

# Oracle Business Intelligence Suite Enterprise Edition Plus – Technical Overview

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# Oracle Business Intelligence Suite Enterprise Edition Plus – Technical Overview

## **ENABLING THE INSIGHT DRIVEN ENTERPRISE**

Many organizations today use a plethora of different Business Intelligence (BI) tools and applications to collect information from a variety of sources, analyze it, and share it with users. However, many of these tools are (i) designed for professional analysts and not business users; (ii) are complex to use and have several functional limitations; (iii) are poorly integrated making it complex to share analyses across different tools; and (iv) have scalability and manageability limitations that make them expensive to maintain as the amount of data, the number of data sources, the number of active users, and the complexity of the analysis being performed grows. As a result, executives find that despite their continued investment in BI technology, they still do not have the relevant information they need to make decisions quickly and effectively.

In order to enable an insight-driven enterprise, both the role of BI and its technical architecture must evolve. In many organizations, BI is restricted to business analysts and expert users. This can be limiting as the business users in charge of operational, tactical and execution often do not have the insight they need to be as efficient and productive as they could be. In order for enterprises to maximize their potential in BI, it has to become so pervasive that it is available when and where it is needed and embedded into the daily routine of the entire organization. BI has to evolve from simply extracting data from warehouses and transactional source systems. It needs to be forward-looking and provide insight based on both historical and real-time data sources.

The BI environment today is fragmented. As a result it is difficult to get a unified view of the entire enterprise. There are discrepancies in the reports/insight derived from the fragmented systems as every system has its own way of interpreting the data in these disparate systems. BI needs to evolve such that it is no longer about reporting results but about driving business processes, whether that is driving the actions of front-line users, or becoming seamlessly linked into operational workflow.

And lastly, there is a shift from using disparate BI tools and using these tools to build applications from scratch, to increasing adoption of pre-built analytic solutions leveraging a unified, enterprise BI infrastructure. This entails leveraging industry best practices, thereby shortening time to value.

In summary, traditional BI tools were not designed to address the insight driven enterprise. A fundamentally different infrastructure and business intelligence solution set are required to meet this need.

## PRODUCT OVERVIEW

The Oracle Business Intelligence Suite Enterprise Edition Plus (OBIEE Plus) is designed to meet this evolving business need. It is a comprehensive suite of Business Intelligence tools and infrastructure designed to bring greater business visibility and insight to the broadest audiences of users, allowing any user in an organization to have Web-based self-service access to up-to-the-moment, relevant, and actionable intelligence.

OBIEE Plus comprises powerful BI server technology and BI presentation tools - referred to as Oracle BI Enterprise Edition (OBIEE) - and supplements them with specialty BI reporting tools secured in the Hyperion acquisition (Plus). Together, these technologies offer significant business intelligence functionality to enable the insight driven enterprise.

OBIEE is an integrated suite sharing a common service-oriented architecture; common data access services; common analytic and calculation infrastructure; common metadata management services; a common semantic business model; a common security model and user preferences; and common administration tools. It is designed to provide mission-critical scalability and performance with data source specific optimized request generation, optimized data access, advanced calculation, intelligent caching services, and clustering.

OBIEE consists of several interdependent components, with the Oracle BI Server at its core. For the purpose of this whitepaper, we will refer to these components as OBIEE:

- Oracle BI Server — a highly scalable, highly efficient query and analysis server that integrates data via sophisticated query federation capabilities from multiple relational, unstructured,

The Oracle Business Intelligence Suite Enterprise Edition Plus is a comprehensive suite of BI components designed to enable the insight driven enterprise.

OLAP, and pre-packaged application sources, whether Oracle or non-Oracle.

- Oracle BI Answers — a powerful ad-hoc query and analysis tool that works against a logical view of information from multiple data sources in a pure Web environment.
- Oracle BI Interactive Dashboard — rich, interactive pure Web dashboards that display personalized information to help guide users in effective decision making.
- Oracle BI Publisher — a highly scalable reporting engine capable of generating reports from multiple data sources in multiple formats via multiple delivery channels.
- Oracle BI Briefing Books — reports that capture a series of snapshots of an Oracle BI Dashboard or report allowing the information to be viewed offline presentation style.
- Oracle BI Disconnected Analytics — a packaged solution to offer Answers and Dashboards to mobile professionals on computers disconnected from the network.
- Oracle BI Office Plug-In — automatically synchronizes information from Answers to Microsoft Word, Excel, and PowerPoint.
- Oracle BI Delivers — an alerting engine to capture and distribute notifications via multiple channels in response to pre-defined business events to speed decision making.

The specialty BI reporting components acquired from Hyperion include a widely deployed set of Business Intelligence tools which offer significant complementary functionality to OBIEE. These areas include strong integration with multidimensional data sources such as Essbase, a report centric approach to query and reporting, as well as robust native access to SAP data. For the purposes of this white paper, we will refer to these as the “Plus” components:

- Hyperion Financial Reporting — a reporting solution for multi-dimensional data (OLAP) that generates highly formatted, GAAP compliant, book quality financial and management reports and supports the emerging XBRL standard.
- Hyperion Web Analysis — a context driven, thin client reporting and analysis tool that enables the graphical interaction, presentation and reporting of multi-dimensional (OLAP) data.

- Hyperion Interactive Reporting — a “report centric” query and reporting tool that transforms data from heterogeneous sources into meaningful queries, dashboards and reports via connection through the Oracle BI Server or direct connection to underlying databases as needed.
- Hyperion SQR — a high performance engine and development language for high volume, pixel perfect report creation, spanning multiple enterprise data sources including SAP R/3 and SAP Business Information Warehouse.

## **OBIEE DESIGN PRINCIPLES**

OBIEE is designed to meet the requirements for a new class of enterprise business intelligence solutions. It consists of a broad set of capabilities including ad-hoc query and analysis, interactive dashboards, reporting, proactive intelligence and alerts, mobile analytics, and more. OBIEE is designed around eight primary principles:

- **Unified Enterprise View of Information:** Virtually every organization has information fragmented in multiple repositories and enterprise applications. OBIEE enables organizations to define a single, consistent, and logical view of enterprise information across these heterogeneous systems such as data warehouses, multidimensional sources, and operational transaction systems. It provides the business with a unified, enterprise view of their information.
- **Unified Semantic View of Information:** OBIEE allows an organization to model the complex information sources of their business as a simple, semantically unified, logical business model. It provides facilities to map complex physical data structures including tables, derived measures, and OLAP cubes into business terms - abstracting how a business user expresses calculations. And it translates familiar, easy-to-understand business concepts into the technical details required to access the information. OBIEE is unique in the market because it defines an enterprise semantic layer that spans across the unified enterprise view of information.
- **Pervasive Access to Information:** OBIEE provides business users with the ability to access the information they need without having to wait for professional analysts. Because end-users work with the unified, semantic view of the information, they can access analyses across multiple devices via multiple

OBIEE is designed to provide a unified view of enterprise information via a unified Semantic Model. It offers pervasive access to information in real time and facilitates insight driven action through a unified analytic infrastructure. It is a platform for delivering Business Intelligence applications and is “hot pluggable”— integrating both Oracle and non-Oracle data sources.



delivery channels while maintaining a consistent definition of the information. Business users only need to learn one semantic layer. This semantic layer is a business-user friendly perspective and intuitive way to view their information.

- **Real-time Information Access:** With technologies like trickle feed ETL, Business Activity Monitoring, Business Event Management and federated data access directly from transaction processing systems, OBIEE allows users to combine historical and real-time information to get an up-to-the-minute view of their business. In addition, OBIEE can combine data from real-time systems with data in the Data Warehouse to give unparalleled insight into the business.
- **Insight-driven Action:** The pro-active intelligence facilities of Oracle BI Delivers and the Guided Analytics facilities of the Interactive Dashboards are designed to help business users navigate information quickly and to effectively troubleshoot problems and take action in response to business events.
- **Unified Infrastructure:** OBIEE is an integrated suite sharing a common service-oriented architecture; common data access services; a common analytic and calculation infrastructure; common metadata management services; a common semantic business model; a common security model and user preferences; and common administration tools which improve access to information and lower operational costs.
- **Pre-built Analytic Solutions:** OBIEE is designed to facilitate the development of Business Intelligence applications quickly and easily. Oracle offers a suite of operational Business Intelligence Applications built on OBIEE to provide faster time to value.
- **Hot Pluggable:** OBIEE is “hot pluggable” into any existing data sources; any major business application; and any security infrastructure. It works alongside an organization’s existing software tools to allow organizations to deploy OBIEE without having to replace existing investments.

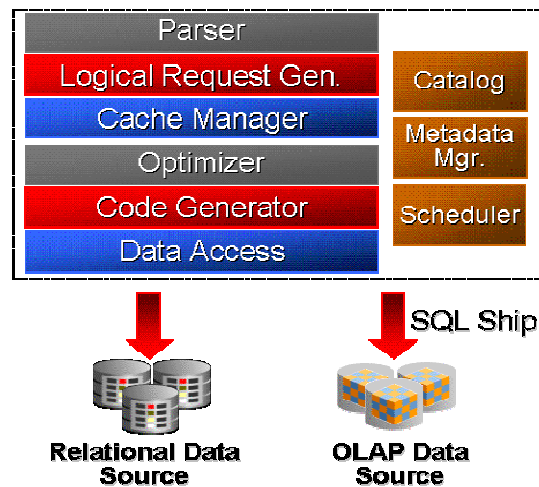
These eight principles are fundamental to the design of OBIEE. Let’s look at each of the key OBIEE components in detail.

Oracle BI Server is a highly scalable reporting and calculation server engine designed to optimize concurrency with highly efficient query processing.

## ORACLE BI SERVER

Oracle BI Server is a highly scalable, highly efficient query, reporting and analysis server that provides services that enable the other components of the Business Intelligence Suite such as Answers, Dashboards, Data Mining, Reporting, and Analytic Applications.

The Oracle BI Server exposes its services through standard ODBC 2.0 and JDBC compliant interfaces. At a simplified level, the internal layers of Oracle BI Server have two primary functions: (1) compile incoming query requests into executable code, and (2) execute the code. Clients of the Oracle BI Server see a logical schema view independent of the source physical database schemas. Oracle BI Server clients submit simplified logical SQL, which ultimately gets translated by the server to some combination of physical SQL sent to the back-end databases, in addition to intermediate processing within the Oracle BI Server Execution Engine. The Oracle BI Server infrastructure includes facilities such as session and query management, cancellation, statistics logging, monitoring, and other server administration functions. It manages security internally, using standard protocols e.g. LDAP, Active Directory or OID.



**Figure 1 – Oracle BI Server Services**

The Oracle BI Server provides the following key services:

The Oracle BI Server provides query parsing, logical request generation, query rewrite and caching optimizations, equivalence processing, code generation, parallel execution and other facilities to optimize query processing and analysis.

## Query Parsing and Compilation

Query compilation is composed of the following five phases: (1) parsing, (2) logical request generation, (3) navigation, (4) rewrites, and (5) code generation. The final output of the query compiler is executable code. This code is passed to the execution engine that is then responsible for executing the code in parallel. The Oracle BI Server has ground breaking innovation in query parsing and compilation techniques; content aware data federation; parallel execution; connectivity adapters; custom memory management and latch contention.

- **Parsing:** In the first compilation phase, the multi-threaded parser accepts the full ANSI SQL92 syntax (including sub-queries and derived tables) and generates a parse tree as its output. Subsequently, the logical request generation component is responsible for instantiating the inferred aggregation in the simplified SQL supported by the Oracle BI Server.
- **Logical Request Generation:** The navigation and rewrite phases do the bulk of the work in compiling a query. The output of these two major phases is an execution plan that is then fed into the code generation phase. The navigator is responsible for the content-aware data federation capabilities - the input to the navigator is a logical request tree describing the precise semantics of the requested data while its output is the initial physical execution plan. The navigator exploits knowledge of content to eliminate the predominant majority of traditional multi-database joins. It also has built-in support for common business analytics such as time series comparisons, shares, and dimension-specific aggregation rules.
- **Rewrite/Optimizations:** Once the navigator generates the initial physical execution plan, the rewrite phase of the compiler is responsible for distributed relational query optimization and optimal native SQL generation. This phase covers (i) Multi-database join plan generation; (ii) Function shipping; (iii) Functional compensation analysis; and (iv) Optimized SQL generation. The Oracle BI Server's join engine is seamlessly invoked when necessary, depending on the following: physical location of tables, SQL functionality supported by the source database(s), and analytical complexity of the original logical query. Join plans are constructed to maximize collective function shipping down to the source databases. Two types of

internal join strategies are currently supported: (1) sort/merge, and (2) nested loop, parameterized query joins. Optimal function shipping reduces loads on the source database and the network. The most important query processing elements to function ship include GROUP BY and aggregation; Filters; and Multi-pass SQL operations.

- **Equivalence Preserving:** aggregate and filter rewrites may push aggregates and filters through the tree (past operators such as joins, union alls, etc.) down to the database, thus reducing database load and network traffic. Both WHERE and HAVING filters may also be pushed to the database, depending on the GROUP BY clause.

### **Code Generation**

Code generation is responsible for producing the native query processing language directives to communicate with heterogeneous, remote databases (i.e. physical SQL generation). It is also responsible for generating the code for any remaining query processing that has not been function shipped to remote databases. This includes the insertion of parallel execution directives for the Analytics execution engine.

### **Parallel Execution Engine**

The Oracle BI Server execution engine is a state-of-the-art; parallel SQL execution engine extended with analytical execution operators. It leverages the sophisticated technology and architectural concepts developed over the past 20 years in the database research community. Some of its key features:

- **Function Shipping:** The Oracle BI Server ships directives for native SQL query strings; directives to execute one or more aggregation passes; and directives for various types of filters to the source database.
- **Parallel Query Execution:** The Oracle BI Server allows multiple queries to be submitted and executed in parallel, perhaps on different machines. Any cancellations would also be done in parallel.
- **Sort Optimizations:** If sorts required for the FULL OUTER JOIN cannot be pushed to the databases, the Oracle BI Server has facilities to allow sorts to be done in parallel. It ensures that no rows are lost between the two queries.

- Merge: The Oracle BI Server has sophisticated join facilities to merge two or more result sets from several parallel queries.
- Ranking and Filtering: The Oracle BI Server can rank and filter rows efficiently.

### **Information Reliability**

Oracle BI Server defines and stores all the elements of analytic calculations as metadata in a central repository. This provides a centralized, consistent definition of measures for all users. Should the definition of a measure change, it needs only be changed within the central repository and all analyses automatically use the new definition. This eases the maintenance burden and lowers cost of ownership.

### **Accessing Oracle BI Server Information**

Oracle BI Server presents itself to other applications as an ODBC 2.0 data source. This means that virtually any ODBC-capable report writer or query tool can use the Oracle BI Server as if it were a relational database. When it does, the query/reporting tool: (i) does not need connectivity to underlying data sources; (ii) is completely insulated from changes in source tables and database platforms; (iii) immediately becomes aggregate aware; (iv) automatically takes advantage of the built-in security and connection pooling of the Oracle BI server, and (v) can use all the measures and columns of the subject area as if they were stored in a single simple database schema. This enables reporting tools to leverage all the derived measures contained in the logical data model the same as any other column. Users of these tools are insulated against returning erroneous results as a result of incorrect table joins or missing data – SQL traps sometimes known as chasm traps, fan traps, or missing data traps.

### **ORACLE BI PRESENTATION SERVICE**

The Oracle BI Presentation Service Server generates the user interface in Oracle Answers and Interactive Dashboards which are used to visualize data from the Oracle BI Server. It interacts with the Oracle BI server as an ODBC client and provides a number of important services: (i) it generates the Answers and Dashboards user interface; (ii) it responds to user selections, generates logical SQL for the Oracle BI Server, and caches logical SQL statements and their results; (iii) it records the specifications the user makes

The Oracle BI Presentation Service generates the user interface in Oracle Answers and Interactive Dashboards which are used to visualize data from the Oracle BI Server.

about how data should be presented and interacts with the charting engine to create charts; (iv) it pivots and aggregates data after the Oracle BI Server generates the result set and (v) provides user and group security for all of the Dashboards and Dashboard objects (reports).

When a user session begins, Oracle BI Presentation Service submits the user's identity (either username/password or some other token) to the Oracle BI Server; authenticates the user; and then requests the Oracle BI Server to provide the "databases", "tables", and "columns" that the user is entitled to use. These objects are displayed in the user interface as subject areas, folders, and columns. The Oracle BI Server also provides metadata information to Oracle BI Presentation Service about column properties such as data types, aggregation rules, and whether or not the user can drill on the column – each of these elements also affect how data is displayed in the user interface.

### **Features of Oracle BI Presentation Service**

Some of the important features of Oracle BI Presentation Service are:

- **Pure Web Environment:** Oracle BI Presentation Service provides a rich interactive user experience within a 100% pure Web environment based on HTML, DHTML, and JavaScript — no client downloads; no plug-ins; no Active-X controls; and no applets. This allows business users with very little training to define new analyses and create new queries by pointing and clicking against a browser based, logical model of information
- **Logical SQL Generation:** Oracle BI Presentation Service allows users to visually define queries within the Answers and Dashboard interfaces. It presents a graphical representation of the query as the user selects and manipulates columns and adds filters (constraints) to the query. The Answers interface also allows users to enter logical SQL directly – the results can still be formatted and displayed within Answers. Once the user submits the query, Oracle BI Presentation Service sends logical SQL to the Oracle BI Server.
- **User Interface Personalization:** When Answers and Dashboard users personalize the structure of their user interface including defining views, layout specification, properties of individual charts, tables, and pivot tables, Oracle BI Presentation Service stores these personalization definitions in a metadata catalog called the Web Catalog as an XML Schema that includes

The Oracle BI Presentation Service provides a number of services such as User Interface Generation and Personalization, Logical SQL Generation, Web Catalog Administration, and Web Services Interfaces in order to embed user interfaces within other applications.

metadata about the user interface and security information such as users, groups, and roles.

- **Web Catalog Administration:** Oracle BI Presentation Service provides a pure browser-based administration tool to administer a Web Catalog. Administrators can control which users can access what dashboards; set user privileges; create and manage groups and roles; change group membership lists; re-name or delete catalog folders and saved analyses, and view and manage sessions.
- **Web Services Interface:** Oracle BI Presentation Service offers a programming interface using the Simple Object Access Protocol (SOAP). The SOAP API can be used to build a custom user interface or embed Oracle Analytics functionality within existing applications. This API can be used to start and manage web sessions; retrieve results from Oracle BI Presentation Service in XML format; embed Oracle BI Presentation Service results in third-party dynamic Web pages and Portal Frameworks including Oracle Portal and any other JSR-168/WSRP compliant Portal; merge report parameters and logical SQL to create analyses and return results; and navigate and manage the Web Catalog.
- **Performance and Scalability:** Oracle BI Presentation Service allows web servers to be clustered for scalability. If web server processing capacity becomes a bottleneck to system performance, an administrator can configure multiple Oracle BI Presentation Service and HTTP servers. A variety of load balancing facilities are supported to distribute user sessions and maintain session affinity with the HTTP server it selected for that session.

These are the core features of Oracle BI Server and Oracle BI Presentation Service and how they work. The next sections of this document will explore Oracle Answers and Interactive Dashboards in more detail.

Oracle BI Answers provides end users with ad-hoc query and analysis capability in a pure Web environment enabling users to create new analyses from scratch and to modify and change dashboards.

## **ORACLE BI ANSWERS**

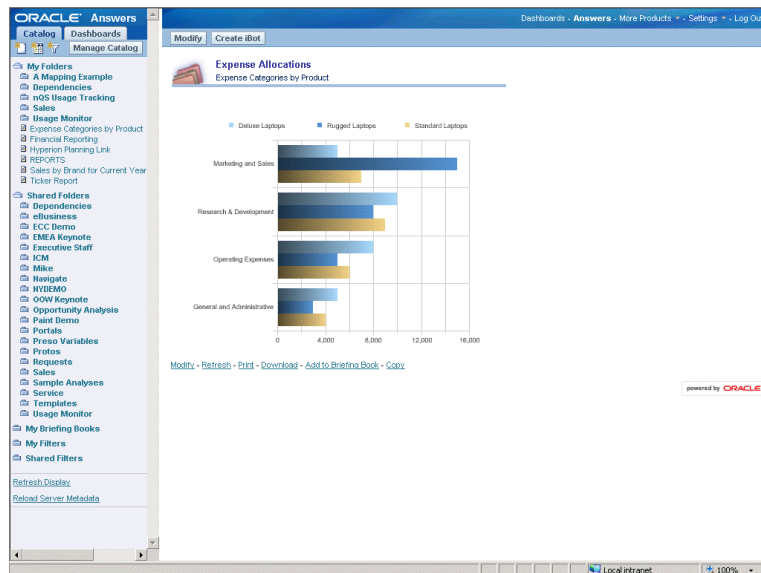
Oracle BI Answers provides end users with broad ad-hoc query and analysis capabilities. It is a pure Web-based environment that is designed for users who want to create new analyses from scratch or modify and change existing analyses that appear on a dashboard page. Users interact with a logical view of the information — completely hidden from data structure complexity — and can easily create charts, pivot tables, reports, gauges, and dashboards, all of which are interactive and drillable and can be saved, shared, modified, formatted, or embedded in the user's personalized Dashboard or Enterprise Portal. Oracle BI Answers is the solution for ad-hoc query and analysis, and for creating the reports that will be used on Dashboards.

### **Using Oracle BI Answers**

Users learn how to use Oracle BI Answers quickly. They work entirely within understandable models of information completely expressed in business terminology. The Oracle BI Answers user begins by choosing a subject area — such as "Marketing", "Sales", or "Inventory"— and selects a folder within Answers. Upon selecting a specific subject area, the user sees within the folder a set of "semantic business objects" that define the business terms against which the user can define calculations or analysis. For instance, if a user chooses "Sales" as a topic, he or she may find items such as "Gross Revenue", "Net Revenue", "Net Revenue % Change vs. Last Year", or "Net Revenue Rank". A specific business term can be selected via a simple point and click to become columns in an analysis. Selecting objects named "Region", "Revenue", and "Current Month" creates a calculation such as "Show me the revenue for each region during the current month."

As the user selects business terms or columns, Oracle BI Answers builds a query. This query is referred to as "logical SQL", since it expresses the logical content of the request. This logical query will be sent to the Oracle BI Server, which will interpret the logical query and create subsequent physical queries to the underlying data sources where the data is stored.





