Spatial data and the mainframe advantage

Highlights

- ***An alliance that helps business and government employ geographic content to make more informed decisions and solve complex problems***
- ***Deploys ESRI ArcGIS Server 9.3 with IBM DB2 9 for z/OS for the efficient storage and management of spatial data***
- ***Leverages long-proven benefits of the mainframe platform including near absolute dependability and availability, the highest levels of security, and the ability to lower the total cost of ownership***
- ***Provides spatial data types with DB2 for z/OS to facilitate the modeling of locations, boundaries and infrastructures***

Geographic information systems (GIS) are mission-critical IT solutions for many businesses and governments. An Environmental Systems Research Institute (ESRI®) GIS solution with IBM mainframe technology delivers functionality and benefits that are unmatched. GIS clients can now expect the same enterprise-class advantages that banking, insurance, and other vital enterprises have come to depend on for years – reliability, availability, security and scalability.

Infrastructure solutions including IBM System z™ and IBM DB2® information management software effectively and efficiently manage high volumes of information. Spatial Support is an important additional feature now available for DB2 9 for z/OS® on System z. This version of DB2 has been enabled for efficient storage and management of spatial information, and z/OS on System z is the ideal platform for DB2. Spatial Support permits geographic content to be stored and retrieved from any application accessing the DB2 relational database.

Enterprise GIS customers using the ESRI ArcGIS® Server 9.3 can leverage the capabilities of the IBM System z platform. Support for spatial

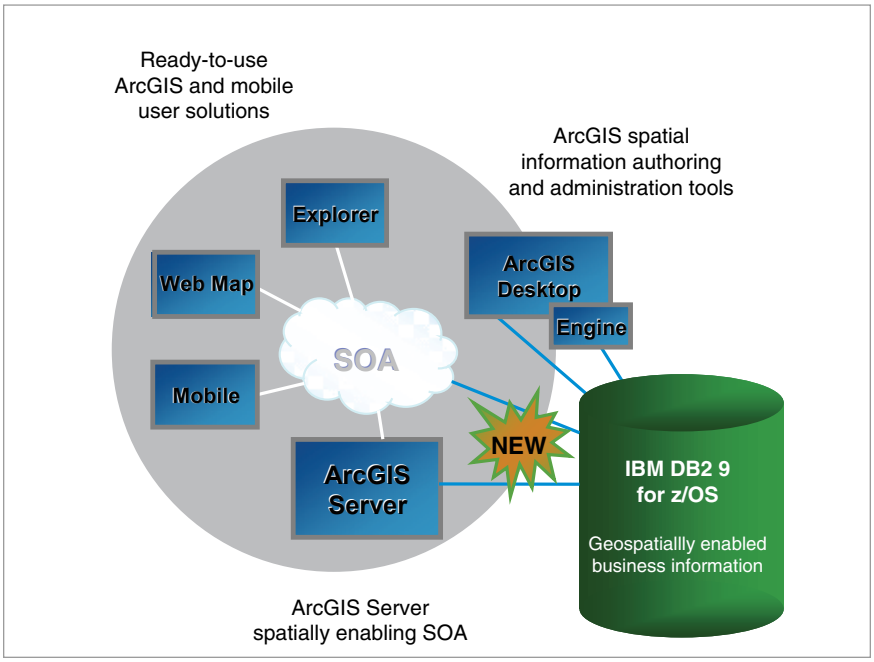
information helps businesses and governments deliver geographic content – on demand – to make more informed decisions and solve complex problems based upon location information.

IBM and ESRI

IBM and ESRI established a global alliance to deliver industry-leading GIS solutions. ESRI supplies GIS software, location-based Web services, and geographic and business data. IBM provides world-class infrastructure technology, project management and systems integration capabilities necessary to deliver complex end-to-end solutions. At this high end of the enterprise space, the ESRI and IBM offering is a premium spatial information management solution.

System z and DB2: the power of many, the efficiency of one

Enterprises that depend on GIS solutions can benefit from consolidating ESRI offerings and their spatial data on System z. Built on a 40-year heritage of large-scale data and transaction processing, the IBM System z Server enables the deployment of multiple workloads to support today's *on demand* requirements. With leadership in virtualization, security and resiliency, System z supports server consolidation, helps minimize risk and redundancy, and is well-suited to be the hub of an enterprise infrastructure – providing solid dependability in today's always-connected, 24/7 world.



ESRI ArcGIS Server: A complete system for authoring, serving and using spatial information on DB2 9 for z/OS

As a powerful platform for ESRI ArcGIS Server spatial information management, System z offers these advantages:

Availability: It has been said that the "z" in System z stands for zero downtime. By storing crucial spatial data with DB2 for z/OS, clients benefit from 24/7 reliability and uptime. As spatial data becomes more important, the need for continuous availability grows as well.

Security: System z has security built into every level – from the processor to the operating system and the application. GIS Clients who store spatial data on DB2 for z/OS greatly reduce their chance of security failures.

Peak performance: Scalability is the term applied to adapting, growing and maintaining performance levels as work and volumes change. By storing spatial data on DB2 for z/OS, clients benefit from near linear scalability.

Cost reduction: An IBM and ESRI GIS solution makes efficient use of hardware, software and human resources.

Energy efficiency: As energy prices rise and utilities become more restrictive, it is important to control power use and cooling demands. The System z platform is ideal for consolidating large server farms and managing the workloads of tens or hundreds of distributed computers

at a fraction of the power required by numerous servers. In this way, System z contributes to what has been termed "green computing."

Virtualization: With advanced virtualization and workload management, the System z helps reduce facility, labor and software costs.

Recovery: Infrastructure simplification also has repercussions for disaster recovery. It's much simpler to test application functionality on one mainframe than on hundreds of distributed servers. Maintaining GIS data integrity and speeding information use in a disaster are imperatives for public safety agencies.

Data consolidation: With spatial data residing alongside core business data, clients can run their ESRI GIS applications against their spatial and business data on DB2. With the help of spatial index support, spatial queries can be run on DB2 for z/OS with optimal performance, eliminating the need to extract business data.

Data storage: Innovative storage technology, open standards, excellent performance, a broad portfolio of storage-proven software, hardware and solutions – all backed by IBM's record of leadership – are a few reasons why clients consider IBM System Storage™ offerings to manage geodata.

Extending traditional DB2 strengths

As part of Spatial Support on DB2 for z/OS, DB2 provides a set of spatial data types that clients can use to model real-world entities such as customer locations, property boundaries, utility networks, and much more. Spatial data is manipulated by using spatial functions invoked from within an SQL statement. Also, clients can create indexes on spatial data that DB2 employs to optimize spatial query performance.

ESRI ArcGIS Server spatial database

Data serving features of the ArcGIS Server include:

Spatial database: The common data storage and management framework for the ArcGIS Server supports all types of data, such as attribute tables, geographic features, satellite and aerial imagery, surface modeling and survey measurements.

The server provides conversion tools to migrate existing geospatial data into the spatial database, and the spatial database itself not only defines how data is stored, accessed and managed; but it also implements complex business logic such as modeling spatial relationships between data (e.g., topologies, networks, and terrains); data validation (e.g., subtypes and domains); and long transactions (e.g., versioning).

The green Z machine

According to analysts Ptak, Noel & Associates, the IBM System z platform can be configured to require 1/12th the electricity of a distributed server farm with equivalent processor capability. (IBM System z: Platform Star for Linux® and Open Source Software, Ptak, Noel & Associates.)

A Robert Frances Group study analyzed consolidation of hundreds of UNIX® servers to one System z mainframe. The calculations showed monthly power costs of $30,165 for the UNIX servers versus $905 for System z. The company calculated they would save over $350,000 in power costs annually. (Mainframe computing in the data center, Robert Group.)

The ArcGIS Server spatial database is the foundation that enables an enterprise to assemble intelligent geographic information systems that can be adapted for many different applications to:

- *Apply sophisticated rules and relationships to data*
- *Define advanced geometric relational models (e.g., topologies, networks)*
- *Maintain integrity of spatial data*
- *Work within a multiuser access and editing environment*
- *Integrate spatial data with other IT databases*

Spatial data management: ArcGIS Server includes both workgroup and enterprise geodata management based on the ArcGIS spatial database model. Geodata services allow administrators to publish geographic data for extraction and replication.

Spatial analysis: ArcGIS Server offers server-based analysis and geoprocessing. This includes vector, raster, 3D and network analytics; models, scripts and tools; desktop authoring; and synchronous processing. Spatial analysis is available with ArcGIS Server Advanced.

For more information:

To learn more about how IBM can help you store and manage geographic data with ESRI solutions on DB2 for z/OS, contact your IBM representative.

For more about ArcGIS Server, visit: esri.com/software/arcgis/arcgisserver/

For more about IBM System z, visit: **ibm.com**/systems/z/

For information about Spatial Support for DB2 for z/OS, visit: **ibm.com**/software/data/db2/zos/spatial.html

To learn more about IBM storage solutions, visit: **ibm.com**/systems/storage/index.html

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