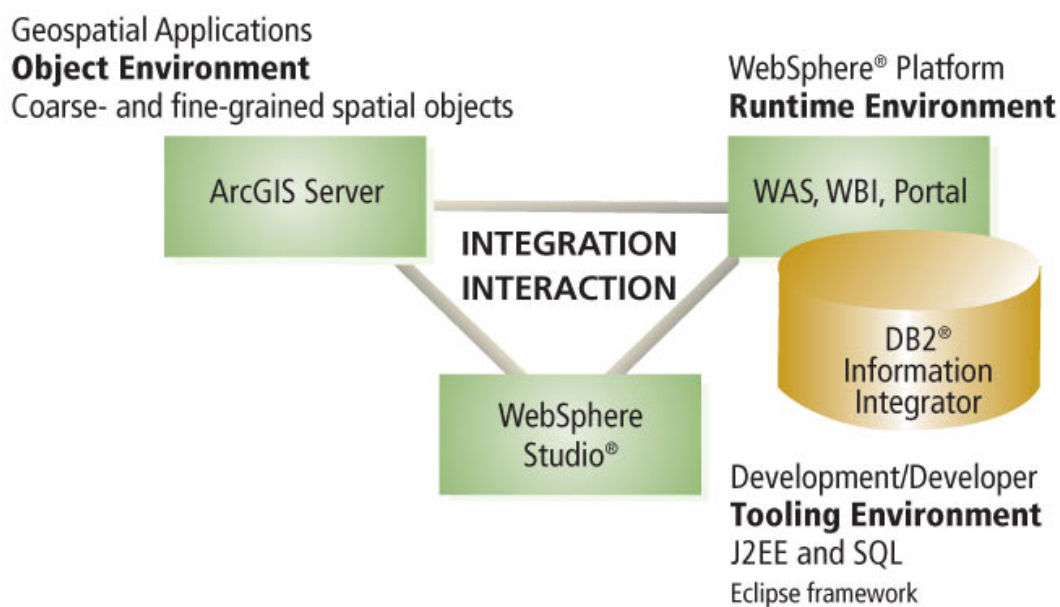


IBM Spatially Enables Enterprise With ESRI ArcGIS Server

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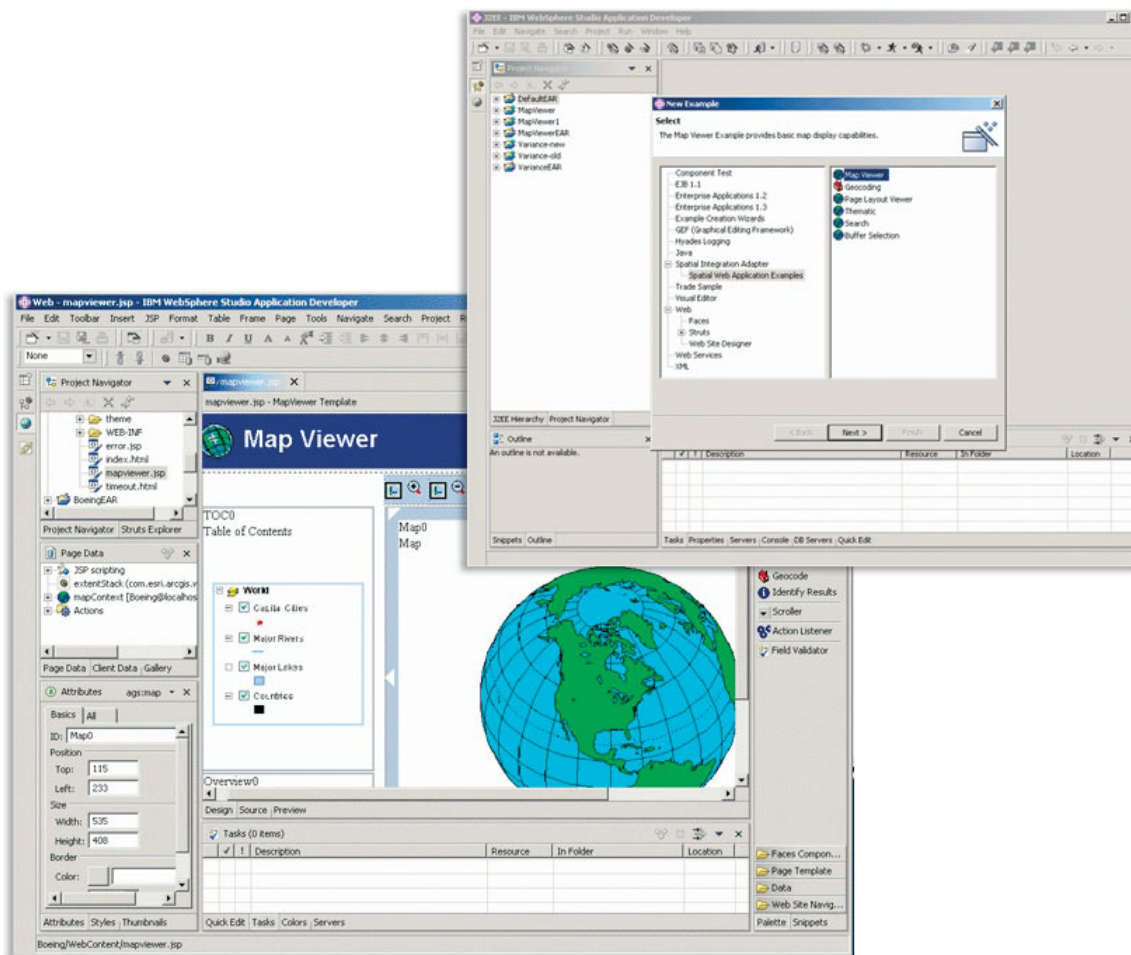
Bringing geospatial tools and information to business processes throughout an enterprise has a number of challenges that are now being solved by a unique IBM and ESRI technology partnership. This partnership has led to the creation of the IBM Spatial Integration Adapter for WebSphere Studio. The Spatial Integration Adapter is a new multiplatform development tool that allows GIS to be integrated into work flow, process management, and security components of enterprise business solutions, such as customer relations management and supply chain management.



Connect the environments to create application development and runtime environments for the enterprise (WAS—WebSphere Application Server, WBI—WebSphere Business Integrator, Portal—WebSphere Portal Server).

The Spatial Integration Adapter is a WebSphere Studio plug-in that enables developers to create geographic applications or applications that incorporate mapping, geographic analysis, and standardized Web services from within an intuitive tool set. The tool set supports integration of spatial objects (drag and drop), as well as the creation of new projects, samples, and so on. This tool set utilizes ArcGIS Server components, delivering to the WebSphere developer all the capabilities offered by ArcGIS geospatial objects in a Java standards environment.

The adapter provides an easy-to-use visual programming environment for the spatial objects and functions that comprise the IBM DB2 Spatial Extender. It allows development of extensive Web-based spatial applications and industry-standard Web services on top of the spatial types and features in DB2.



