Objectivity Case History

NOTE: This information is for reference purposes only – Do not reproduce.

Call the Sales Rep prior to any customer contact.

Customer Information

Customer: Coherent Networks, Inc.

Industry: Telecommunications, Power Utilities, and Parcel Mapping
Application Domain: SmartMaps Solutions Framework ,Customer Care, Service Provisioning
Status: Deployed
Platform: NT
Compiler: C++
Other Tools: Microsoft Foundation Checker (MFC), VisualBasic, StingRay, Enable, BoundsChecker

Company Background

Coherent Networks helps energy and telecommunications service providers achieve operational excellence and gain a competitive edge. To help their customers achieve these objectives, they deliver next-generation operational support systems (OSSs) that allow organizations to be successful in today's increasingly competitive global marketplace. Their software products and related services are designed to meet the needs of customers who depend heavily on geospatial data.

SmartMaps Solutions Framework™

Objectivity/DB is the heart of the SmartMaps Solutions Framework that maximizes system performance and streamlines system administration activities. Objectivity/DB is the highly scalable SmartMaps database designed specifically for use in operations, large and small, that require robust processing, editing, and display of geospatial data.

Through the SmartMaps Solutions Framework™ and its advanced data-integration and display technology, Coherent Networks delivers solutions that contribute directly to strategic corporate objectives and to organizational success by enabling their customers to expand their capabilities for using geospatial data.

The SmartMaps Solutions Framework allows client organizations to rapidly access, migrate, integrate, and reconcile geospatial data with other data stored in a variety of formats to create a seamless graphic view. Data retrieved from diverse sources is continuously synchronized to assure up-to-the-moment accuracy for all applications that rely on that data. The result: information that originates in standalone systems is now available for integration in new, more meaningful ways. This innovative data-access technology extends the life of legacy systems and allows custom integration of data regardless of its platform, making new applications and customized software solutions possible for the enterprise.
Through such data-integration strategies, Coherent Networks makes information "do more." Combining the latest in technology, data integration, and innovative application development, Coherent Networks preserves customers' investment in existing data sources, and provides a state-of-the-art platform for running, integrating, and enhancing the performance of applications currently in use.

Customer Care

For energy service providers, who are facing new challenges due to deregulation, the key to retaining and gaining market share is exemplary customer service. Coherent Networks delivers the competitive edge that allows their utility customers to provide more accurate service delivery combined with excellent customer care. Their customers are able to achieve these critical goals by maximizing the flow of information throughout their organizations, placing it in the hands of the people who need it the most.

Their telecommunications customers, who have dealt with deregulation for some time now, are faced with a new challenge: faster provisioning of digital services. Coherent Networks software is designed to integrate critical data from disparate sources and present it to management to enhance and accelerate broadband provisioning capabilities that are vital to business and marketing decisions—even to survival.

Coherent Networks is moving network engineering from an operations process to a business process, enabling their customers to compete more effectively.

Service Provisioning

Coherent Networks is committed to helping its clients' meet tough challenges. For some, the challenge is to keep customers. For others, the goal is to increase market share. For all, Coherent Networks provides an important strategy for meeting critical objectives. To enhance their value and effectiveness in this regard, Coherent Networks has developed strategic alliances with industry leaders such as **Objectivity, Inc.,** Object/FX Corporation, ESRI, and Autodesk, Inc. Their service offering is geared toward providing effective solutions to customers worldwide, yet their solutions are customized to meet specific needs. To better serve their customers worldwide, they work with their European Affiliate, Network Management Group of Lyon, France. Through alliances with strong business partners, and through the focus and organization of their own internal capabilities, Coherent Networks offers its customers a high level of commitment to quality products and responsive service.

Why Objectivity?

Coherent Networks selected Objectivity for its support of true object-oriented development and its ability to manage large, complex databases with high performance characteristics. Coherent Networks collaborate with Objectivity on customer solutions, as well as in sales and marketing opportunities.

Coherent Networks states five strategic advantages for using Objectivity:
1. Optimal Performance
2. Outstanding Scalability
3. Better All-Around Efficiency
4. Flexible Storage & Data Access
5. Fast Application Development

SmartMaps Advantage #1: Optimal Performance

When it comes to handling spatial information of any volume or complexity, the Objectivity/DB provided by the SmartMaps Solutions Framework is a high-achiever. The reason: the efficient way this database manages data. The difference with Objectivity is in the way Objectivity stores and handles the information.

Objectivity offers the advantage of object-oriented technology—a critical advantage when the goal is to display complex geospatial information. In the SmartMaps Objectivity database, each object is self-contained. It stores, within itself, all information related to attributes, associations, and the graphic styles needed to render the object as desired to the end user. Each object is an "intelligent" object that can store (and quickly access) large amounts of information. In addition, related objects are stored near each

other on the disk, further speeding access, display, and update operations. This core architecture of object-oriented technology makes the SmartMaps Objectivity database a fast, productive option for rendering
spatial data—and for providing timely access to it.

SmartMaps Advantage #2: Outstanding Scalability

The SmartMaps Objectivity database is highly scalable. Its object-oriented technology is designed to provide a responsive network environment that accommodates anything from modest 10-gigabyte storage arrangements to tera- and petabyte-sized databases with a high degree of efficiency. In fact, in geospatial applications, the larger the database, the more pronounced the performance advantages of the SmartMaps Objectivity database becomes. Database size has a far less significant impact on the SmartMaps Objectivity database. The SmartMaps Objectivity database remains responsive as your information needs evolve and grow.

