

Leica ADE Suite

A Leica Geosystems Geospatial Imaging White Paper
May, 2007

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Introduction

Today, location data can be found *everywhere*. It permeates every environment and exists in virtually every database within every organization. Uses for location data are as extensive as the data itself. However, as ever-present as location data is, and as sought after are the business solutions associated with it, location data is seldom fully leveraged to give businesses the competitive advantages available. The true competitive advantages associated with location data come from the integration of location data with business data into business information.

The reason location data is seldom utilized to full advantage is simple. Until recently the only way to utilize location data was via traditional geographic information management systems (GIS). Emerging from a field called cartography and developed using technologies from the 1960s, GIS applications were originally built for the sole purpose of extracting and separating spatial data from business data in order to create paper maps. Of course how maps are rendered and visualized has evolved quite a bit since the original GIS applications of the past. Still, one thing that hasn't changed is the way legacy GIS applications underutilize location data. These legacy GIS applications often require location data to be used independently of business data, and often they require specialized, proprietary storage models. A hallmark of GIS applications is their complex and difficult map-based analysis requiring specialized staff such as cartographers, GIS analysts and developers. Moreover, because traditional GIS applications were developed for a specialized group of people, cartographers, GIS analysts and developers, it is often impossible to customize GIS' user interfaces and functionalities to meet the needs of business users and the non-GIS audience.

Recent advances in Oracle's relational database management system (i.e. Oracle Spatial and Locator¹) have enabled organizations to store, manage and analyze location data in an integrated fashion with business attributes and scalar data. This disruptive technology has created the opportunity for consolidated, business-driven data models and open, business application-friendly analysis using simple, understandable APIs (such as SQL). No longer are organizations tied to complex and expensive legacy GIS applications and mapping software, because unlike the past, simple database queries through any application are used for true integrated location analysis.

With this in mind, the Leica ADE Suite was developed to enable GIS and business users alike to be able to utilize location and business data in an integrated way without having to separate the data, business processes or system architectures. The Leica ADE Suite of products extends the capabilities of Oracle Spatial and Oracle Application Server MapViewer to facilitate web based viewing, updating and management of all data directly within the Oracle ecosystem. Unlike legacy GIS platforms, Leica ADE Suite is unique in that all products have been developed from the ground up to utilize the power of the Oracle database and application server. As with true enterprise wide service orientated architectures (SOA), Leica ADE Enterprise applications once deployed are available globally without onsite deployment and support requirements. They all utilize the same code base and ensuring that custom applications can be built once and deployed anywhere, regardless of the device or platform. Furthermore, because the Leica ADE Suite leverage fully Oracle's Fusion Middleware, applications developed using Leica ADE Suite of products will benefit from unprecedented scalability, security, extensibility and the ability to be seamlessly integrated into service-oriented architectures and business intelligence environments.

The following paper outlines the products and facets therein that the Leica ADE Suite brings to the enterprise location intelligence market.

¹ For more information about Oracle Spatial and Locator technologies please see:
<http://www.oracle.com/technology/products/spatial/index.html>

Leica ADE Suite

The Leica ADE Suite is developed to enable organizations to deploy spatial information to the people who need it, when they need it and where they need it. Whether it is a business user who requires spatial data to be integrated with a business intelligence system, a field technician whose responsibilities include real-time asset location tracking, or a developer tasked with the job of creating a new spatial management application, the Leica ADE Suite includes a feature set to meet every business (and spatial) need.

Overview of Oracle Spatial, Locator and MapViewer Technologies

Within every Oracle database release (Express Edition, Standard Edition, Standard Edition One, and Enterprise Edition) exists a set of technologies (called Oracle Locator) that enables organizations to store, manage, and query location or spatial information inside the database at no extra cost (monetary, operational or otherwise) (Figure 1). With this powerful and disruptive technology organizations can simply and easily extend business data models to include location as another attribute to be used in *any* business process workflow by *any* system. For instance, what if a business user needed to know which competitors exist within a two mile radius of the San Francisco store? With their location and attribute data stored in an Oracle database, a simple query could be performed, using almost any available business reporting tool, such as Microsoft Excel or other business intelligence packages, to gain this knowledge. Furthermore, for more advanced analytics and location data models, organizations can acquire Oracle Spatial as an additional option to the Oracle Enterprise database.

Oracle Application Server MapViewer covers the other end of the spatial data management spectrum by offering a simple, powerful and scalable application programming interface for rendering Oracle Locator/Spatial to web-ready, data-rich maps. Unlike other map rendering technologies on the market, Oracle Application Server MapViewer requires no special middleware other than an Oracle Application Server (Java Edition, Standard Edition, Standard Edition One, or Enterprise Edition) and renders data directly out of Oracle databases without the need to transform data into another format.

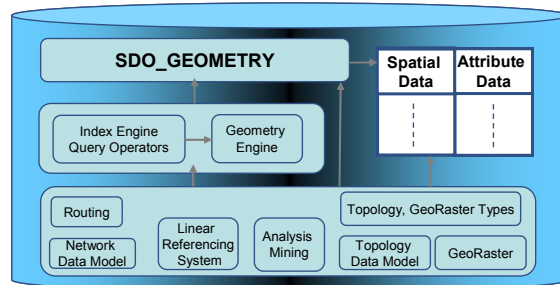


Figure 1. - Oracle Spatial database technologies

Leica ADE Enterprise: Reducing Costs while Increasing Scalability and Workforce Productivity

Many organizations today rely on entirely non-scalable, costly GIS software for simple business applications that include location analysis. Often the users of the GIS software must go through expensive training and certification courses just to complete a day's work – whether or not that work involves “real” GIS processes or not. Moreover, aside from the fact that legacy GIS software is complex and difficult to use, most GIS software packages do not scale at all. For instance, because of the complexity of the legacy GIS architecture, if an organization were to attempt to scale the number of users from 100 to 200, using legacy GIS software, more often than not that organization would have to completely reengineer their system architecture rather than simply add a new web container or web server.

To solve issues dealing with complexity, cost and scalability, Leica has produced Leica ADE Enterprise a robust, web-based platform for spatial and non-spatial data management. Leica ADE Suite leverages and extends Oracle Spatial and Oracle Application Server MapViewer's

ability to manage and render spatial data by providing a rich user interface and out-of-the-box experience coupled in a completely scalable architecture. Moreover, the flexible API provided in the product is developed using an identical code base to all the other Leica ADE Suite products, allowing these products to directly interact with data stored natively in Oracle without the need for separate, GIS-centric extraction, transformation or loading procedures

A pure, J2EE, web-based architecture that is fully integrated with Oracle Application Server enables this product suite to scale easily and efficiently without the need to reengineer the application or architecture. Leica ADE Enterprise satisfies most common tasks associated with traditional GIS, but is built for speed, flexibility and scalability and designed to enable organizations to customize how end-users interact with spatial and non-spatial data. Additionally, Leica ADE Enterprise is entirely integrated with the Oracle product stack, automatically leveraging Oracle's strong security model and architectural principles as well as advanced Oracle Spatial features such as GeoRaster and the Topology Data Model. This allows Leica ADE Enterprise to be effortlessly incorporated into service-oriented architectures while providing robust, user-friendly interfaces to an organization's most valuable spatial data.

Leica ADE Remote: Enable the Remote Worker to do more for Less (more Accurately)

Many organizations must provide access to data and applications for offline use by field workers (using laptops or tablet PCs). However, quite often the risk run by the organization is that data replicated to the local, offline environments is quickly out of sync with production data. Furthermore, in terms of location information, many legacy GIS applications require complex reconciliation processes in order to merge the offline data back into production databases. Leica ADE Remote removes these common barriers to implementation. By utilizing Oracle's locking technologies, workspace manager, and powerful programming interfaces, Leica ADE Remote enables organizations to distribute location-enabled applications and data that not only allow for versioning and long-running, offline transactions but use the same interfaces to merge the data back into the production database without having to run through complex reconciliation procedures. Furthermore, because Leica ADE Remote can leverage any database business process, business workflows can be easily integrated into offline extraction and merge operations. Leica ADE Remote mirrors all of the functionality, security and flexibility found in Leica ADE Enterprise but provides this in a desktop environment (Figure 3). Because of this, Leica ADE Remote is able to run in online mode (connected in real-time to an Oracle Database or Leica ADE Enterprise) or offline mode (completely disconnected), utilizing Leica ' unique data serialization techniques to store data in a local environment. Just like Leica ADE Enterprise, Leica ADE Remote is developed using the same code base and flexible APIs which enables custom applications and application extensions to be built once and deployed everywhere – and can completely incorporate any and all functionality found in Oracle databases (and Oracle Spatial).

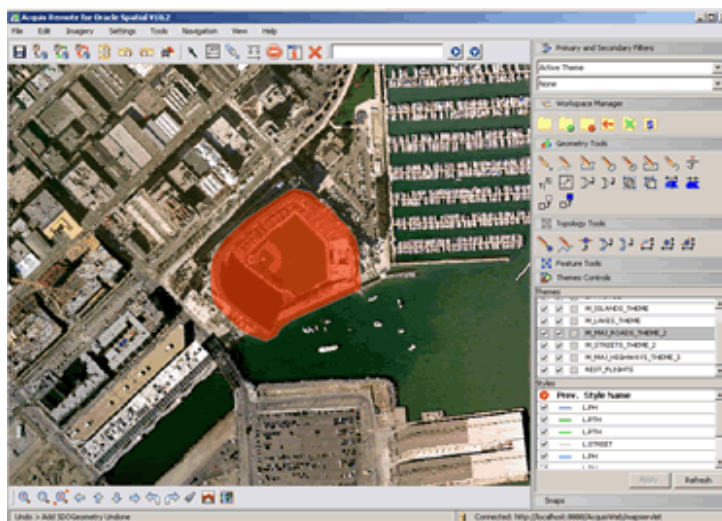


Figure 3. –Leica ADE Remote

Leica ADE Mobile: Free the Workforce through Enterprise Mobility

Considering that most paper-intensive, mobile business processes can be streamlined via mobile digital technology, many organizations today (large and small) would like to move away from expensive, error prone paper-based data collection and reconciliation of spatial and location data. Leica ADE Mobile removes the barriers to implementation of direct-connected mobile technologies utilizing the exact same features and extensibility of Leica ADE Remote. Leica ADE Mobile is developed to provide real-time access to spatial and non-spatial information via handheld, global positioning systems (GPS) and wireless devices. Never before has such a powerful product been developed to allow field users to connect and update data in Oracle Databases directly (and in real-time) from handheld devices without having to adjust, recompile or reconfigure data. Data can be seamlessly and accurately reconciled via a direct connect to Oracle Databases (through Leica ADE Enterprise) or via an interface with Leica ADE Remote. Moreover, because Leica ADE Mobile uses the same code base, APIs and architecture as other Leica ADE products, it can be integrated into virtually ANY business process and/or service-oriented architecture.



Figure 4. – Leica ADE

The Benefits of Using the Leica ADE Suite in Today's GIS and Location-analytics market

Via consumer applications and open, web-based mapping portals (e.g. Google Maps, Yahoo! Maps, MapQuest etc.) the traditional GIS and Location-analytics market is shifting from a being specialized market directed at only a few experts to a market which empowers the people who are closest to the business data and processes are to utilize spatial data in order to make better decisions more efficiently. With this in mind, today's organizations are implementing technologies such as Oracle Spatial and the Leica ADE Suite. While Oracle Spatial technologies make it possible to consolidate all business data and processes into a single, scalable, secure and extensible enterprise database environment, the Leica ADE Suite enables end-users (GIS and non-GIS) to more efficiently and effectively interact with both the business data and business processes without the need for proprietary data models, processes or interfaces. In effect, Oracle Spatial and the Leica ADE Suite bring the ease-of-use and familiarity of consumer location applications into the enterprise while providing an enterprise platform that far exceeds the capabilities of any traditional GIS. Furthermore, as organizations continue to adopt service-oriented architectures, they will look to technologies such as Leica ADE Suite to seamlessly integrate location data into business processes. This integration is either impossible or too costly to using legacy GIS architectures.

Here are some industry specific examples of how the Leica ADE Suite can help your organization reduce costs while becoming more efficient and effective:

- **Land-use Planning and Management (Cadastrals):** Recently, organizations such as the United States Census Bureau and the State of Michigan have begun to transition away from “black box”, proprietary GIS systems such as MAF/TIGER and ESRI ArcGIS to the more open and scalable Oracle Spatial Topology Model and Acquis Enterprise Suite. What does this mean? Out of the box, Oracle10g Spatial provides (via a built-in topology model) the most powerful way to store and manage data that is topological in nature and the Leica ADE Suite is the ONLY suite on the market that is completely integrated with this unique set of Oracle functionalities. For instance, in a typical land-use model, parcel boundaries may be shared with roads, which may be shared with sidewalks, which may be shared with neighborhoods, which may be shared with postal codes etc.; what happens if a road must be widened? In legacy systems, every feature, from the parcel to the postal code would have to be modified to account for the wider road. In the Oracle10g Spatial Topology Model, rather than storing and managing unique geometries for all of the aforementioned features, a single set of primitive geometries is stored once and all of the related features simply layered on top. So, if a road is widened (the underlying primitive geometries are modified) using the Leica ADE Suite, all of the related, adjoining features are thusly modified automatically. No other tool set in the world does this as efficiently and effectively.
- **Emergency Management:** When the State of West Virginia determined their e-911 system was woefully inadequate and in desperate need of an overhaul, they turned to Oracle Spatial and the Leica ADE Mobile. Why? By utilizing Leica ADE Mobile installed on GPS-enabled Trimble devices, e-911 volunteers are able to quickly and easily collect and update address data from the field. Once collected, data can be automatically synched – over the air or via office network connections - with enterprise Oracle systems without the need for in-office, desktop reconciliation. This enables West Virginia e-911 employees to make decisions based on the most current, up-to-date information without having to wait for unnecessary processing.
- **Asset Management:** Until recently, the Washington Suburban Sanitary Commission (WSSC), which manages all of the information pertaining to water, sanitation and fire hydrants for Prince Georges and Montgomery counties, required that all contractors carry huge, out-of-date paper books (with bound 200-foot sheets) in order to manage assets like painted fire hydrants. Of course, not only did this slow down contractors, but the data collected was often inaccurate and had to be manually processed by other WSSC employees. To rectify this, WSSC, with the help of Leica’s ADE team, built a simple asset management application using Leica ADE Remote and Leica ADE Mobile (e.g. built once and deployed everywhere). Using this application, contractors are now able to collect and update information into laptop, tablet and mobile devices without the need to carry the large, out-of-date, paper-bound books. Moreover, collected data that used to take weeks to process and reconcile, can now be processed by one person in only a few minutes – and the data is far more accurate.
- **Business Intelligence and Service-oriented Architectures:** The United States Postal Service (USPS) is continually looking for ways to not only streamline business processes but to also get the best available, most accurate data to its thousands of field offices so that they can make better decisions every hour of every day. That’s why the USPS decided they needed better, up-to-the-minute weather data to be dispersed to their many field offices. Using Oracle Spatial technologies and the team’s spatial expertise USPS was able to have a flexible and powerful system build, based on a Service-oriented Architecture, for pinpointing and analyzing weather data to be automatically sent to thousands of field offices simultaneously via email. At the field offices, USPS workers are able to view this data on location-intelligent, highly accurate maps in order to best

plan their routes. At a national level, USPS officials can now more accurately determine what resources are needed when natural disasters, such as hurricanes occur. Furthermore, as this system continues to expand, Leica ADE Enterprise will be used to manage and analyze data for “what-if” scenarios.

Summary

Location (spatial) data is ubiquitous. It can be found in virtually every database in every organization around the world. However, because location data is often tied to traditional, legacy GIS, more often than not, organizations are not utilizing their location data to its fullest potential. With the advent of open and powerful relational database technologies like Oracle Spatial, organizations are now able to make that final step toward a location-enabled enterprise. Within this new paradigm, not only do the walls dissolve between location data and crucial business data and processes, but location data becomes simply another type of business data. Finally, via the Leica ADE Suite, both traditional GIS and end-users are able benefit from a seamless, multimodal environment, while using the same set of business data and business processes to make better decisions more efficiently. In the end, organizations are afforded growth potential and cost savings far beyond what are available using legacy technologies: Oracle Spatial and the Leica ADE Suite is how forward-thinking organizations will location-enable the enterprise.

Leica ADE Suite – May 2007

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