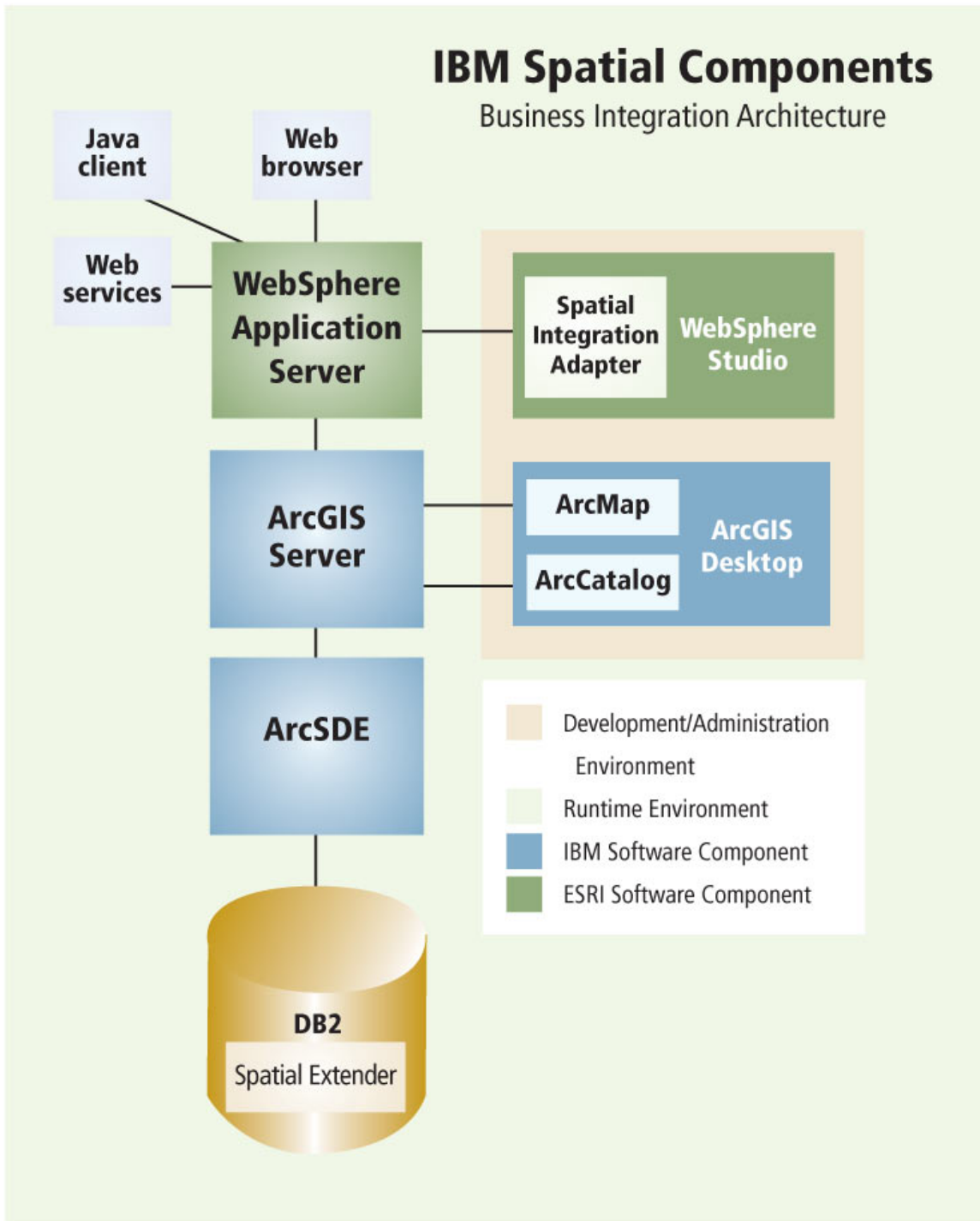
For simple implementation, no GIS or ArcGIS skills are required. Simply drag and drop GIS components into any Java/J2EE application. Inset: ArcGIS Server objects in drag/drop development environment: J2EE.

Once installed, the adapter allows programmers who create the presentation portion and business logic of a WebSphere-based application to apply visual programming techniques, such as drag and drop of spatial objects, to the creation of Web-based content.

The adapter allows rapid assembly of spatially enabled Web applications, using a collection of visual components. Communication with ArcGIS Server is handled in a way that is transparent to the developer. WebSphere Studio Application Developer (WSAD) is currently the only tool that includes these visual components. The resulting applications run on multiple environments including Linux, UNIX, Windows, and even mainframe systems.

