



Crystal Clear Customers: The Role of the Operational Data Store

Customer relationship management (CRM) applications are not quick or easy to implement – and for good reason. Few other implementations affect so many departments, require such a significant overhaul of business processes and force data integration across the enterprise. The deeper the CRM applications infiltrate your organization, the better your rate of return becomes. To properly implement CRM, you need two new sets of capabilities – tactical and analytical CRM applications – and the architecture to support them.

The analytical applications are classified as business intelligence, which consists of the data warehouse supplying data to the various data marts and the analytical applications performing the analyses. The applications running against these components give us insight into our customers’ demographics, buying habits, profitability, lifetime value and so on. However, insight into customer behavior is not enough. We need the ability to act upon these findings by having ready access from anywhere in the enterprise to current information about our customers as well as quick access to some analytical results.

The tactical or operational applications are called business management. These applications give the enterprise the ability to act upon its collective intelligence and customer knowledge. They provide the organization with an enterprise-wide understanding of a customer, which facilitates a transition away from the silo business unit or

functional viewpoint.

In a mature technology environment, business management is “where the action is”; it allows business intelligence and comprehensive customer knowledge to be applied to modify customer behavior and manage customer touches. Business management consists of the operational data store (ODS), the transaction interface (TrI) that provides users with access to the valuable information as well as the ability to update the ODS, an oper mart that provides the ability to perform tactical analyses, and the associated meta data that provides business and technical people with information about the ODS.

Figure 1 shows the components that support analytical and operational CRM applications as well as the processes (data acquisition and data delivery) that support their construction and usage.

The architecture used to support these two important sets of applications is called the Corporate Information Factory (CIF). See Figure 2.

The CIF is a logical architecture that provides an integrated view of

enterprise data that enables both business intelligence and business management capabilities. Please see the article, “The Corporate Information Factory Comes of Age,” published in *DM Review*, March 2002. This architecture is a proven road map that ensures successful enterprise-wide CRM implementations and other corporate-wide technology strategies.

What is an ODS?

The ODS is a subject-oriented, integrated, current-valued and volatile collection of detailed data that provides a true enterprise view of information. Let’s look at these defining characteristics in more detail.

Subject-orientation: The ODS is organized around major subjects of interest to the enterprise. The primary purpose of the ODS is to collect, integrate and distribute current information about the subject and to provide an enterprise view of this subject. The subject can be any that is important for the organization. For example, the customer ODS will typically house the most current information on a customer as well as information on all recent customer interactions with the organization – including product ownership and summary usage statistics, statement information, summary-level contacts and other related information.

Integration: The integration characteristic of an ODS is of key importance to e-commerce and CRM. A customer ODS represents an integrated image of a customer profile. Information making up this profile can be pulled from any system in the organization, both operational and informational.

While building and refreshing a customer ODS, the organization inte-

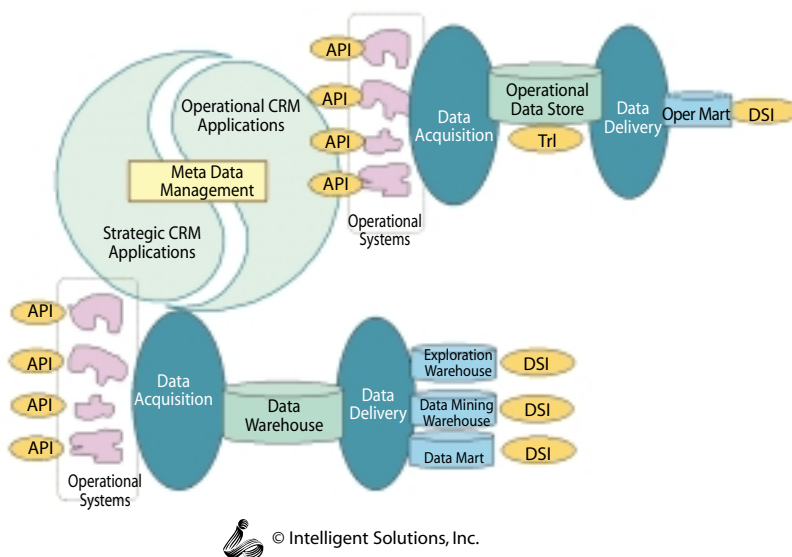


Figure 1: Analytical Versus Tactical CRM Components

grates all the different sources of tactical customer information into a consistent view in the ODS, which is then used to interact with the customer across all contact points. As the definitive record and the consolidation point for customer profiles, the ODS also feeds other systems in the organization with this valuable customer information. The real value in the customer ODS is that anyone in the organization can access this integrated view from anywhere in the organization (or outside of it) at any time.

Current-Valued: The ODS carries little or no history. Unlike a data warehouse, which is a series of snapshots of information used for strategic analysis, the ODS is a current picture of the subjects in question and is used for "action." Note that "currency" is relative and can be defined differently depending on the subject matter; the ODS used by a bank may define current to include weekly account balance figures carried for one or two months. A customer ODS will usually have some recent historical information (e.g., prior address, closed accounts, recent campaign solicitations, etc.). An important point to remember with an ODS is that it should have far less history than the data warehouse, and it should not be considered as a replacement for the warehouse because it cannot facilitate the detailed analysis performed by business intelligence systems.

Volatile: The data in the ODS will change frequently; and these changes are typically reflected as updates to the existing fields in a record, not snapshots of whole records as in the warehouse. Changes to customer information in the operational systems will be reflected as a change in the customer ODS. Some types of customer information, such as account ownership, customer touch records and contact information, can change frequently. In many cases, the ODS can be updated directly by the users and customers, adding to its volatility. New customers might be added directly into the customer ODS at the same time that their new product information is placed into the business operations systems. The customer ODS must be designed to handle these frequent changes.

Detailed: The customer ODS may carry mostly low-level detail for all customer profile information but may have only summarized information about customer contacts and accounts or services. The summary data that does exist in the ODS is different from the summarized fields found in the warehouse. The summary fields in the ODS are dynamic in nature rather than static. That is, summaries may be calculated at the time of request rather than being pre-calculated and stored in the database.

Refreshment Speed

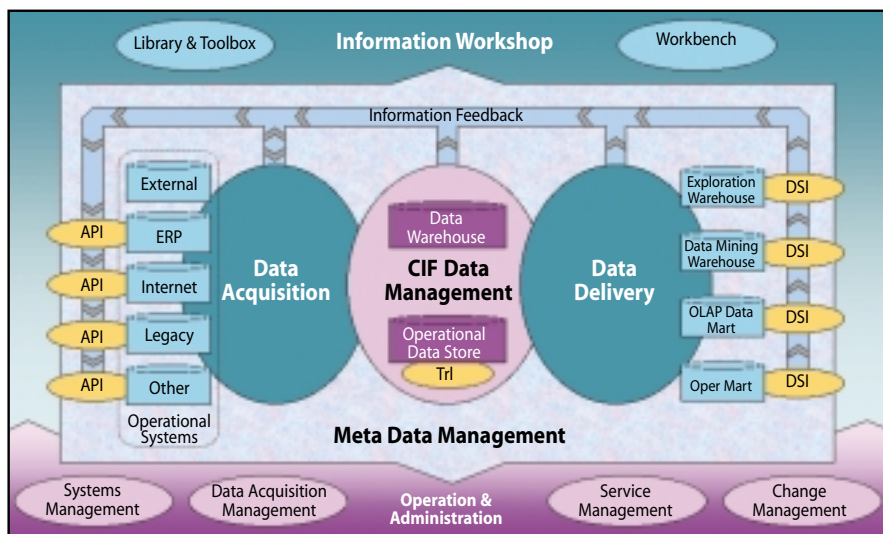
There is one additional characteristic of an ODS that is also very relevant to the CRM and e-commerce world – the speed at which the ODS is refreshed. Your organization has some choices in terms of the currency of information and the frequency with which that information is updated. For example, a customer may log onto your Web site and enter his new address, phone and fax number. The new customer contact information must be updated in the customer ODS almost immediately, within a few seconds, upon its entry into the operational environment. This type of ODS is labeled a class I. This class of ODS is used when the information must be up to date at all times (e.g., the customer service representative talking to a customer must see his most current

information regardless of where it was initially entered or changed). Usually, only minimal or very simple data integration is possible with this class.

A class II ODS is a little more relaxed, using store and forward techniques for data update rather than performing synchronous updates. A class II ODS can receive updates every half hour or hour. The customers' summary Web purchases may be updated into the customer ODS every 30 minutes. Because the service representative only uses this information to get a feel for the customers' product interests, going instead to the product-centric ordering systems for his transaction details, class II updates are fine for these summaries. Because the information is not as current in a class I, the integration of the ODS with the other systems may not be as difficult as for a class I. There is some trade-off of update frequency and integration complexity.

A class III ODS is typically loaded in batches, most often on a daily basis. Customers' buying preferences may be updated into the ODS only once every day or so. Information currency requirements are not nearly as robust when organizations build a class III ODS. Because the buying preferences are used to understand cross-sell recommendations and because they do not change that frequently, class III updates work well.

The fourth type of ODS, Class IV,



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Figure 2: The Corporate Information Factory

is a special case where information to feed the ODS comes not only from the operational systems but also from the warehouse. The information from the warehouse is loaded into the ODS only periodically, usually in a scheduled fashion. This aspect of the Corporate Information Factory – the interaction between the data warehouse/data marts and the operational data store – is often overlooked or ignored because it is a rather new data flow for the CIF. This interaction calls for small amounts of pre-aggregated or pre-analyzed data to flow from the strategic decision support environment into the ODS for use with more tactical applications. By placing the results of a strategic analysis in the ODS, we can rapidly access key strategic information while performing operational tasks.

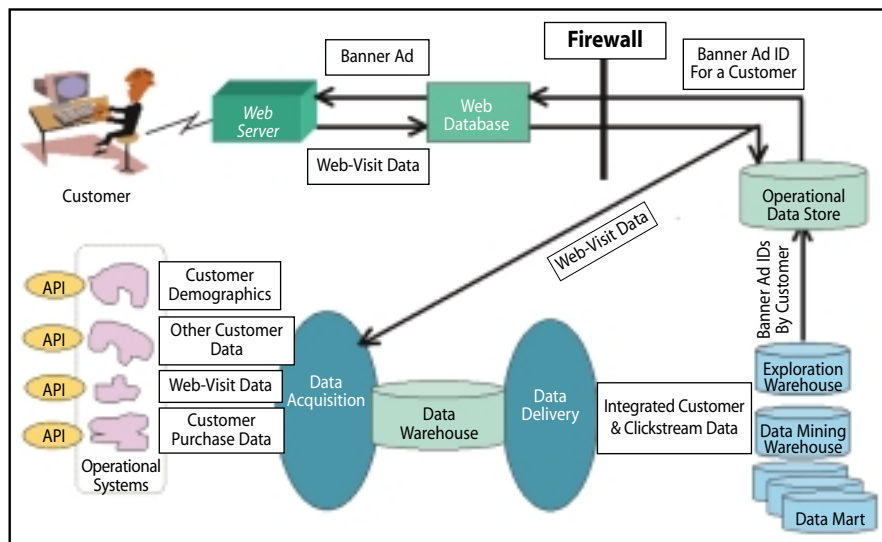
Once the strategic results are stored in the ODS, online real-time support of important strategic information is possible. In doing so, the data warehouse can be said to support online high performance access of data when that access is needed.

The remainder of this column will discuss an example of this “real-time access” to strategic results for use in an e-commerce setting.

Banner Ad Creation

When you log onto a Web site, have you ever wondered about the rationale for what banner ads appear? Companies with little or no insight into their Web visitors simply slap up one of any number of banner ads, hoping that one of these will catch your eye and interest you. This is similar to the mass marketing or “spray and pray” techniques traditionally used by brick-and-mortar companies. Other companies seem to always have an appropriate ad or coupon that is just right for you. What is the second group doing differently? How do they know what interests you?

The answer is that the second group of companies likely has a sophisticated business intelligence environment that captures your clickstream and analyzes where you came from, the areas you visit in the company’s Web site, the items you showed an interest in, the ones you put in your shopping basket and then took back out,



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Figure 3: Data Flows

and the items that you eventually purchased. All these transactions give the company insight into you. By analyzing this information, the company can determine the appropriate banner ad to display when you next visit their Web site. They only have about a tenth of a second to recognize you, determine the appropriate banner ad and display the ad on your screen. This certainly cannot be done if it involves scouring and analyzing all your previous clickstream data to determine the appropriate ad. That could take several minutes or longer, and you will be long gone before the site even comes up.


Here is where the interplay between the ODS and the various analytical marts comes in. Figure 3 shows the data flow in this scenario. Several types of analytic applications (data mining, exploration and traditional OLAP types of marts) are used to perform the hard-core analytical functions on the massive clickstream and customer data. These marts work in concert, the results of one perhaps feeding an analysis in another to determine your preferences, buying history and responses to different campaigns.

For each visitor to the Web site, the analyses performed in Figure 3 determine the appropriate banner ad IDs for each visitor. Once these IDs are identified for each visitor, they are stored in the ODS. When you return to the Web site, your identification is sent to the ODS, a process then looks up the banner ad ID specifically for you, sends the ID to the content server and makes

the ad appear on your screen in subsecond time! Every time you log on, the process picks the next ID in the listing to display another appropriate ad.

Periodically, your clickstream and other data are analyzed again, and a new set of banner ad IDs is loaded into the ODS for quick reference upon your next visit.

This column has demonstrated the value of the ODS as a critical component of your e-business and CRM strategy. The ability to access integrated current information from anywhere in the enterprise is the first step toward true CRM. The second is the ability to access strategic information in a real-time mode again through the ODS. This latter ability has proven to be a valuable and highly successful new twist in this well-established component of the CIF.

Until recently, most companies were investing resources in analyzing historical data contained in the warehouse, which didn’t let them act in real time. Conversely, the real-time data alone doesn’t provide key insights into past patterns and behavior that is so critical to providing the kind of personalization that online customers now expect and demand. Now we have an architecture that allows us to do both – generate business intelligence and then act upon it immediately. 

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