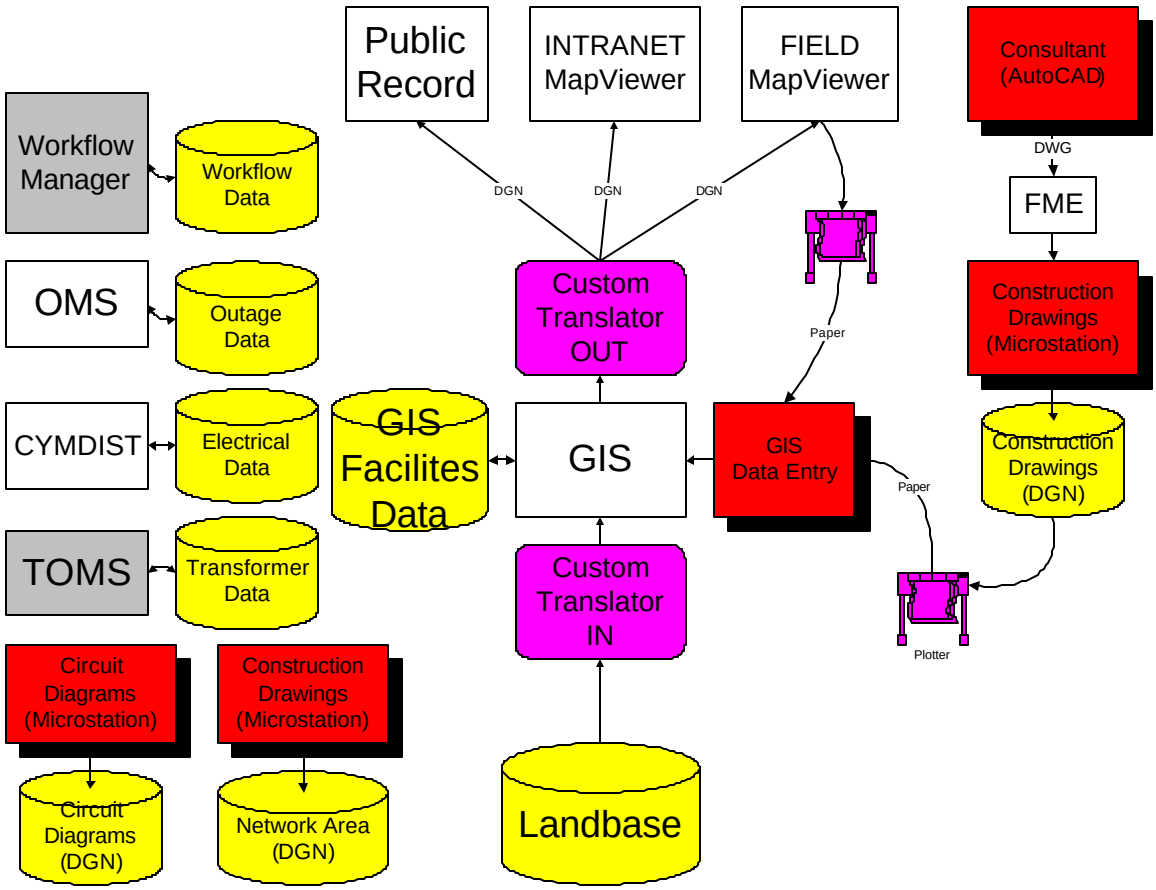
The Department of Defense uses many applications from vendors like Autodesk, Bentley, MapInfo, and ESRI. Historically sharing data among these applications has been problematic. In fact Safe Software has created a thriving business on helping organizations share data among applications. However, changes are on the way. At the recent Geospatial Technology Conference in San Antonio, one of the future key requirements that was presented for the next generation of geospatial technology within the Department of Defense is a vendor-neutral application environment with a shared datastore. The US Air Force's Geobase initiative is an early harbinger of a vendor-neutral application environment within the Department of Defense.

What this means for telecommunication, utility, and government organizations that rely on geospatial data is that increasingly they will be able to buy best-of-breed applications that they will be able to run concurrently on a common data store.

The Problem of Integration

Most telecommunications, utility, and public works organizations face the same problems, many redundant datasets, redundant processes, and the need to do more with less.

For example, the diagram below shows a simplified system architecture for an electric utility. The most important thing to recognize in this diagram is that each application has its own data store. This means that there is redundant information, and there are redundant processes required to maintain the redundant data. For example, subcontractors perform engineering design using AutoCAD©. The data is then converted to DGN format because the internal engineers use Microstation©. The same design data is then printed out and re-digitized into the organization's GIS. This is just one example, but the same redundant data and redundant processes characterize the outage management system, transformer management system, and other systems.



Object-Relational Technology

One of the major new technologies that have been introduced into the market in the last 10 years is object-relational technology. The traditional relational model is based on two dimensional tables and a standard query language, SQL. The object-relational model extends the relational model to include structures such as arrays and abstract data types. In addition, SQL99 extends relational SQL to support object-relational queries. Together object-relational database management systems and SQL 99 make it possible to support a much broader range of data types including spatial, temporal, and complex data models. The ISO SQL/MM standard extends SQL99 to include geospatial and other non-traditional relational queries.

All of the major RDBMS vendors are implementing support for object-relational extensions. In addition all the RDBMS vendors support extensible indexing which allows other types of indexes beyond the traditional B-tree indexes. Specifically, quadtree, grid, and r-tree indexes are now available.

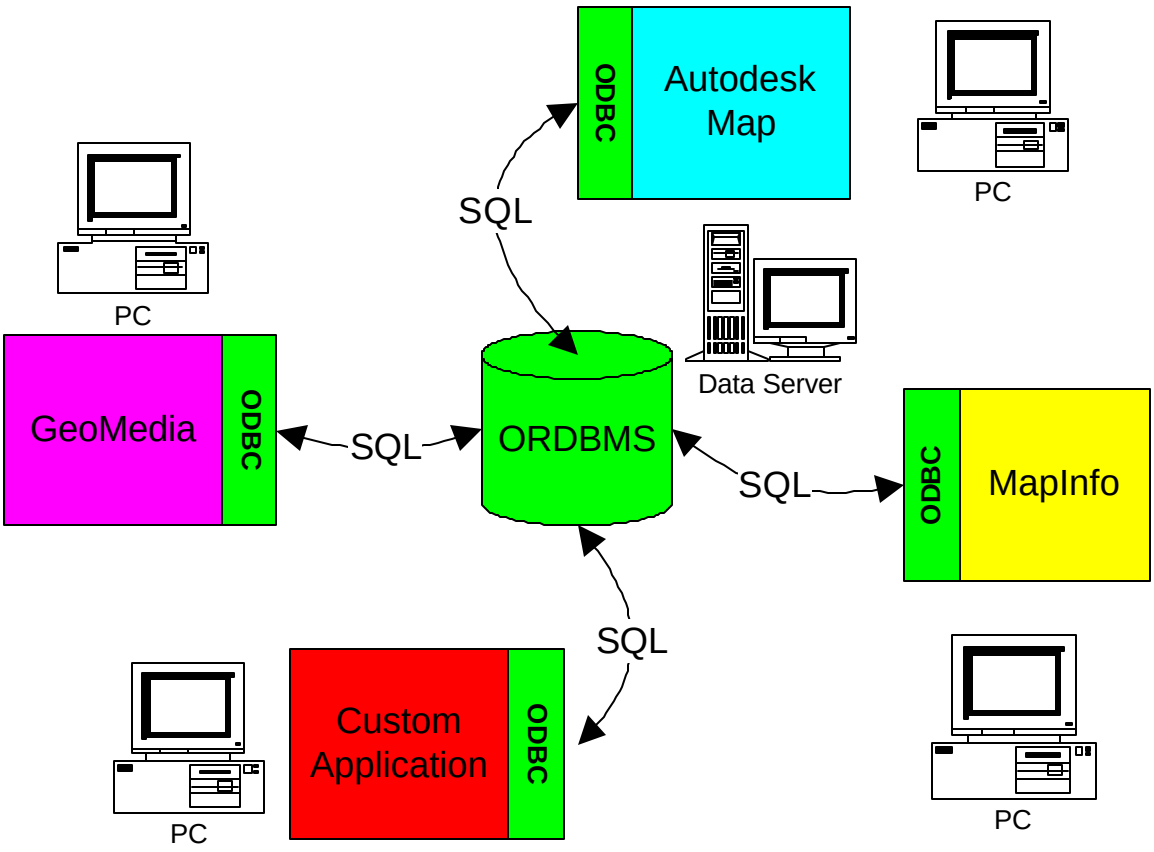
For telecommunications, utilities, and public works organizations this means that database management systems are now able to store, query, and update all of the data structures required for managing their network infrastructure including geospatial (vector and raster), connectivity, attribute, and versioned data. For example, the location of poles and transformers, the paths of cables and pipes, which cables are connected to which transformers, which hydrants, valves, laterals, and pipes are connected, and attribute information about each piece of equipment and be stored in an object-relational database management system , and with versioning as-built and design or project data can be safely stored in the in the same database.

Geospatial Standards

In addition standards for querying, accessing, updating, and rendering geospatial data are rapidly evolving. The best know is the Simple Feature Specification from the Open Geospatial Consortium (OGC), that defines how simple features are represented in SQL, CORBA, and COM. More recently the OGC has defined standards for web mapping (WMS), web feature manipulation (WFS), and for XML-based data exchange (GML). Others such as LandGML are in progress.

Vendor-neutral Application Environment

The combination of object-relational database management systems together with rapidly evolving standards for geospatial data means that the following diagram, which illustrates a true multi-vendor application environment is becoming a reality. Applications from major GIS vendors as well as from independent ISV's will all be able to interoperate concurrently against a common, shared datastore.



Standard Data Types and Structures

To be able to do this requires standardized data structures for the data types and structures required by telecommunications, utility, and public works organizations. The data types that are now in the process of becoming de jure or de facto standards include:

Spatial Data Types

Points, lines, arcs, closed polygons

Georeferenced rasters

Oriented points, cartographic text

Linear topological networks (connectivity)

Polygon topological networks

Linear referencing system

Addresses

Parcels (property)

Versions (long transactions)

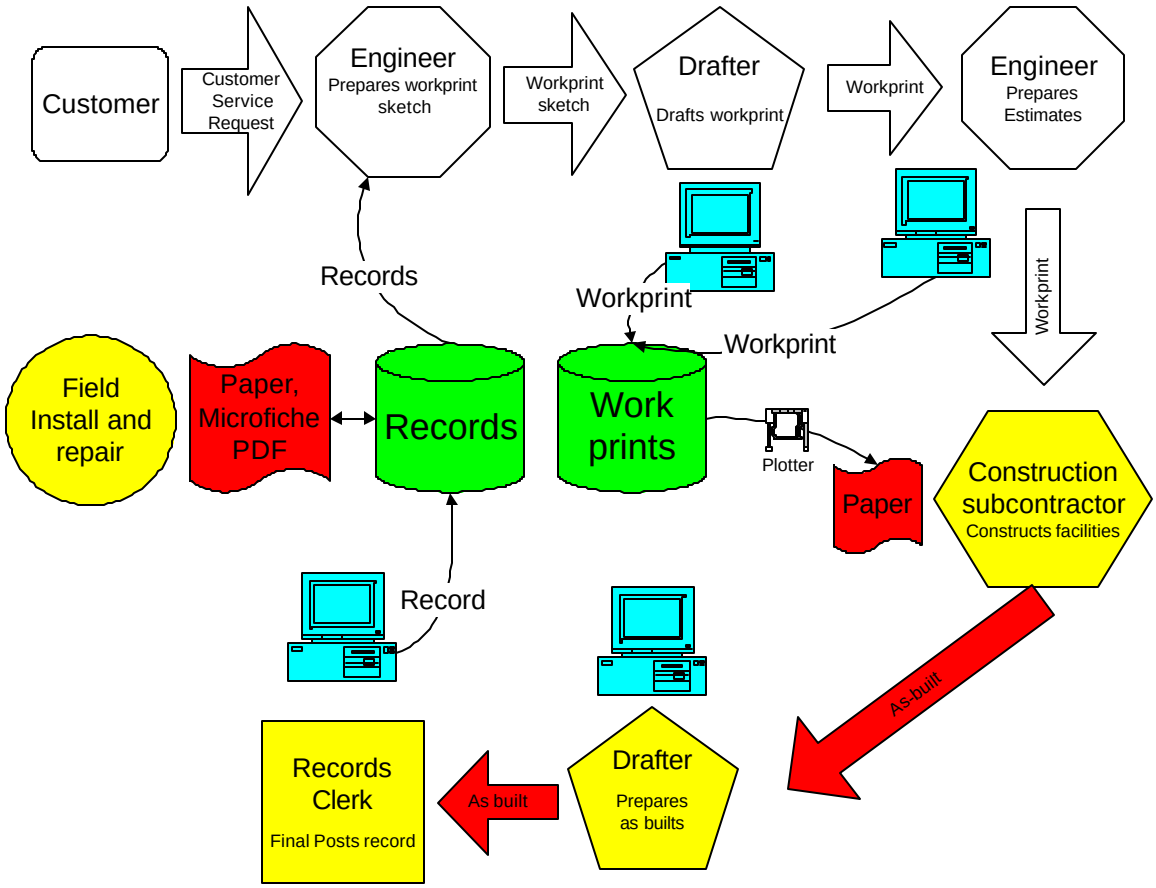
History

Stylization

We are on the cusp of a time when all of these data types and structures will be accessible using SQL, industry standard interfaces like ODBC, JDBC, and OLEDB, and geospatial standards from ISO, OGC, and other standards organizations. For example, the Interoperability Initiative comprised of Intergraph, Autodesk, Laser-scan, and MapInfo was formed to speed up the process of establishing these standards.

The benefits to telecommunications, utility, and public works organizations are multifold, but the most important are first, choice – the ability to choose best-of-breed applications - and secondly, the reduction or elimination of redundant data data and redundant processes.

For example, the following diagram illustrates the typical engineering design process at a telecommunications or utility organization:



There are two critical processes that result in backlogs, often render the records database out of date and unreliable, lead to redundant data and processes, and result in this process being very expensive.

1) After the engineering design is complete for a project, construction drawings are printed on paper. These drawings are used during construction. After completion of construction the paper drawings are marked up to reflect what was actually constructed and returned to the records department as paper as-builts. The record clerks redraft these drawings to create new electronic drawings which are posted into the records database.

Most organizations have an as-built backlog, which can stretch from 45 days to several years. As a result the records database is out-of-date and unreliable.

Field personnel require accurate records data to their job. If the data is inaccurate, the work crew may go out to an installation or repair job with the wrong equipment or material, and have to return without completing the job. “Returns” are expensive and to avoid them, field personnel often maintain their own “mapbooks”, or paper drawings which they annotate manually, which is a classic example of redundant data and a redundant process.

2) Secondly, the field personnel need to be able to provide feedback to the records database when they install new equipment, find that the records database is incorrect, or when they change the state of a switch or other critical piece of equipment. In many organizations, feedback from the field is either not supported or is backlogged. Again the result is redundant data and a redundant process, because field personnel are again forced to maintain their own paper "mapnooks", in which they record their own facilities data.

Having a single centralized open datastore that is able to store all of the organization's facilities data, and that is open through SQL and ODBC or JDBC to all applications including those used by the field personnel enables streamlining of the engineering design lifecycle and significant reduction in cost. Some estimates from telecommunications and utility organizations have suggested 70-90% cost reductions are feasible by streamlining the engineering design lifecycle.

Conclusion

The world is becoming increasingly multi-vendor, where more and more organizations need to run applications from multiple vendors and share common data stores. We are on the cusp of a time when all of the data types and structures requires to manage network infrastructure will be open and accessible using SQL, industry standard interfaces like ODBC, JDBC, and OLEDB, and geospatial standards from ISO, OGC, and other standards organizations. The benefits to telecommunications, utility, and public works organizations are first, choice – the ability to choose best-of-breed applications - and secondly, the reduction or elimination of redundant data and redundant processes with potentially dramatic reduction in the cost of common business processes.