IBM

DB2 Information Management Software

BCS speeds access to gridded data 100-fold with IBM Informix Dynamic Server.

Overview

■ *Application*
BCS Grid DataBlade, an extension to IBM Informix® Dynamic Server that supports efficient storage and manipulation of gridded multi-dimensional data

■ *Business Benefits*
First-to-market solution responds to customers' needs for realtime, customized analysis of gridded data; analysis of data subsets 50 to 100 times faster than with previous technology; reduced bandwidth and disk capacity allows for improved network performance

■ *Software*
IBM Informix Dynamic Server, Version 9.3

■ *Hardware*
IBM @server pSeries™

With a BCS Grid Datablade solution, U.S. Navy pilots can train on real-life scenarios — including forecasted weather patterns, visibility, wind speed and direction — using PC-based flight simulation software.

How can a fighter pilot experience his next mission in realtime, two days in advance, including the thunderstorm he is likely to encounter at a specific moment along his route? How can a researcher perform multiple oblique sections of a real human organ without leaving her desk? How can a forestry company project a harvesting schedule for trees that have not even begun to grow? Victoria, British Columbia based software developer Barrodale Computing Services Ltd. (BCS) deals with such questions daily. With only ten employees, BCS is a small company — but the software solutions it delivers address big technical challenges such as these.

"We considered both Oracle and Microsoft SQL Server as the information management platform for our product. But IDS was the only database that was both cost-effective and explicitly designed to handle the complex data types and analyses on which our clients rely."

— Ian Barrodale, President and Owner, Barrodale Computing Services Ltd.

Using the powerful IDS database, BCS Grid Datablade easily stores meteorological information for the earth's full surface at all flyable altitudes.

Since 1995, BCS has powered its solutions with the robust database technologies that form the core of IBM Informix Dynamic Server (IDS). That was the year the company focused its development skills and experience on object-relational database management systems (ORDBMS) to create effective solutions for a wealth of applications. These solutions—which include mathematical modeling and statistical analysis, signal and image processing, simulation and other advanced scientific techniques—involve data that is "gridded" in two-, three- and four-dimensional grids.

Recently, BCS developed an IDS DataBlade module—a collection of data objects and code that extend the functionality of the IDS, Version 9.3 database—to support the storage and manipulation of gridded data. Among the key uses of such data are geospatial applications, which process information about the locations and shapes of objects found on the earth's surface.

"Since it acquired the Informix database business, IBM has proven its dedication to its Informix customers by delivering a series of IDS releases that are technically and functionally superior to any that preceded them."

–Ian Barrodale

According to BCS President and Owner Ian Barrodale, he and his colleagues selected IDS for this initiative over several other leading databases. "We considered both Oracle and Microsoft SQL Server as the information management platform for our gridded data product," he notes. "But IDS was the only database that was both cost-effective and explicitly designed to handle the complex data types and analyses on which our clients rely. In addition, IBM Informix DataBlade engineers provided BCS with excellent technical support."

Known as the BCS Grid DataBlade, the module promises to bring powerful benefits to a host of industries that rely on multidimensional data, and has sparked the interest of a broad base of organizations in the scientific and government sectors. By reducing network bandwith usage and disk capacity consumption, the BCS solution allows organizations to perform customized analyses in a much shorter time frame.
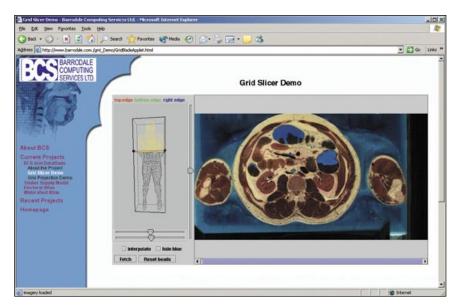
Unprecedented processing speed

The Grid DataBlade initiative began a few years ago, when the U.S. Navy needed a technology partner to create a groundbreaking meteorological application. The challenge was to

access very specific "slices" of timely meteorological data for particular locations, rather than sift through data for an entire area. BCS—an IBM Business Partner with IDS expertise—was at the top of the Navy's list.

The BCS Grid DataBlade solution allows the Navy to have a global weather database that users can program to extract such specific data as weather for particular flight plans over a five-day period. "Using IBM Informix database technology and the concept of data 'slices' to extend database functionality, our clients can analyze precise subsets of data directly on their server—and obtain results 50 to 100 times faster than with previous technology," says Barrodale.

Training pilots with realtime data
Traditionally, using gridded data has entailed downloading the entire gridded dataset, then searching through it for the pertinent data. For the Navy's needs, the time required for such downloading and searching was prohibitive. "Weather forecasts for the Navy are typically five days into the future, the altitudes go up to flyable heights, and the longitudes and latitudes cover the entire Earth. That's a lot of data," explains Barrodale.

The BCS information management system allows scientists to extract small subsets of human cross-sections, thereby increasing efficiency of their medical research efforts.

The Navy's Fleet Numerical Meteorology and Oceanography Center (FNMOC) is integrating the BCS Grid DataBlade with flight simulation software to create real weather patterns in training environments. The DataBlade extracts time-significant, location-specific weather data from a four-dimensional gridded dataset housed in IDS, Version 9.3 and passes it to trainees running the flight simulation on a PC. The result is a vertical depiction of weather along a precise flight path.

Says Tony Williams, a civilian contractor at FNMOC, "With the help of IBM Informix database technology, this test application can potentially grow into a groundbreaking product. Navy pilots can train for Thursday's mission days in advance—including a simulated flight through every detail of Thursday's weather."

IDS in the service of science
The National Oceanographic and Atmospheric Administration (NOAA) is also exploring ways to manage and distribute satellite data products using the BCS Grid DataBlade running IDS on an IBM @server pSeries machine. These applications include modeling ocean circulation, ocean-atmosphere interaction and atmospheric processes as well as integrating gridded environmental information derived from satellites with land- and ocean-based measurements.

The U.S. National Library of Medicine granted BCS access to their Visible Human Project consisting of 1,871 parallel high-resolution colored images of a male cadaver, which BCS then subsampled to form a 1.6-gigabyte 3D gridded dataset.

Researchers can use the Grid DataBlade on the BCS Web site to extract 2D slices of human cross-sections—at arbitrary inclinations—without having to download the entire dataset, thus producing results in seconds instead of minutes.

Currently designed to run under major UNIX operating systems—including IBM AIX®—as well as the open-source Linux® operating environment, the BCS Grid DataBlade allows users to easily manipulate an IDS data subset—for instance, selecting a portion of a map image and depicting it in several different projections. "The Grid DataBlade absolutely shines when the subset of the data is a small portion of the total amount stored in the IDS dataset," explains Barrodale. "Something that previously took a minute to calculate now takes a second. Something that once took an hour now takes a minute. In some cases the speed increases are even more dramatic."

The real-world applications seem almost limitless, Barrodale adds. "A major diamond company has expressed interest in using IDS and the BCS Grid DataBlade to conduct seismic surveys in the ocean," he observes. "DataBlade technology could help underwater marine laboratories explore the movement of tectonic plates and other oceano-graphic phenomena—or power an international project to catalog the millions of stars and their features."

Extending IBM's leadership to the Informix community
Barrodale says BCS and its custom-ers are pleased with IBM's demon-strated commitment to the Informix user community. "Since it acquired the Informix database business, IBM has proven its dedication to its Informix customers by delivering a series of IDS releases that are technically and functionally superior to any that pre-ceded them," he notes.

Barrodale is also excited about the possibility of adapting the DataBlade to other IBM information management products, which would broaden BCS's potential customer base even further. "We are confident that many institu-tions worldwide that currently use IBM DB2® Universal Database™ will be eager to utilize our grid functionality in the form of a DB2 Extender™," he says. "We look forward to leveraging all the opportunities that IBM's global marketing power and information management leadership have opened to us."

For more information
Please contact your IBM marketing representative, IBM Business Partner or IBM Direct at: 1 800 IBM-CALL.

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For more information about Barrodale Computing Services Ltd., visit: *www.barrodale.com*.