From a runtime perspective, the position is similar. WebSphere Studio Application Server is a cross platform, highly scalable, transactional server that targets hosting business applications. It has excellent connectivity options into legacy environments, for example, mainframe applications or third party business applications, such as PeopleSoft or SAP. The Spatial Integration Adapter, together with the ESRI Java Application Development Framework (ADF), allows spatial applications to take advantage of these characteristics or business applications to include spatial function as if it were native to the platform. This includes the ability to access

ArcGIS functions via a standards-based Web services layer from any client. Business processes can be built and run across these services, regardless of platform or language.



The IBM and ESRI infrastructure stack.

The Spatial Integration Adapter takes advantage of a number of standards. The visual components use JavaServer Faces (JSF) technology; the Web services component supports all the relevant Web services standards, including WS-Security. The plug-in is written on top of the open-source Eclipse platform (www.eclipse.org). Eclipse works across platforms, in widely available commercial product sets, such as the IBM WebSphere foundation and tools portfolio and the IBM DB2 Information Management portfolio.

JavaServer Faces clearly separate the presentation from the data. The ArcGIS Server Application Development Framework JSF components are included in the standard WebSphere Studio Application Developer JSF palette, affording integration with a multitude of standard component libraries for rich application development. Developers can create new J2EE applications rapidly by using the visual page designer in WebSphere Studio. Since the full ArcObjects application program interface (API) is available in Java, it can either use the coarse-grained visual components or code against the fine-grained ArcObjects API. Applications are automatically packaged and deployable as J2EE applications, making them Web-based, robust, and highly scalable by running on WebSphere Application Server. Custom components can be built on top of the ones delivered with the plug-in.

The screenshot shows the IBM WebSphere Studio Application Developer environment. The main browser window displays a web page titled "Notification List" with the following content:

We will notify the following neighbors:

Name and address
WADE, ROBERT S & PATRICIA L - 3504 DEERING DR
HICKMAN, DONALD & MICHELLE PERES - 4109 HOPPER ST
DAVIS, ANTHONY M & KIMBERLY M - 4113 HOPPER ST
POLAND, JENNIFER L - 3400 DEERING DR
DOUGLAS, TONY & CRYSTAL - 3328 DEERING DR
BEAZER HOMES CORP - 5811 GLENWOOD AVE STE 200
SOULON, CHANTAL - 3401 DEERING DR

Parcel details:

Field	Value
AREA	9501.3151979
PERIMETER	413.515949812
PIN_	231006
PIN_ID	231006
PIN	1747464058
REID	0282812
NCPIN	1747464058
LONG_PIN	174701464058
MAP_NAME	174701
OWNER	DAVIS, ANTHONY M & KIMBERLY M
ADDR1	4113 HOPPER ST
ADDR2	RALEIGH NC 27616-8653
ADDR3	
DEED_BOOK	09207
DEED_PAGE	0947
DEED_DATE	Thu Dec 13 00:00:00 PST 2001
DEED_ACRES	0.22
CALC_AREA	0.218
BLDG_VAL	128009.0
LAND_VAL	25000.0
BILLING_CL	2
DESCRIPTIO	LT 116 MITCHELL MILL SUB PH2 BM2001-103
STNAME	HOPPER
STYPE	ST
STCODE	

Map of the neighborhood:

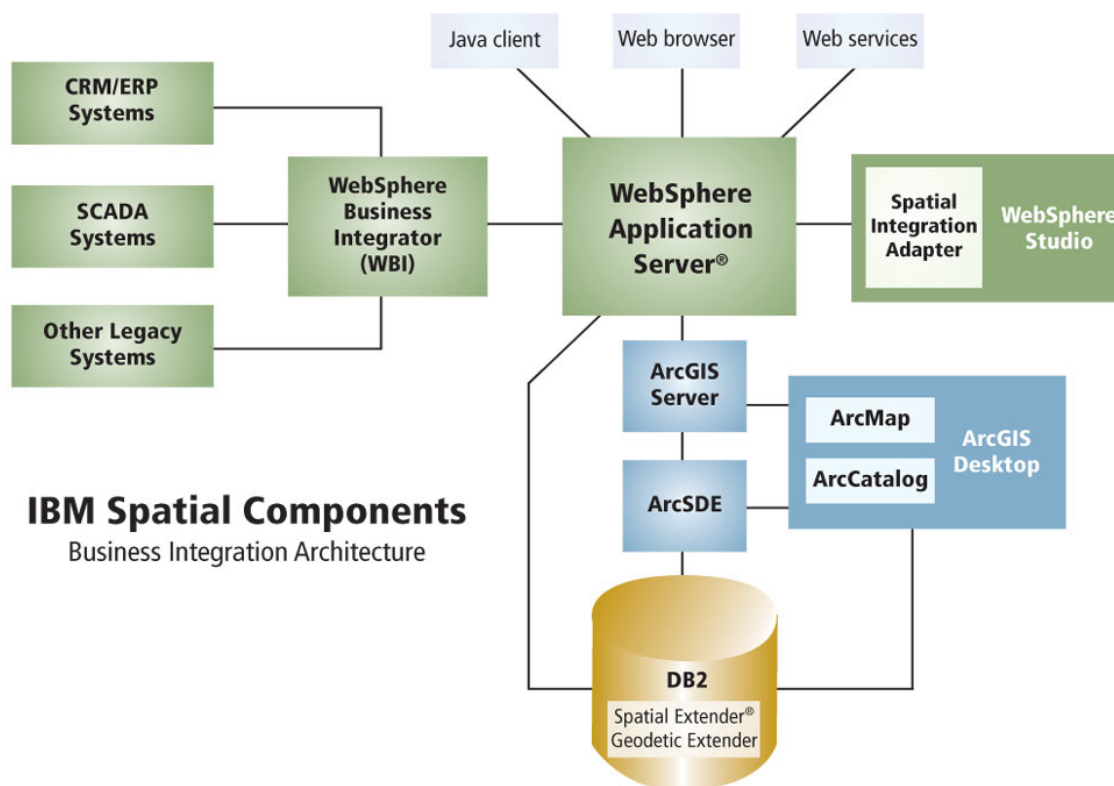
Map showing parcel boundaries and colors. Layers include: APA_OWNER, NO DATA, Individual, Corporal, Life Esta, Home O, Public H, Utilities, City, County, State, Federal, Airport A.

Console [Variance (WebSphere v5.1)]:

```
[7/28/04 11:41:56:353 PDT] 244d5c8a Digestor [org.apache.commons.digester.Digester] [ConverterRule]{faces-config/convert} Merge(javax.faces.Number, [ConverterRule]{faces-config/convert} Merge(javax.faces.Date, [ComponentRule]{faces-config/component} Merge(javax.faces.Graphic [ComponentRule]{faces-config/component} Merge(javax.faces.Input) [ComponentRule]{faces-config/component} Merge(javax.faces.Output) [ComponentRule]{faces-config/component} Merge(javax.faces.Panel) [NavigationRuleRule]{faces-config/navigation-rule} Merge(/input1...
```

Building Permit Variance: WebSphere Application Developer and ArcGIS Server to construct a JavaServer Pages-based Web page, which computes and returns the owners of the adjacent parcels.

The WebSphere Studio environment includes a WebSphere Application Server to afford real-time testing of the applications during development. The WebSphere Application Server also exposes ArcGIS functions as Web services. This supports the JAX-RPC and JSR109 Java Web services standards. There is a special wizard in WSAD to create a Web services module from an existing ArcGIS installation with Web services security. This affords interoperability with other platforms and neutral zone deployment via the Web Services Gateway. Rapid application development in a standard J2EE and JSP environment allows cross platform creation and deployment of spatial applications with access to the most extensive spatial functional library in the industry. From a development perspective, the Spatial Integration Adapter provides a bridge between J2EE developers of business applications and ESRI-skilled developers creating spatial applications.



ESRI and IBM complementary and comprehensive enterprise GIS environment.

For more information, visit www-306.ibm.com/software/data/spatial/integration_adapter.html and www-306.ibm.com/software/data/spatial. Article authored by David Beddoe, IBM Software Group.

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