SmartMaps Advantage #3: Better All-Around Efficiency

But by storing all pertinent information in objects themselves—including attributes, associations, and graphic display instructions—SmartMaps Objectivity object-oriented storage technology minimizes such system inefficiency. It also eliminates the manual maintenance that goes along with that inefficiency. The SmartMaps Objectivity database consequently "runs cleaner" and requires far less system administration—constant monitoring of disk usage, for example—when the goal is to display geospatial data. The result is a system architecture that minimizes maintenance expenses at the same time that it speeds access to critical data.

SmartMaps Advantage #4: Flexible Storage & Data Access

For working effectively with geospatial data, the SmartMaps Objectivity object-oriented database offers a key architectural benefit: it operates as a **federated database**. The SmartMaps federated database is a networked grouping of individual databases. This grouping provides flexible options for data storage and data access, with individual databases operating independently but in harmony with one another. Instead of the typical database/server arrangement, which concentrates all data on one disk, a SmartMaps Objectivity database can reside on any network PC, not just on a designated server. Users communicate directly with the database—and therefore have direct access to the intelligent objects it stores—with no special interfacing software required. The SmartMaps Objectivity database can be centralized in one machine, as in a conventional storage arrangement. But components of the database can reside on any number of individual network machines, which together comprise a federated database. Furthermore, any PC on the network can be both client and server.

This architecture provides more flexible options for storing and segmenting information—by project, for example, or by geographic region—and consequently provides more direct access to that information. Though physically separate, the individual databases operate as a unified, single database that performs at a higher level. Object-oriented technology makes the SmartMaps database fast and efficient. The federated database structure augments this speed and efficiency.

SmartMaps Advantage #5: Fast Application Development

Application development—and application maintenance—is simpler and faster with SmartMaps Objectivity object-oriented methodology. This simplicity and speed stem from three factors:
1. The SmartMaps Objectivity database environment requires no transaction management—none. It therefore eliminates one of the primary sources of errors in programming.
2. SmartMaps objects contain all of their own data and all of their own methods, making applications easier to design, develop, and maintain. Programmers are relieved of many of the unnecessary intricacies and convolutions that are native to programming code.

3. Object-oriented development in SmartMaps produces units of codes (objects) that can be "plugged in" easily to a wide range of programming projects and used again and again.

These factors promote a highly efficient, highly productive environment for application development—one in which developers excel. To promote this environment even further, the SmartMaps Solutions Framework provides a robust Application Programming Interface (API) that offers established classes and methods to enhance and simplify development initiatives.

Objectivity Application Specifics

Data Complexity	50-60 classes at most 2-3 levels deep.
Database Size	Gigabytes of data. Each map will be 30k to 50k.
Containers	Currently 1500 (3 containers per document).
Concurrent Users	Scalable to 100 simultaneous clients.
Domain object	everything that is on the map
Attribute value	relates to the domain
Relationship	a VArrray
Platform	NT
Language	C++
Objectivity key features	Distribution, container based architecture, performance, object versioning, language interoperability, scalability, transparency, platform independence.

Competition

Coherent Networks evaluated Objectivity, ODI, Versant, Gemstone and O2. Coherent Networks' distributed architecture was key, and a unique architectural advantage over competitive offerings. Objectivity's page mechanism and containerization fit very well into the Coherent model for SmartMaps capabilities. SmartMap must support one coherent logical view, as a representation of the physical inventory that comprises a large utility's network. SmartMap extracts and scrubs data from a myriad of proprietary telco and power company legacy apps. These systems use disparate databases such as IMS, DB2, Oracle, MS Access and flat files. Objectivity is the engine that powers Coherent's revolutionary product!

Issues and Resolutions

1. Scalability
Size of lock server, AMS server, data server machine.
NT configuration, ram, other settings.
Benchmarking performance.
Use of ooRunStatus and ooLockmon.

The ools process is about 75 Kb binary, 780 Kb when running. It has the transaction table and lock table. The ooams is about 44Kb binary, 480Kb when running. The ooams is only needed when remote Objectivity clients are accessing the database on a data server machine. The ooams needs to run on the data server machine(s). The lock server can run on any node in the network. The ooams is merely a database page server. The client asks for a database page from an offset in the database file. In this respect the ooams is I/O bound rather than cpu. On the other hand the lock server does very little I/O (all rpc calls) but can have some bursts of intensive cpu activity checking dependency graphs etc. Now the Objectivity clients will either be doing local I/O to a local database and/or RPC to a remote data server, RPC calls to the lock server and any computation on behalf of the application.

Putting all this together, the Coherent Networks database server should be a file server and the hosts where the Objectivity clients run should be cpu/ram heavy. If the lock server runs on a different node to the clients this node should be a fast cpu rather than I/O machine. If it runs on the client machine(s) it will be competing with the clients for CPU resources.

Wrap ooRunStatus() calls around specific pieces of code to understand what is going on.
Use oospace to inspect database space usage. Analyze oospace output from the production system for container initial sizes and extensions. Use oospace for container size. oospace will also give the highest container id.

Profiling and Quantify have proven as useful tools with Objectivity.

2. Indexing/Versioning
Are we using this optimally? What are the tradeoffs?

Looked at the different index update modes, Insensitive, Sensitive, and ExplicitUpdate and the pros and cons of each, for Coherent Networks, the ExplicitUpdate encapsulated in the objects non-const set methods was the right place to do this.

Contact Information

Objectivity Rep: Maura Farrell

Customer Contact:
Jim Brule, Vice President, Strategic Alliances
Mark Brule, Chief Technology Officer
Tel:
Email: