Olation® – a New Age of Visionary Intelligence

Olation®, as a fusion of analytical – olap and relational databases [thus the term, **Olation**] represents a milestone in the evolution of database technology; as a consequence, and given the business value in its speed-to-solution and speed-to-benefit, Olation will have a significant impact on the implementation of planning, analysis and reporting information systems.

Like any important evolutionary event, Olation combines the best features of what came before it with important new capabilities. As we will see, Olation provides a seamless, optimized in-memory multidimensional – OLAP functionality layer over the "bedrock" relational database environment that every company utilizes to capture and store transactional information. A *real* real-time capability now exists between the relational and multidimensional "spheres," which had previously been two discrete database - functional entities, indeed, most often, two entirely different database types (OLTP and OLAP) altogether.

Olation's fusion of OLAP and relational technologies provides these benefits:

- Management obtains Business Intelligence* *dynamically*, enabling decision-making based on real-time company performance and expected plan results.
- IT is able to manage and control data, with all requisite security in place, from one "sanctioned" single source, i.e., within the relational database environment; there is no integration/duplication of data required, much less are there different, or even proprietary, database systems to oversee.
- End-users are able to leverage their skills with any preferred tool (report writers, spreadsheets, dashboard products, even other B.I. products, etc.) with the knowledge that all data is "true" back to and available from the transactional source; furthermore, there is no lag time in end-user computational models, including for "write back," given the OLAP capability inherent in Olation and its ability to provide data in real time to any front end.
- There is *collaboration* in respect to technologies, since Olation functions as a "connector/nexus" between different applications, front ends and databases (Olation can connect to any system and installs in SQL Server; SAP HANA; Oracle [expected 2nd Qtr, 2014]).
- As well, *staff collaboration* becomes a reality, enabling firms to power towards corporate objectives: performance is measurable in real-time, and "what if" plans can be altered—whether related to budget, forecast or long-term strategic—likewise in real time, to target future profitability.

As a product that fosters this kind of connectivity and collaboration to reach corporate objectives, Olation goes "beyond Business Intelligence," to deliver *Visionary Intelligence*. As a technology that for the first time fuses OLTP and optimized OLAP capabilities, Olation invites a "Welcome to a New Age."

At this point, we can step back to briefly review "the old way of doing things": the development of OLTP and OLAP technologies and how they gave rise to standard Business Intelligence technologies. This will provide particular insight about Olation's technology and business-benefit differentiators.

[*Note: the term "Business Intelligence" (B.I.) is generally regarded as a more user-friendly identifier for a product that features OLAP, including the capability to perform fast multidimensional data viewing. In this white paper, the two terms, Business Intelligence and OLAP, are used interchangeably.]

It's All Relational: the Online Transaction Processing (OLTP) Database

Every business has a system, if not several systems, for collecting and storing its core operational data. The entry point for data may be at someone's desk (keyed in), or through an automated collection and transmission system that will record each transaction. Examples of transactions are entries in an accounting system, reservations for an airline seat or a hotel room, and credit card purchases of clothes in a department store. Once a transaction is completed, the necessary data is sent back for storage to a database. At minimum, the data sent to a database from a sales register would include date, store location, item identification number, credit card number, purchase price, among other particulars.

In the seemingly distant past, companies developed their own individualized systems for the collection and storage of data. Eventually the "relational model"—endorsed by E.F. Codd in an influential paper published in 1972—was acknowledged as the best database management system for capturing, validating, and storing large volumes of individual transactions, aka, on-line transaction processing (OLTP). Since that time companies have made huge investments in relational database management systems (RDBMS).

Database management systems also allow for the retrieval and processing of stored data. It should be noted, though, that the internal design of the database affects how quickly and flexibly data can be retrieved and processed. Imagine the case of a company needing to verify a single transaction, or wanting simply to total the purchases of an item at one location during a fixed period of time. RDBMSs are amenable to this kind of straightforward query combined with simple math. However, the static physical design of relational databases—data is stored in two-dimensional tables, with each entry being a row in the table—impedes more complicated data analysis. As well, the sheer volume of data in the database makes analytical activities very time-consuming, if not unrealistically complex.

By now there are products that, in addition to standard or "canned" result sets, can deliver up fairly complex reports from relational database systems, based on underlying queries that users can create via a manageable interface. Newer "in-memory technology" products are particularly well-suited to conveying data visualization results – dashboards that allow a wide selection of choices ("multidimensional" selections, in OLAP terms). Software vendors often characterize these products as Business Intelligence, and this is not the place to argue for or against their inclusion in a particular product category. It is worth noting, however, that there is general agreement that the more actionable data (what Business Intelligence is meant to be) that can be obtained from underlying systems, the better.

All that said: for all the many reporting tools and impressive graphical interfaces, "management still has difficulty reaching and working up the data to run the business." End-users, by the 100s of millions continue to live in spreadsheets, which can also justifiably be characterized as a Business Intelligence technology. And for good reason: spreadsheets can go beyond reporting, giving users the chance to work up calculated analytical results. Also, spreadsheets "allow write-back", and so can be used for "what if", planning models…however cumbersome they become.

OLAP in the Organization

The term OLAP, for On-Line Analytical Processing, was coined by the same E. F. Codd who had endorsed relational databases as the best transactional data store. Codd next affirmed the fact that that relational databases *do not have the functionality to perform sophisticated analyses* on transactional data, the core operational data of a business.

In order to work up data in a meaningful way, analysts need to prepare models that can quickly and accurately compare and contrast all manner of "multidimensional" (as compared to flat, relational) data: for example, actual sales of a particular group of products, over time, within specific regions, as compared with the budget plan. Analysts must be also able to create "what if" scenarios within their models: by how much will the total cost of a product decline if a less costly production material is substituted in the manufacturing process? And if the price of the product is lowered, and sales rise by ten percent as a result, by how much will revenue and profit be affected? These types of analyses, often based on complex calculations whose results best indicate how a businesses is performing, must be done as quickly as possible, and shared among many users.

A new *multidimensional* database model evolved out of the necessity to perform these kinds of sophisticated analyses. Multidimensional models can accommodate on-line analytical processing (OLAP)—the ability to organize data in multiple *dimensions* for end-users to quickly create, analyze, and calculate complex data relationships. The structure of a multidimensional model is not a series of tables (as exists in a relational database) but what is referred to as a *cube*. Cubes modeled in a multidimensional database extend the concept associated with spreadsheets: just as a cell in a spreadsheet represents the intersection of two dimensions (sales amount of product by region), a cell in an n-dimensional cube (for example, with the dimensions *Products*, *Customers*, *Regions*, *Months*,…*n*th dimension) represents the intersection of *n* dimension members. As in a spreadsheet, a cell might be calculated by formulas involving other cells.

The cube structure allows for particularly fast, flexible *data-modeling* and *calculations*. For one, locating cells is vastly simplified—an application can identify a cell location by name (at the intersection of dimension members) rather than by searching an index or the entire model as in a relational database. Multidimensional models are able to incorporate advanced array-processing techniques and algorithms for managing data and calculations. As a result, they can store data very efficiently and process calculations in a fraction of the time required of relational-based products.

We should note here that these strengths are not shared by ROLAP products—or "Relational OLAP" products—nor by so-called "in memory technology" products. ROLAP products have the drawbacks of additional ETL cost and slow query performance, even though are more closely tied to the relational data store. In-memory products are best suited for relatively smaller data stores, constrained by how much RAM is available. As well—key point—there is typically extremely limited capability to create computational models quickly: outstanding dashboard graphics (at best) are the main selling feature of in-memory products; they just "can't do the math" required for key business indicators based on complex calculations.

Promises Not Kept from Business Intelligence

We have considered how core operational data is collected and stored: overwhelmingly, in relational databases. As well, the weaknesses of front-end tools like report writers and even in-memory dashboard products: they are either unable to accommodate sophisticated queries and/or create the models that analysts need to pattern complex real-world data relationships. We also know that OLAP technology accomplishes enables end-users to model multi-dimensionally as well as perform complex calculations and address "what if" modeling.

In sum, how does Olation fit into this picture?

Until the advent of Olation, the most advanced analytical products required significant—often *very* significant—effort (in time and money) to bring transactional data into multidimensional cubes. First it was necessary to prepare the transactional data into specialized form, aggregating and adjusting it for integration; then there was the process of integrating, via a specialized process, the "analysis data" into a multi-user multidimensional database. Updating could only occur at intervals; or, at best, a cumbersome trigger system would need to be in place to simulate "live" integration of incremental data. In sum, costly, time-consuming, resource-intensive procedures, requiring special programming, highly specialized skill sets and often a great deal of rudimentary re-keying, not to mention re-coding. The end result was typically an independent "proprietary" multidimensional database entirely separated from a company's transactional system, which continued to receive and store key operational data.

From a business standpoint, the cost of maintaining a transactional system and an analytical system has typically been so great that organizations, departments and user groups:

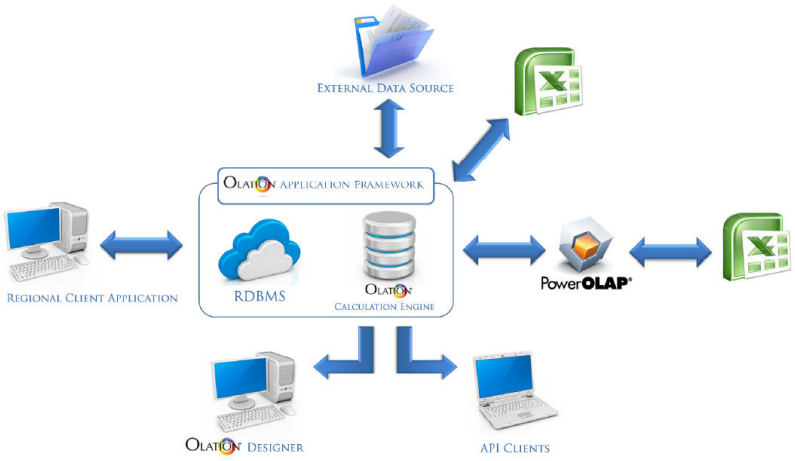
- resorted to Excel again, even with all its attendant problems, as the basic system for management information;
- made successive purchases of different Business Intelligence products, whether for different purposes or to fulfill the promise they expected to be kept from their first purchase; and/or
- spent a great deal of time and money overall, also on ERP or other transactional systems, because those systems are sold with similar promises to deliver Business Intelligence

The Power of Olation: Relational Store *and* Multidimensional Modeling

Olation overcomes technological shortcomings by leveraging the relational core of systems already in place: it is a totally manageable and brilliantly fast layer that utilizes optimized multidimensional OLAP modeling capabilities for in-memory aggregation and calculation results, as well as for modeling meta data. Olation supports "write back" from any user interface for planning (budgeting, forecasting) models, and the data is captured in one place, in SQL Server tables. With data in SQL Server (or SAP HANA or Oracle, etc.), all data is truly *live*, throughout the system, and available to all user front ends.

Key Technical Competencies

- Olation Calculation Engine that integrates seamlessly with Microsoft SQL Server™, MySQL, SAP HANA, Oracle and other relational databases.
- True real-time Multidimensional OLAP (MOLAP) that is not based on Relational OLAP (ROLAP) and therefore does not have the performance limitations of such tools.
- Easy mapping of existing relational structures into corresponding multidimensional structures—and this process only needs to be done once.
- Defined relationships between environments, enabling intelligent drill-down into cubes, with corresponding drill-through into relational transactions.
- Ability to construct multidimensional data types, such as dimensions and cubes, with automatic creation of the corresponding relational structures.
- Access to external data sources by reference using a SQL query to the data or by staging and transforming the data in tables in the Olation database.
- Full API supporting third-party access to all Olation functions.
- Total algebraic expression across all dimensions



Olation – Welcome to a New Age

From a management perspective Olation is the optimal solution for businesses that have taken an honest accounting and decided they have a data problem (data proliferation, data management, data under-utilization) that needs to be solved and/or have decided they need a Business Intelligence or Planning (budgeting/forecasting) solution. Olation is also suitable for businesses that have tried one or many solutions promising success but that have ultimately failed to meet expectations. Olation therefore is a good fit for businesses with existing solutions that provide only part of what they need, but still need more from these solutions and want to leverage their existing platforms. Significantly, this includes businesses that rely on proliferating spreadsheet systems for management decision-making.

Key Business Benefits

Olation® creates dramatic business impact in a number of ways:

- Offers enterprise planning, analytical, and reporting information systems.
- Delivers true dynamism throughout the environment, allowing data to be changed bi-directionally.
- Serves as one single version of the truth, not a copy of transactional data that has been staged for business intelligence analytics.
- Reduces application development time and costs.
- Reduces application implementation costs and maintenance.
- Markedly increases end-user productivity.
- Leverages existing skill set of the end user by allowing Olation® to be managed through existing tools, such as Excel.
- Acts as a connector/nexus technology, Works Well With Others Systems: