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Closing the Loop in a Consolidated World: Evaluating Packaged Analytic Applications

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The Data Warehousing Institute (TDWI), a division of 1105 Media LLC, provides in-depth, high-quality education, training, research, and certification for business intelligence (BI) and data warehousing professionals worldwide. TDWI can help your BI team stay abreast of new and emerging trends and techniques and gain the skills they need to deliver effective BI and data warehouse solutions. Through our Membership program and regional chapters, TDWI can also help you and your team establish a network of peers in the industry to whom they can turn for assistance and advice to solve thorny technical and organizational problems and advance their careers.

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The Rise of Packaged Analytic Applications

Packaged Operational Applications. The year 2000 marked a turning point in the dynamics of packaged enterprise applications in the software industry. That's because December 31, 1999, was the date that most major corporations set as a target for converting their custom-built, legacy applications—most of which used a two-digit date field that threatened to wreak havoc on applications at the start of the new millennium—to modern, integrated software packages sold by top-flight vendors such as Oracle, SAP, PeopleSoft, and Siebel.

Although companies spent oodles of cash in a mad dash to avert a binary meltdown, the millennium doomsday bug merely accelerated market trends that were already well under way. To save money, streamline processes, and improve operating efficiencies, companies were changing their approach to software development. Instead of hiring legions of developers to build applications in-house, companies were now eager to purchase software packages to manage core operational processes, including manufacturing, finances, orders, inventory, human resources, sales, marketing, and services. The advent of this packaged software signaled the evolution of application development from craftsmanship to industrial automation.

Packaged *Analytic* Applications. Thanks in part to the millennium bug, the year 2000 represented the crest of the wave of interest in packaged enterprise applications. But it also marked the beginning of another wave in packaged software that is now reaching maturity: that is, packaged *analytic* applications.

Analytic applications are the business complement to enterprise applications, although they have always taken a backseat to their operational brethren until recently. While enterprise applications run a company's back- or front-office operations—for example, tracking accounts receivable, accounts payable, and general ledger activity in a finance department—*analytic* applications shed insight into the status and effectiveness of those operations. For example, a financial analytic application might help financial managers track performance against plans or assess the profitability of the company's customers and products, among other things. In short, companies use enterprise applications to run the business, but they use analytic applications to make sense of it.

After years of neglect, analytic applications are finally getting the attention they deserve. Numerous CIO studies in the past three years show business intelligence—another moniker for analytic applications—at the top of CIOs' purchasing lists. The reason is pretty straightforward: companies have amassed lots of information about their business and processes (thanks to packaged enterprise applications), but have few tools to mine that data for insights that can lead to smarter decisions, better plans, and more empowered workers. Whereas operational applications provide information that helps a company run more efficiently, analytic applications provide insight that helps a company run more effectively.

Some companies, such as Oracle (the sponsor of this report), have created prebuilt analytic applications that span most departments in an enterprise. These analytic packages come with an integrated set of tools, data schemas, business views, and predefined reports and dashboards that significantly accelerate the time it takes to get a BI solution up and running. Many organizations are now evaluating packaged analytic

applications to determine whether they are a more cost-effective alternative than developing BI solutions from scratch.

Build versus Buy

Packaged analytic applications are following much the same trajectory as packaged enterprise applications. Adoption of packaged analytic applications started slowly in the late 1990s and was hindered by a few false starts, but is now gaining momentum. This is particularly true for analytic packages that offer truly integrated, end-to-end solutions that are easily configured and upgraded. For example, last year Oracle sold millions of dollars' worth of packaged analytic applications, and it's one of the fastest growing product lines at the mammoth software vendor.

Roll Your Own

Since the early 1990s when data warehousing and business intelligence were in their infancy, most organizations have built their analytic applications from scratch. This involves creating a data management architecture consisting of a data warehouse, staging area, and data marts, as well as a BI architecture consisting of reports, analytics, dashboards, and scorecards. Depending on the scope of the implementation, rolling your own BI solution is a costly, complex affair, ranging from several hundred thousand to several million dollars or more. Even a small project requires hiring the following staff:

Full-Time Staff

- A **project manager** schooled in BI principles
- A **data architect** to design and build the data management architecture
- **ETL developers** to map source data and manage metadata
- A **report developer** to create the end-user semantic layer and reports
- A **data warehouse administrator** to manage the system

Part-Time Staff

- **Business analysts** to gather requirements
- A **technical architect** to deploy the computing infrastructure
- A **data modeler** to create the data warehouse schemas
- **Data administrators** to address data quality issues
- **Quality assurance** analysts to test programs
- A **database administrator** to tune database performance
- A **technical writer** to document metadata and write training material
- **Support staff**, including trainers and help desk personnel

We've seen many BI programs at large companies that have teams of 50 or more people along with dozens of contractors. The large teams are required gather requirements, architect solutions, document metadata, train and support users, and purchase, configure, and integrate a host of tools, such as ETL (extract, transform, and load), data profiling, cleansing, scheduling, administration, data modeling, reporting, analysis, and monitoring tools, among others. Importantly, they need expertise in consolidating and integrating

data from heterogeneous systems and applications and reconciling and validating data quality. In many respects, BI solutions have forced organizations to set up their own systems integration shops at significant expense.

According to TDWI Research, the average data warehousing project costs \$1.1 million and takes 10 months to deliver, while a data mart project costs \$544,000 and takes six months to deliver.¹ So, these are not small projects. Despite the investment required, most BI solutions are used by less than 20 percent of employees (if that) and provide only departmental views of data. In such situations, executives inevitably question the wisdom of their analytical investments and begin to seek a better way.

The Packaged Option

Until recently, executives have had few alternatives to rolling their own BI systems. Some outsourced the development and maintenance of the solutions to consultants or systems integrators, but this often proved equally expensive and risky. Today, however, several vendors offer packaged analytic applications that promise to drastically reduce the time and cost to deploy a BI solution, while delivering an end-to-end view of corporate performance and role-based views for almost all employees in core functional areas.

Classic Packaged Analytic Application

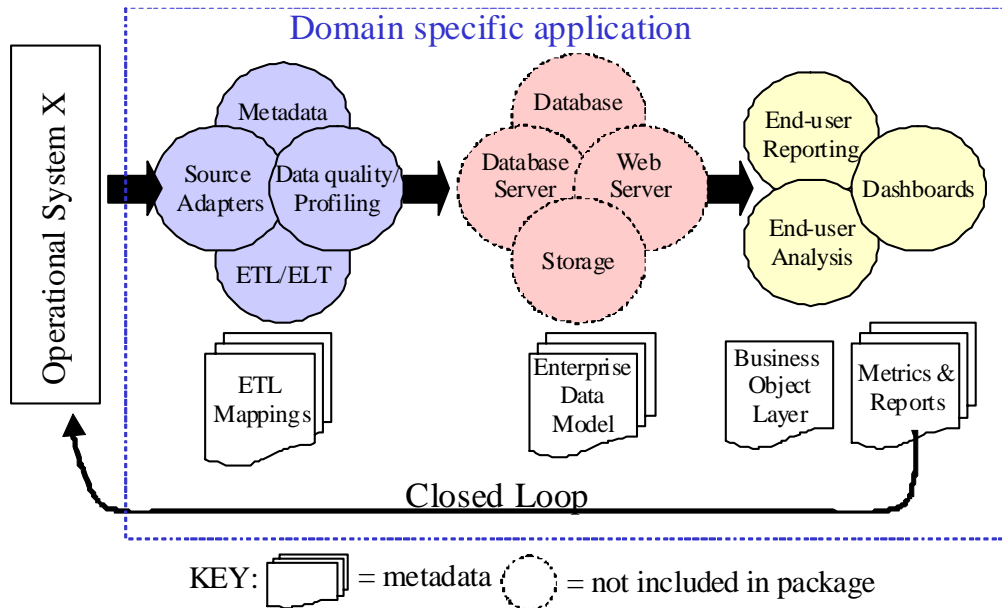


Figure 1. The architecture of a packaged analytic application and the components that come in leading packages. (Note that the database, database server, Web server, and storage are usually not included in analytic packages.)

¹ From *In Search of a Single Version of Truth: Strategies for Consolidating Analytic Silos* by Wayne Eckerson, TDWI Best Practices Report, 2004 (www.tdwi.org/research/reportseries). Technically, the numbers are for consolidating data warehouses, but the common approach for consolidation was starting from scratch.

Tools. Like their operational counterparts, packaged analytic applications come with all the components required to deliver a complete solution. (See Figure 1.) The leading packages contain tools for ETL (and ELT: extract, load, transform), data quality and profiling, reporting and analysis, and scorecarding and dashboarding. The only components that aren't typically bundled into an analytic package are the database management system, Web and database servers, and the storage system. Most organizations already have these components or have set corporate standards for them apart from their BI initiatives.

Metadata. Most analytic packages also contain an enterprise data model that supports multiple business functions (e.g., sales, finance, marketing), often tailored to specific industries. For example, an organization might purchase a sales analytic application for the grocery industry and then add other functions over time, all of which run off the same data model and platform. The best packages also contain ETL templates that map data from specific source systems to the enterprise data model. These templates usually require source system adapters that access and extract data from various packaged operational applications. Most packages also contain customizable adapters to support non-standard sources, such as Excel, Access, and custom-built operational applications. On the front end, the analytic packages come with predefined business views that provide a user-friendly representation of the enterprise data model. The business views enable business users to explore data dimensionally using business metrics, dimensions, and hierarchies with which they are familiar (e.g., "Show me sales by region, product, and salesperson").

Best Practices. Most importantly, analytic packages embed best practices for analyzing data in each domain. That is, the packages contain predefined metrics, reports, dashboard templates, and guided analytics that customers can use to track and analyze the performance of business functions. The metrics and reports represent the domain knowledge of experts who have implemented BI solutions for multiple clients and understand the best way to view and analyze information in specific functional areas. Customers can use the reports and dashboards as-is or tailor them to unique information requirements.

Some packages also "close the loop" between analytical and operational applications using guided analytics. These are pieces of conditional logic that guide users through a series of reports or actions to address a business issue or anomaly in the data. Some guided analytics instruct users to drill down to related reports, while others trigger alerts or recommend various actions based on values in the data (e.g., update a database, kick off a workflow).

Value Proposition

Benefits. We've already hinted at the value of packaged analytic applications compared to traditional, in-house BI solutions: quicker time to deploy, less overall cost, an enterprise view of data, role-based views for all employees, closed loop processing, and built-in best practices. In short, packaged analytic applications—when deployed correctly—take the grunt work out of delivering a BI solution. Since the package preintegrates the key components using a common set of metadata, the organization doesn't expend time, energy, money, and resources acting as its own BI systems integrator. This minimizes costs and the risk of failure.

At a recent Oracle customer event, several CIOs said that implementing a packaged analytic application took considerably less time, money, and headaches compared to custom-building a BI solution. “I’ll never build a data warehouse again,” said Ari Bose, CIO and Business Transformation Officer of UT Starcom, which has deployed packaged analytic applications for order management, financials, and supply chain, each of which took a team of three people less than 10 weeks to deploy. Prior to joining UT Starcom, Bose led the team that built an enterprise data warehouse for 3Com.

Time and Costs. Figure 2 illustrates the tangible advantages of an analytic package. When deployed properly, leading packaged analytic applications shrink the time required to complete the four major tasks involved in delivering BI solutions: 1) back-end ETL mapping; 2) designing the data warehouse data model; 3) defining metrics, reports, and dashboards; and 4) training and rolling out the solution.

The most significant gains are in the ETL mapping step, where a packaged solution can reduce time spent by half. And since creating ETL maps is the most labor-intensive part of building a BI application, this represents a significant time and cost savings. However, the package must support ETL mappings for the *specific* source systems that a customer wants to extract to achieve these accelerated deployment times. Even when using predefined ETL mappings, most organizations that have implemented analytic packages say that the bulk of the development process involves validating and fixing dirty data—something that no package can do without substantial human intervention.

A packaged analytic application also reduces the time required to build a data model, since it comes with an enterprise model that organizations can adopt out of the box or tailor to their specific needs. (It is highly recommended, however, that organizations minimize their customizations to packaged data models to avoid upgrade problems in the future.) In the same way, organizations can simply adopt or tailor the predefined reports and metrics in a packaged analytic application, which speeds the deployment process.

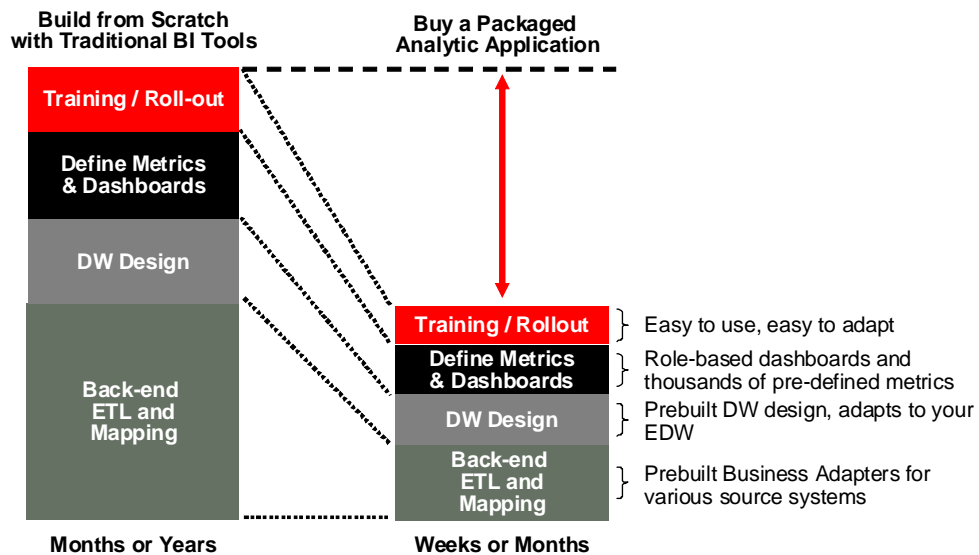


Figure 2. Time required to deploy a custom-built versus a packaged analytic application.

In essence, the only tasks required to implement a packaged analytic application are to install the software, configure the application, define security and roles-based views, refine reports based on user feedback, and test, train, and deploy. In contrast, there is a whole litany of tasks involved in building and deploying a custom analytic application. These are summarized in Table 1.

Tasks Involved in Deploying an Analytic Application

Buy Approach	Build Approach
Purchase and install software	Assemble a BI/DW design team
Configure the application	Gather user requirements
Define security and roles-based views	Design a DW data model
Refine reports based on user feedback	Analyze source systems
Test, train, and deploy	Purchase an ETL tool
	Create ETL mappings
	Document metadata
	Purchase BI tools
	Create business object model
	Create reports and metrics
	Define user roles and security
	Test, train, and deploy

Table 1. Deploying a packaged analytic application involves fewer tasks, especially if the package provides prebuilt ETL mappings for your source systems.

Enterprise View. Another advantage of packaged analytic applications is that they enable organizations to deploy BI on a small scale for a single department and then expand seamlessly to support other departments using the same model and platform, delivering a consistent view of enterprise information. In contrast, most organizations, in a rush to meet business needs, build distinct data marts for each department, none of which uses the same data model or dimensions. The roll-your-own BI approach usually creates dozens of analytic silos that must eventually be replaced or consolidated into a single enterprise data warehouse at great expense.

A robust packaged analytic application can also help an organization create a unified BI environment on a single, integrated platform and exploit industry best practices built into the packages. For example, Oracle offers seven categories of packaged analytic applications that span a vast spectrum of business processes, from finance and human resources to sales, marketing, and procurement. Each domain contains dozens of individual applications consisting of prebuilt reports, dashboards, metrics, and guided analytics. (See Figure 3.)

										
Sales	Service & Contact Center	Marketing	Procurement & Spend	Supply Chain & Order Management	Financials	Human Resources				
Pipeline Analysis	Service Effectiveness	Campaign Effectiveness	Direct / Indirect Spend	Revenue and Backlog	General Ledger	Employee Productivity				
Forecast Accuracy	Customer Satisfaction	Customer Insight	Buyer Productivity	Inventory	Accounts Receivable	Compensation				
Sales Team Effectiveness	Resolution Rates	Product Propensity	Off Contract Purchases	Fulfillment Status	Accounts Payable	Compliance Reporting				
Up-sell/ Cross-sell	Service Rep Efficiency	Loyalty & Attrition	Supplier Performance	Customer Status	Cash Flow	Workforce Profile				
Cycle Times	Service Cost	Market Basket Analysis	Purchase Cycle Time	Order Cycle Time	Profitability	Retention Analysis				
Lead Conversion	Churn & Service Trends	Campaign ROI	Employee Expenses	BOM Analysis	Expense Management	Return on Human Capital				

Figure 3. Oracle offers seven categories of packaged analytic applications for various functions, some of which are tailored to specific industries as well.

Oracle’s packaged analytic applications are built on a single enterprise data model consisting of hundreds of star schemas with conformed dimensions. The applications contain prebuilt ETL mappings to many packaged operational applications, including almost the entire Oracle E-business Suite, PeopleSoft Enterprise (human resources and financials), Siebel CRM, SAP 4.7, and JD Edwards Financials. The complete environment contains 35 dashboard applications, almost 1,000 prebuilt reports, more than 3,000 exposed metrics (with 15,000 built in and documented but not exposed), and hundreds of prebuilt, guided analytics and workflows, according to Joe Thomas, senior director of BI applications at Oracle. Given the scope of Oracle’s packaged analytic applications, it’s clear that it can serve as a robust BI environment for most organizations.

Challenges

Missing Pieces. Despite the benefits of packaged analytic applications, they are not suitable for every organization. For example, a package may not support the specific application or set of applications an organization needs. Perhaps the application is on the road map but not delivered yet, or maybe it is geared to a different industry or set of processes that don’t exist in your organization.

Even when an analytic package doesn’t support the necessary functional areas, some organizations decide the benefits of the packaged platform warrant custom development of the missing functionality. For example, Silicon Image deployed Oracle BI applications for order management and financials and developed a custom application to track cell phone usage on the same platform. “We decided to build a custom application on the same analytic framework as the other analytic applications so users could go to one place to get all their information,” says Kenny Gilbert, CIO of Silicon Image.

Over-Customizing. Sometimes organizations compensate for missing functionality by customizing a packaged application to make it fit. While many packages allow organizations to tailor the data model and reports, some organizations go overboard and spend nearly as much time and money customizing a package as it would have taken to build it from scratch. This undermines the total cost of ownership—the primary value driver for implementing packages—and also creates a migration nightmare when an organization upgrades the package to a newer version.

TDWI Research from 2002 shows that more than one-quarter of organizations that responded to the survey (27%) had customized more than 50% of a packaged analytic application and another quarter (24%) had customized between 30% and 40% of a package.² In the face of such extensive customizations, many of these projects surely imploded. Indeed, in the early days of packaged analytic applications, I heard about many multi-million dollar disasters.

Ecosystem. Another downside of packaged analytic applications is duplication. Since analytic packages come bundled with ETL and BI tools, among others, organizations might find themselves saddled with expenses related to maintaining duplicate tools. In these cases, organizations will need to decide whether to incur these extra licensing and training costs or to spend money customizing the package to accommodate their standard tool sets. They might even decide the costs or headaches of either approach are too great to warrant implementing a package at all.

Vendor Issues. Another potential disadvantage is that packaged analytic applications lock organizations into a single vendor. Although this might be good for some organizations (offering “one throat to choke”), it makes it difficult to switch vendors, since a package implements a data infrastructure that isn’t changed easily or inexpensively. Conversely, organizations must be careful not to implement multiple packaged analytic applications from different vendors, which would create islands of analytics that are not easily integrated. In this case, it would be best for organizations to create a unified strategy based on a single analytic platform to avert such problems.

Also, some analytic packages may not contain best-of-breed tools that are tightly integrated together. These types of analytic packages are more veneer than substance—essentially glorified suites with a pretty wrapper around products acquired from other companies. Customers of such offerings often cite performance and scalability problems. Obviously, it’s best to purchase packaged analytic applications from vendors that devote significant resources to developing, enhancing, and supporting a truly integrated package of best-of-breed BI applications.

² From *The Rise of Analytic Applications: Build or Buy?* by Wayne Eckerson, TDWI Best Practices Report, 2002 (www.tdwi.org/research/reportseries).

Recommendations

It's clear that packaged analytic applications promise a host of benefits and should be evaluated as part of any BI initiative. Organizations at different stages in their BI journeys should calculate the pros and cons of implementing packaged analytic applications. The following recommendations can help you determine whether packaged analytic applications are suitable for your organization:

- 1. Starting from Scratch.** If your organization has limited or no BI capabilities, then you should consider a packaged approach. If this is the case, then assess whether the package supports all the functions you need at the depth you require. A package that is tailored to your particular industry will come closest to meeting your needs with minimal customization. Packages that are easily configurable through administrative settings are much easier to upgrade to new versions than packages that require you to make significant changes to fact and dimension tables and business views.
- 2. Mixed Environment.** If your organization has deployed BI in pockets—for example, finance, sales, and marketing have built their own data marts—then you'll need to assess the political waters before implementing a packaged analytic application. If your organization is run in a decentralized fashion and each department has significant autonomy to build and maintain its own systems, then a package might suffice as a departmental initiative. However, most executives eventually want an enterprise view of information and will charge a team to deliver it. A package offers a convenient and cost-effective way to support other departmental BI initiatives on a single platform—provided you can overcome the politics and territoriality involved in such a decision.

Some departments may have an advanced, custom-built BI solution with a well-architected and designed data warehouse that integrates data across departments. In this case, the packaged application may not win the battle, but it can be useful to highlight the cost efficiency (or lack thereof) of the roll-your-own approach.

- 3. Mature Custom Environment.** When an organization already has an enterprise data warehouse, a package may be suitable as a stopgap measure to meet the pressing needs of an individual department that the central DW team doesn't have time to address. More commonly, however, organizations decide to embrace packaged applications when they want to consolidate multiple applications and systems and standardize on a single vendor's offerings to save money and streamline their supplier network. Such a decision usually affects both the operational and analytical sides of the business. The logic is that if they are going to standardize on an ERP package they should also standardize on the ERP vendor's analytic package. Usually, the vendor offers special financial incentives to encourage customers to adopt both their enterprise and analytic packages and argue that they can offer better integration between these environments than two different vendors.

Evaluation Criteria. Whatever your existing environment, you need to evaluate each analytic package carefully on its own merit:

- Does it have sufficient functionality?
- Are the modules tightly integrated?
- Is the architecture consistent across all applications and modules?
- Does it use a common set of security, administration, development, APIs, and scheduling tools?
- Does it support slowly changing dimensions?
- Are the applications tailored to your industry?
- Does it create a legitimate data warehouse?
- Does it use a model-driven approach to change management?
- Does it offer a rich set of configuration settings to tailor the application to your specific requirements without changing the core data model?
- Does it document how to upgrade customizations?
- Does it include best-of-breed tools for ETL, reporting, analysis, and dashboards?
- Can it work with tools other than the ones included in the package?

Until recently, packaged analytic applications were not sufficiently mature or integrated to deliver the promised benefits. But times have changed. Certain vendors now offer robust sets of packaged analytic applications built using best-of-breed products that run on a consistent set of metadata. Although packaged analytic applications aren't suitable in every situation, they can help organizations minimize the time and money needed to implement a robust BI solution that scales seamlessly from a single department across an enterprise. As such, it would behoove every organization to examine whether packaged analytic applications are right for them.

From our Sponsor

Oracle Business Intelligence (BI) Applications are complete, prebuilt BI solutions that deliver intuitive, role-based intelligence for everyone in an organization—from front-line employees to senior management—to enable better decisions, actions, and business processes. Designed for both “single source” and heterogeneous environments, these solutions enable organizations to gain insight from a range of data sources and applications, including Siebel, Oracle E-Business Suite, PeopleSoft Enterprise, JD Edwards, and third-party systems such as SAP.

Oracle Business Intelligence Applications were developed with the expectation that data resides in multiple places, and potentially, multiple packaged and custom-built applications. Oracle Business Intelligence Applications include prebuilt extract, transform, and load (ETL) adapters and business logic to tap into a multitude of common operational applications and data sources, including Oracle E-Business Suite, Siebel CRM, SAP, PeopleSoft Enterprise, JD Edwards, call center operational information such as IVR and CTI data, Web logs, flat files, and a host of other systems. Oracle BI Applications also include a prebuilt enterprise data warehouse design, optimized for use by business users, with common, conformed dimensions, enabling true cross-value-chain intelligence. In addition, the Oracle Business Intelligence Foundation enables real-time access and intelligence across virtually any enterprise data source. The result is that Oracle Business Intelligence Applications provide a secure, extensible, easy-to-use, cross-enterprise view, regardless of where the data may be physically stored.

Oracle BI Applications are built on the Oracle Business Intelligence Enterprise Edition (OBI EE), a comprehensive, innovative, and leading BI foundation. This enables organizations to realize the benefits of a packaged BI application, such as rapid deployment, lower TCO, and built-in best practices, while also being able to very easily extend those solutions to meet their specific needs, or to build completely custom BI applications—all on one common BI architecture.

Oracle currently offers the following BI Applications for the front and back office:

- Oracle Financial Analytics
- Oracle Human Resources Analytics
- Oracle Procurement and Spend Analytics
- Oracle Supply Chain and Order Management Analytics
- Oracle Contact Center Analytics
- Oracle Marketing Analytics
- Oracle Sales Analytics

For more information on Oracle BI Applications, please visit www.oracle.com/goto/obia or contact your Oracle account representative.