Spatial Database Engine™ (SDE™)

The Universal Spatial Server

SDE

The Universal Spatial Server

More than 80 percent of data have a spatial component. Professionals in business and the public sector are discovering that they can communicate more effectively, make better decisions, and gain competitive advantage by using the spatial component in their databases. Spatial Database Engine™ (SDE™) software from ESRI is the leading technology for enterprise spatial data access and management.

What Is SDE?

SDE is a software solution for managing and providing access to many types of spatial data. SDE was developed for two principal markets: the geographic information system (GIS) community and the database management system (DBMS) community who wish to extend their databases with spatial technology. For the GIS community, SDE provides the most advanced solution for managing and providing access to spatial data. SDE is fully integrated with all ESRI® GIS application solutions including ArcInfo™ software, the world's leading professional GIS; ArcView® GIS software, the premier desktop GIS solution; and ArcExplorer™ software, ESRI's Internet browser technology. SDE provides a single common interface between the user and the diverse collection of geographic data that exists within an organization. For DBMS users, SDE provides an open solution for storing, managing, and using the spatial dimension within all of the leading DBMS vendor products including IBM®, Informix®, Microsoft®, Oracle®, and Sybase®.

Three-Tier Architecture

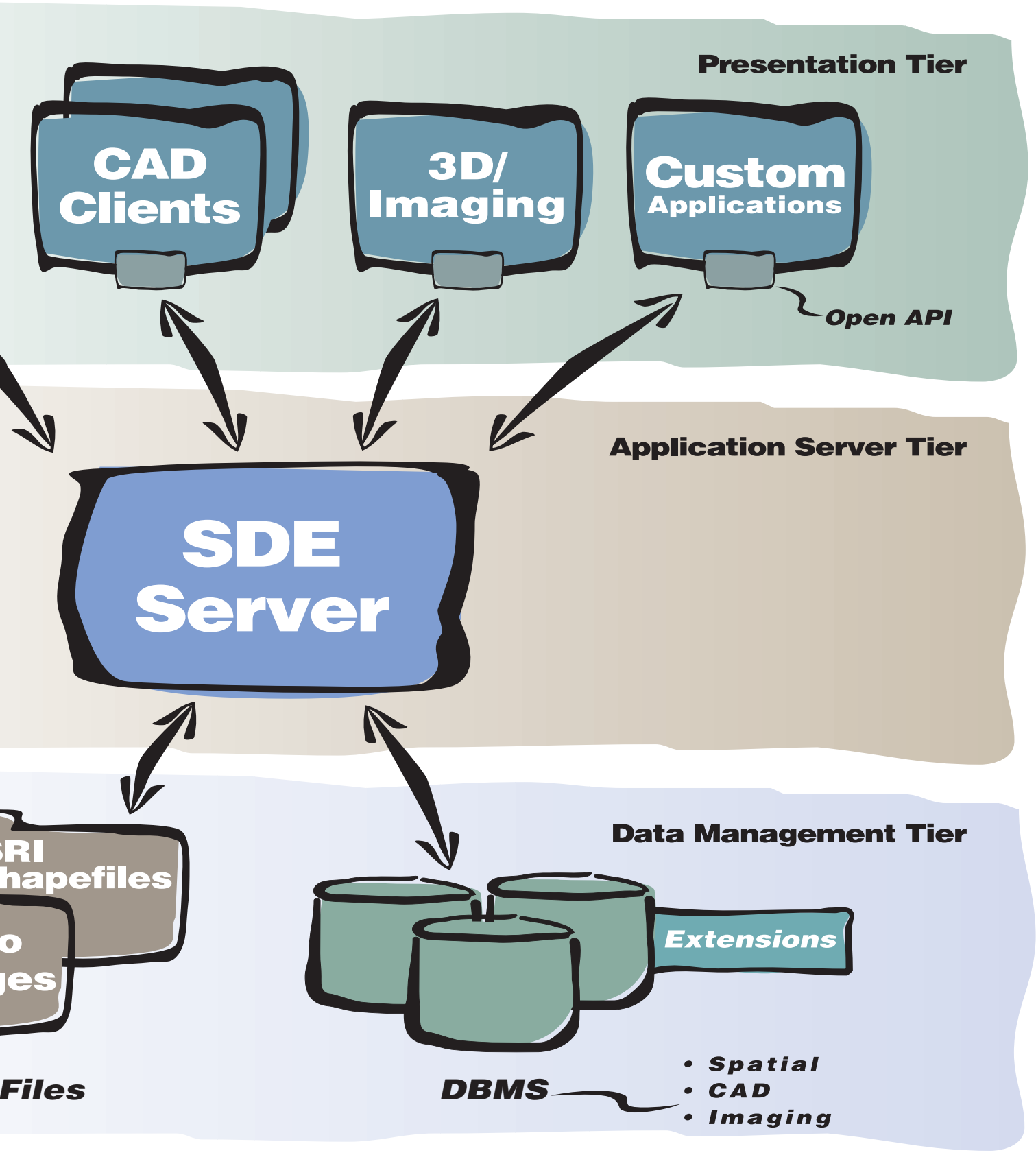
SDE uses a modern three-tier architecture to run distributed applications across an enterprise. SDE extends a two-tier implementation by adding a middle application server to support distributed computing services. In this role, SDE acts as the spatial application server providing advanced spatial query functions, spatial geometry verification, map projection functions, fast loading of GIS databases, and administration tools.

Open Systems

The ability to operate in a heterogeneous environment is a key advantage in today's computing environment. SDE operates over any local area or wide area Transmission Control Protocol/Internet Protocol (TCP/IP) network. SDE provides cooperative client/server processing. A clientside task performs spatial functions, such as buffering and dynamic overlay, and provides the application programming interface (API) to the SDE application server task, which performs efficient query of the databases.

Data

Enterprise Technology for Integrating GIS/DBMS/CAD/3D Visualization/Imaging



Open Spatial Server Solutions

Recognizing the heterogeneous nature of today's computing environment, ESRI is committed to open computing environments and open data access. SDE software's open environment (open data access, open platforms, open standards, and open application development) gives users the opportunity to choose alternatives tailored for their organization and preserve their investments in data, infrastructure, and expertise.

Open Data Access

SDE supports data managed by all leading DBMS vendors including IBM, Informix, Microsoft, Oracle, and Sybase. Through its multithreaded capability, it is able to connect concurrently to multiple databases.

Open Platforms

SDE supports all popular client and server hardware/operating system environments. The SDE server runs on Microsoft Windows NT® and leading UNIX® platforms. Just as important, SDE operates in any TCP/IP-based network.

Open Standards

SDE is the only solution for central DBMS-based geographic management with an openly published API. More importantly, through ESRI's work with organizations such as the International Standards Organization (ISO), the American National Standards Institute (ANSI), and the Open GIS Consortium (OGC), ESRI has been actively participating in the definition of spatial standards, especially the OGC Simple Feature Access Specification, ISO/ANSI SQL3, and Structured Query Language (SQL) multimedia standards.

Open Application Development

SDE provides organizations with an open API and development environments including the C API or the new SQL API (available on select DBMS platforms). Developers can work in advanced development environments such as Tcl/Tk for UNIX-based applications; Visual C++®; or MapObjects® with Visual Basic®,

Case Study

Telecommunications

Telecom Italia Mobile S.pA. (TIM) is the largest mobile telephone operator in Europe, serving more than 10 million Italian customers. Headquartered in Rome, TIM operates 20 regional offices that are responsible for such strategic tasks as deployment, operations, and maintenance including seven service centers devoted to customer relations. Its aggressive technological development and marketing services have allowed the company to add more than three million new users during the last 18 months alone.

One of the key operational systems devoted to customer care that serves this intricate wireless transmission web is TIM's Sistema Informativo Territoriale (SIT), a powerful GIS built on an integrated set of ESRI software including SDE, ArcInfo, and MapObjects.

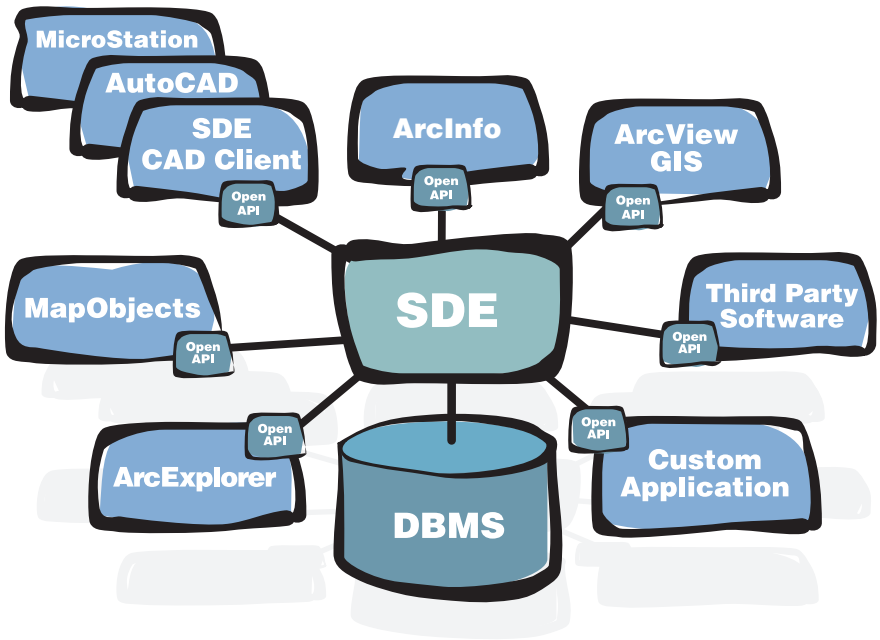
> *"We're able to provide high-speed access to what could be thousands of users at once, all looking at different areas of the spatial database."*
>
> *Nick Gee*
> *Telstra*

Delphi™, PowerBuilder®, or other popular environments for developing Microsoft Windows®-based applications. Custom applications can also be created with ArcInfo using the Open Development Environment (ODE), or ArcView GIS using Avenue™ software.

DBMS Technology

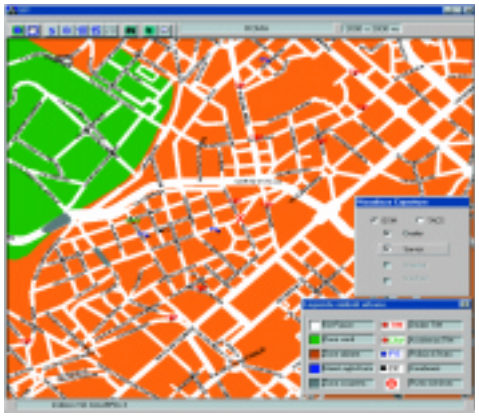
SDE has been engineered to take advantage of the most advanced offerings from each DBMS vendor. For example, SDE can read and write data in Oracle's Spatial Cartridge format. SDE has also been licensed as a Spatial Extender for IBM DB2® DataJoiner® and is available as a Spatial DataBlade® Module for Informix.

SDE—Any Client, Any Spatial Data, Over Any Network



SDE is used to store and manage the spatial features contained in databases.

TIM's network engineering department has developed algorithms for its GIS to incorporate both natural and man-made topographical features that could adversely affect mobile telephone transmission. This allows the optimization of equipment installation and provides substantial cost savings in a very competitive marketplace.

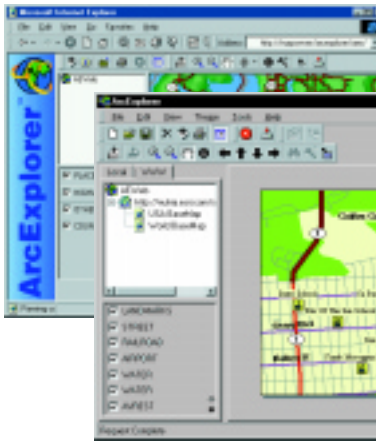


This coverage of Rome shows the blocks, roads, parks, and other urban features in the City. The areas not covered by radio transmission signals are shown in gray.

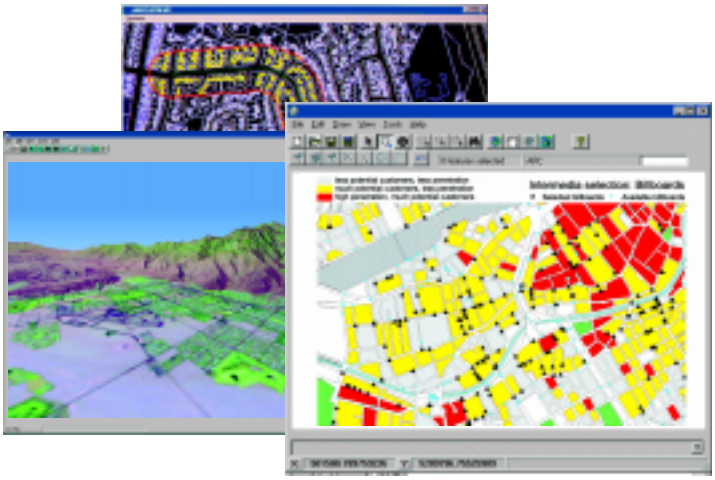
SDE Clients

A Broad Range of Application Solutions

Free Data Viewer

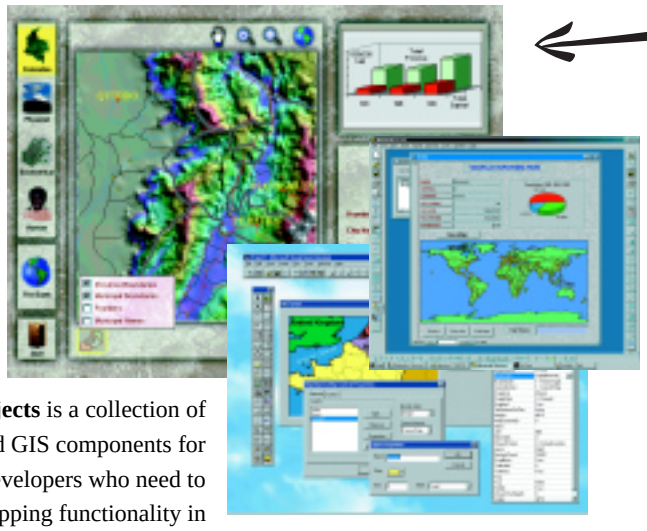


Professional GIS



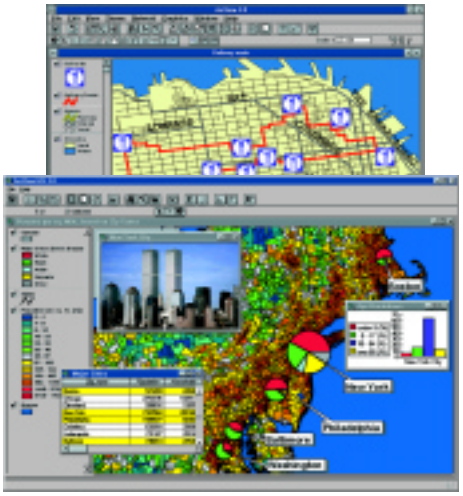
ArcInfo embodies the full power of a professional GIS to automate, manage, analyze, and display spatial information. ArcInfo is the de facto standard among GIS professionals.

Embedded GIS/Mapping



MapObjects is a collection of mapping and GIS components for Windows developers who need to embed mapping functionality in their applications.

Desktop GIS

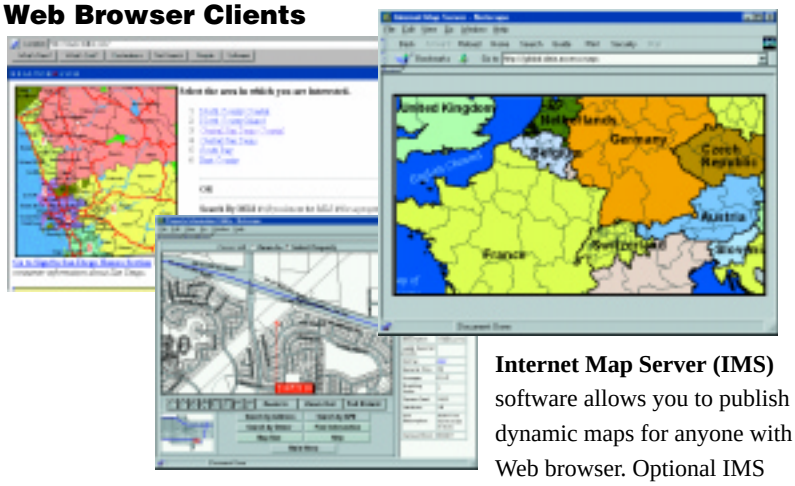


ArcView GIS places mapping and spatial analysis at your fingertips. The world's most popular desktop mapping and GIS software, ArcView GIS is easy to learn, use, and customize.

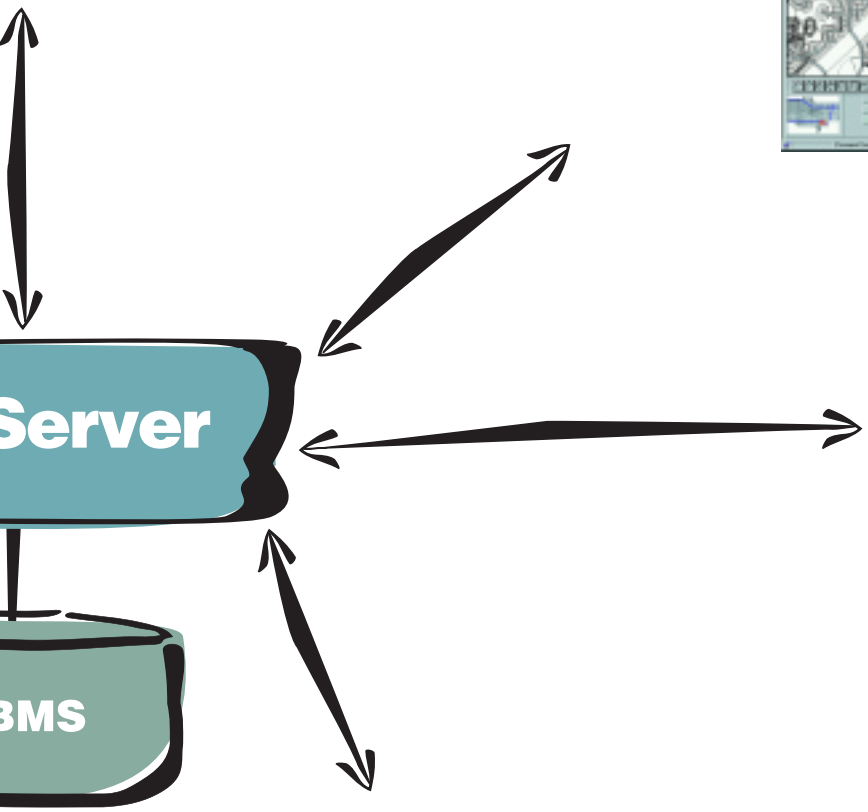
From the desktop to the enterprise, from the Internet to custom applications, SDE software's full range of client applications ensures maximum flexibility and scalability in implementing the best solution for your needs.

ArcExplorer is a free SDE client application. Built using MapObjects, it's the ideal choice as a no-cost spatial data viewing client. ArcExplorer is a stand-alone application that works across networks and is Web-enabled.

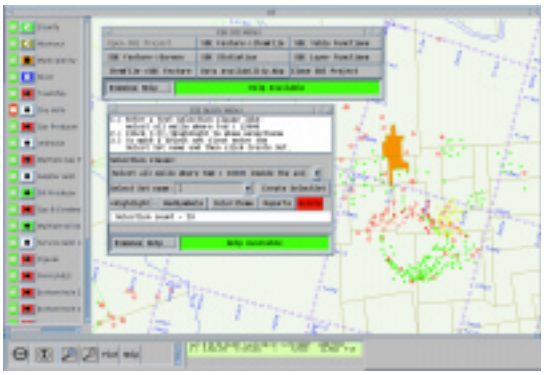
Web Browser Clients



Internet Map Server (IMS) software allows you to publish dynamic maps for anyone with a Web browser. Optional IMS extensions are available for ArcView GIS and MapObjects.



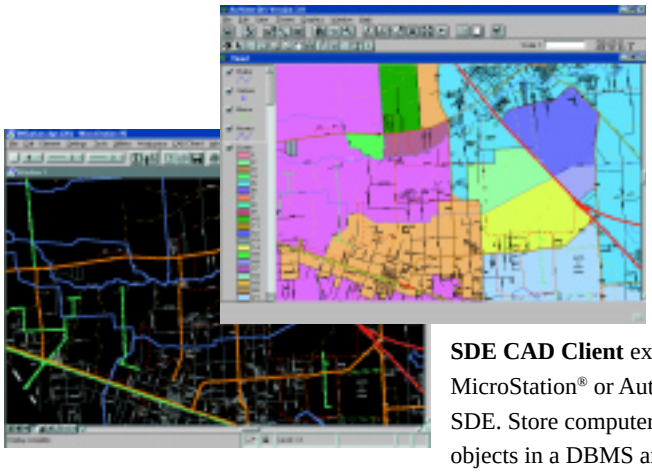
Custom Applications



Courtesy of Chevron Petroleum Technology Company

The **open C API** lets developers and users build custom applications tailored for specific markets.

CAD



SDE CAD Client extends MicroStation® or AutoCAD® to work with SDE. Store computer-aided drafting (CAD) objects in a DBMS and make them available to the entire enterprise.

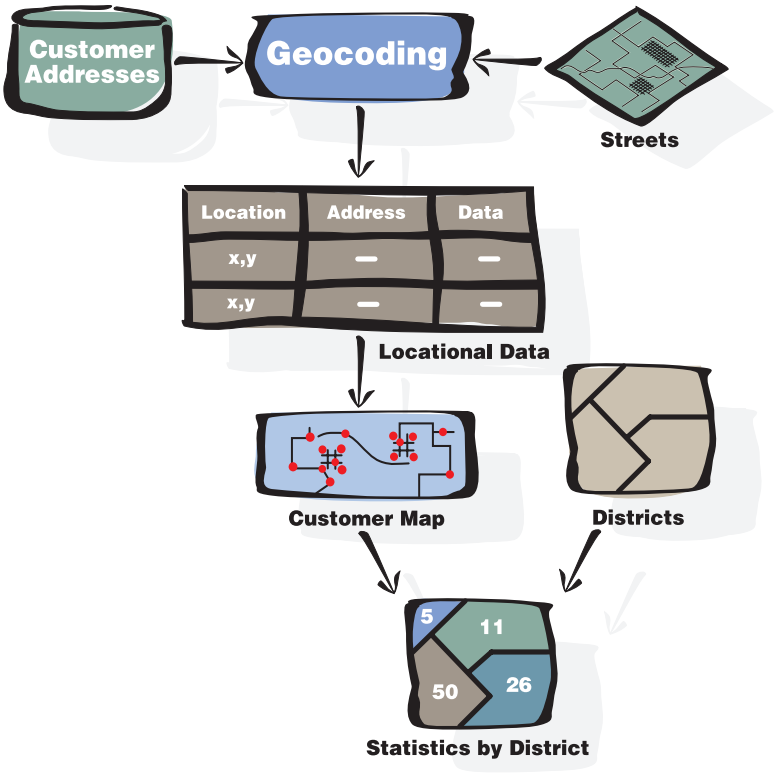
"SDE allows us to embed our vast geographic database within our database management system as opposed to being stored in a separate GIS database. This unified database permits much faster query and display."

Richard Janssen
RealSelect, Inc.

Spatially Enable the Enterprise

Treat geographic and alphanumeric data equally.

Three emerging trends are increasing the demand for open access to spatial data. First is the growing recognition that an organization's geographic data can be used for widespread purposes. Second, commercial organizations are beginning to use spatial location to integrate their core business data and are adding spatial analysis to their business processes (i.e., spatially enabling the enterprise). Third, many government agencies are under pressure to provide increased public access to geographic data. SDE is the ideal technology solution for all three of these trends.



Proceed with GIS

Simple geocoding assigns geographic coordinates to street addresses. This allows map query, visualization, and spatial analysis to be performed on standard DBMS data. These combined can also be analyzed and aggregated relative to other map data (i.e., districts/territories) to derive and calculate new information. SDE allows users to query these data sets using various client software programs to analyze and view the various geographic layers.

Case Study

Government

Too often, government agencies, like planning and engineering departments, each collect and automate land data with different scales, accuracies, and basemap references. Not having a centralized data set of land data makes it difficult for government users to quickly locate relevant land use information, and nearly impossible for the general public to do so.

MacDonald Dettwiler, Canada's leading systems engineering company, is using SDE to connect an anticipated 12,000 employees and citizens of British Columbia, Canada, to data and maps.

Called LandData BC, the system allows both expert and nontechnical users to search for specific types of land-related information held by the government, such as wildlife habitat information or zoning and planning data, and download this data via a computer network.

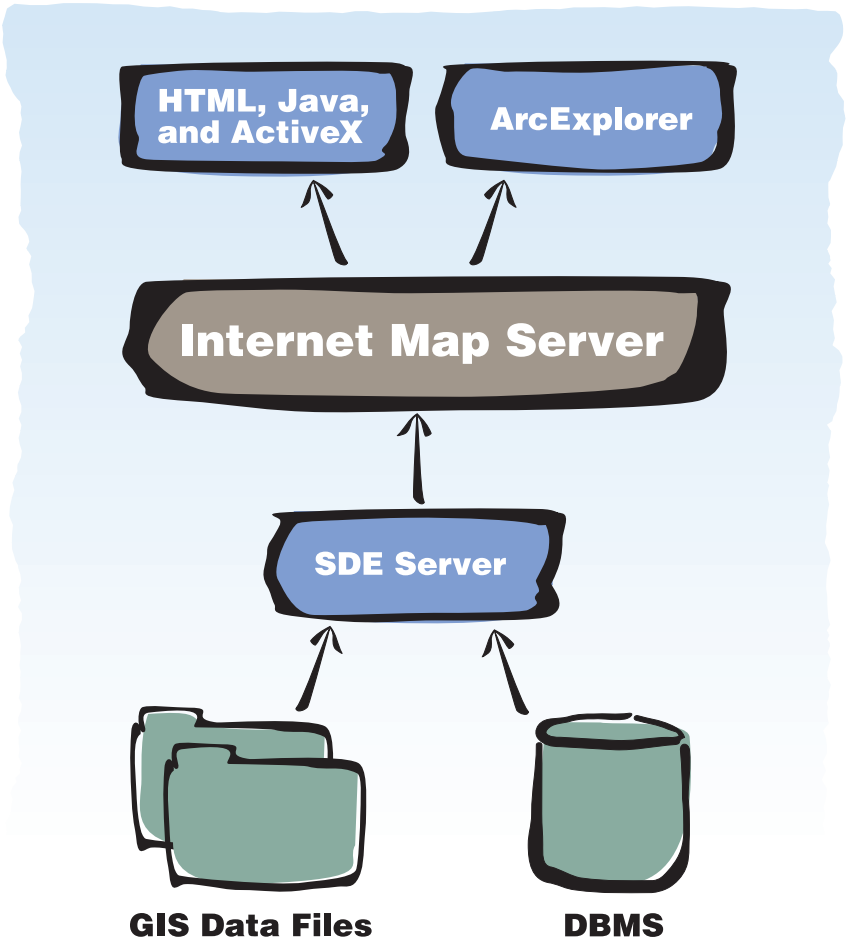
"SDE's ability to rapidly access locations is a fundamental part of our application... SDE is an important technology, giving us a competitive advantage."

Ken Arneson
XYPOINT

Leverage Your GIS

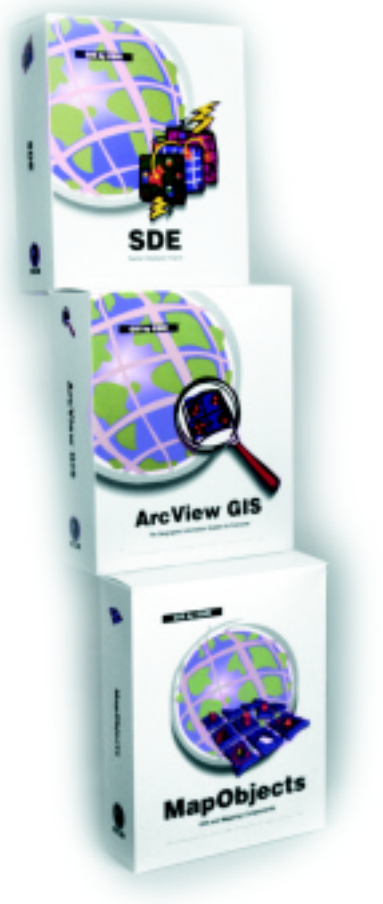
Managers and users of geographic data have long recognized that people throughout an organization must share spatial information to solve problems jointly. The goal is to enter data once and allow access by many—SDE coupled with the client/server computing environment and DBMS technologies makes this a reality.

Furthermore, SDE works with ESRI's IMS technology to provide a scalable, multitier, database-oriented solution for Internet mapping sites. This architecture has proven its ability to handle the large hit rates of busy Web sites. ESRI's IMS software supports HTML, Java™, and ActiveX® Web browser clients. In addition, the free ArcExplorer data viewer works with IMS.



LandData BC leverages the government's existing investment in data, hardware, software, and people to provide faster, more efficient services and products. And each department can make its information available to third party users in return for a fee, so there is a revenue potential.

SDE Includes



SDE fulfills the vision of any data, stored on any platform, served to any clients. It is the true Universal Spatial Server. SDE allows the storage of vector GIS data, CAD data, and raster data in the DBMS in association with other tabular information. This results in simple database design, administration, and data distribution. Conformance with industry standards means easier customization and application development.

SDE Configurations

SDE is available in three configurations, Enterprise SDE, Workgroup SDE, and ArcSDE™. Enterprise SDE provides open access and central management of shared spatial data. Workgroup SDE is for smaller organizations that need the functionality of Enterprise SDE and yet do not need to support a large number of clients. ArcSDE is a special version of SDE that operates as an extension to ArcInfo and adds the ability to serve ArcInfo data and ESRI shapefiles. Enterprise SDE and Workgroup SDE include the SDE server, administrative tools, SDE CAD Client, ArcView GIS for Windows, and a MapObjects developer's license.

Case Study

Utilities

With the advent of deregulation and increased competition, utility companies need industry-specific applications that improve productivity. The data management needs of electric, gas, water, and wastewater utilities and other organizations working with network and land base data are complex. A data model for utilities must deal with features that are not simply points and lines, but valves and pipes or wires and devices.

ESRI, with business partner Miner and Miner, designed Arc Facilities Manager (ArcFM™) software to meet the needs of the utility industry. ArcFM includes powerful capabilities such as core editing, modeling, and data management of an enterprise system. ArcFM is an easy-to-use, out-of-the-box solution developed on ArcInfo, SDE, and MapObjects.

In ArcFM, SDE manages access to data. SDE provides superior data access and data retrieval speed in an enterprise environment

Developer Opportunities

Analysts predict that the database market will become more than a $10 billion industry by the year 2001. This, combined with the universal spatial server concept of SDE and the high growth in the use of GIS, means an abundance of opportunities for application developers.

ESRI provides developers a variety of options for creating new applications or adding SDE support into existing applications.

- **API—**Open C, extended SQL on selected DBMS platforms.
- **OLE/COM—**MapObjects.
- **Customizable Clients—**ArcInfo and ArcView GIS can be customized.

The ESRI Business Partner Program offers a variety of software and services to help you implement GIS. Within the United States, please send information about your company, including mailing address, to buspartners@esri.com. Outside the United States, please contact your local ESRI distributor.

"SDE is a natural evolution for GIS and works well with our existing DBMS technology. That's why we chose SDE."

Tom Royston
Petroconsultants

Details

For more information, download the SDE white paper at www.esri.com/sde or call 1-800-447-9778 for a copy of the white paper.

Demonstration

For a demonstration of SDE, call your U.S. regional office or international distributor.

due to its cooperative client/server architecture.

ArcFM is an example of an industry-specific solution built on top of generic GIS tools. Whether beginning a new utility system or migrating from existing data and applications, ArcFM is a ready-to-use solution that can be used as is or tailored to meet specific business and operational needs.

For more than 30 years ESRI has been helping people manage and analyze geographic information. ESRI offers a framework for implementing GIS in any organization with a seamless link from personal GIS on the desktop to enterprisewide GIS client/server and data management systems. ESRI GIS solutions are flexible and can be customized to meet the needs of our users. ESRI is a full-service GIS company, ready to help you begin, grow, and build success with GIS.

Corporate

ESRI
380 New York Street
Redlands, California
92373-8100, USA
Telephone: 909-793-2853
Fax: 909-793-5953

For more information
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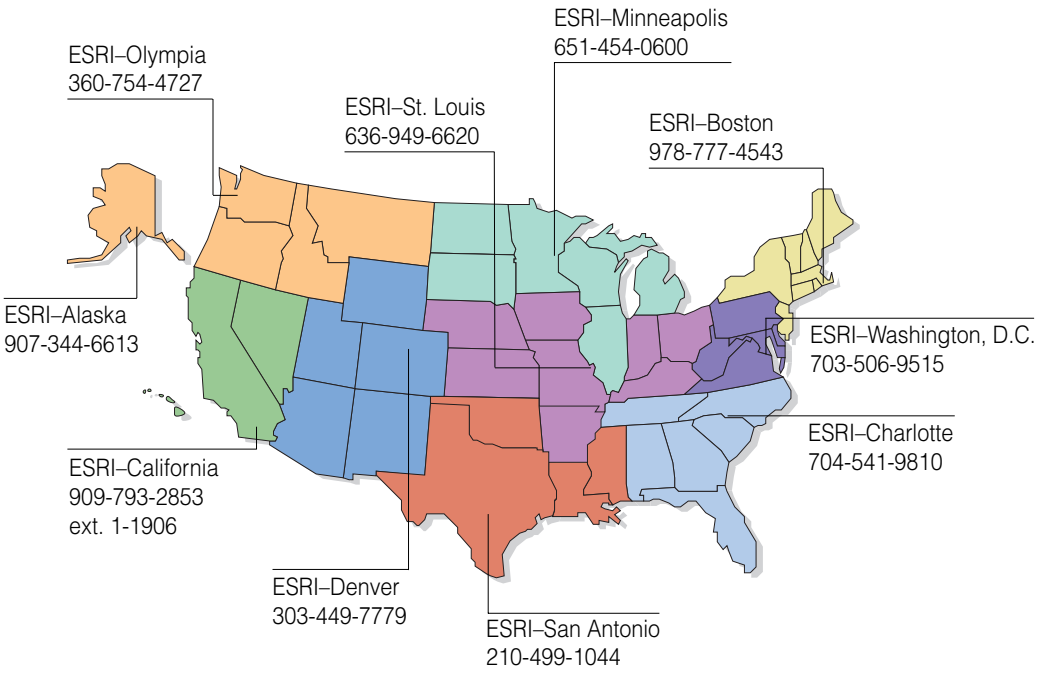

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