**Figure 2. Oracle BI Answers: User Interface**

### Features of Oracle BI Answers

Some of the important features of Oracle BI Answers are:

- **Data Storage Independence:** Oracle BI Answers eliminates the need for users to understand physical data storage — what physical table stores revenue for the current month, for instance. Measures can be selected with a single click even if the information is stored in two separate physical databases. Oracle BI Answers also eliminates the need for users to understand how business rules are constructed, for example, how revenue is calculated.
- **Powerful Visualization Facilities:** Oracle BI Answers enables users to view data in several ways — tables, charts, or pivoted tables — and to combine multiple views in a compound view. After saving the analysis, users click to the dashboard editor to embed the views in dashboard pages.
- **Sharing Analysis Online:** Analyses, once constructed, can be saved for personal use or published for use by a wider audience. These can be modified without limit.
- **Saved Analysis:** Measures, descriptive attributes, filters, sorting patterns, sub-totals, charts, and pivot table views can be added, deleted, or changed. After a user makes all the changes, the new analysis can be saved and shared with a group of users.
- **Powerful Ad-Hoc Analysis:** Since the analytic process is often iterative — select measures, add filters, examine results, add

new columns, change filters, delete columns, and so on — Oracle BI Answers does not impose a prescribed order in which calculations are defined such as measures first, then attributes, and then filters.

- Personalization: Oracle BI Answers automatically filters and personalizes information by user based on the user's identity or role.

### **Physical Data Storage Independence**

Oracle BI Answers eliminates the need for business users to understand physical data storage and enables them to combine data from multiple enterprise information sources quickly and easily.

Oracle BI Answers eliminates the need for business users to understand physical data storage and enables them to combine data from multiple enterprise information sources quickly and easily. Some of the key features of Oracle BI Answers in this area are:

- Combining Structured Data from Multiple Sources: Oracle BI Answers allows users to combine data from multiple applications or databases in a single calculation. For instance, to compare sales forecasts, quotas, and actual revenue to accurately predict revenue growth, a business user may need to combine data from three sources – the forecasting system, the sales system, and the general ledger. Within Oracle BI Answers the three sources appear as one logical source to the business user.
- Combining Relational and OLAP Data Sources: Oracle BI Answers allows users to combine data from a relational system and an OLAP source in a single calculation. For instance, to compare sales forecasts from an Oracle CRM System with revenue data from a SAP BI/DW Warehouse. Within Oracle BI Answers the forecast and revenue data appear to be from the same logical source.
- Combining Relational and Spreadsheet Data Sources: Oracle BI Answers allows users to combine data from relational databases with non-relational data from Excel spreadsheets, for example, in a single calculation.
- Combining Transactional Data with Data Warehouse Information: Finally, Oracle BI Answers allows users to combine data from a data warehouse with information from transaction processing systems in a single calculation.

Unlike Oracle BI Answers, many business intelligence tools restrict users by allowing them to access information from only a single data source in a specific calculation. In addition, some of these tools

even restrict a user's access to a single data source during an entire session.

### **Complex Business Measures**

Oracle BI Answers allows users to easily use complex business measures and derived metrics eliminating the need for time-based reporting tables and simplifying data management.

Oracle BI Answers allows users to select complex business measures — such as market share changes versus a year ago or sales percentage changes versus a year ago — in calculations. Some of the key features of Oracle BI Answers are:

- *Complex Business Measures* are a challenge to compute in SQL or in most commonly used reporting products because they either: (i) involve "row to row" comparisons, something SQL was not designed to do, or (ii) involve queries that combine multiple levels of aggregation. Oracle BI Answers allows complex business measures to be calculated query execution time without having to pre-calculate and store data.
- *Eliminates Time-based Reporting Tables*: Oracle BI Answers eliminates the need to create and store complex time-based reporting tables. For instance, most organizations have tables structured with N\*M columns representing the last N periods of data for M measures plus N\*M more showing the variance from last year and so on. Oracle Answers makes these measures available by simply defining them in metadata, thereby eliminating the need to build and maintain such tables.
- *Derived Measures*: Oracle BI Answers simplifies the use of derived measures i.e. measures that are computed on a query result set such as ranks, Ntiles, standard deviations, running totals, moving averages, and moving medians. These derived measures are difficult to compute in SQL but are very useful — moving average and moving median are valuable functions for smoothing data and discerning trends. Oracle BI Answers allows users to define new formulas using existing measures.

### **ORACLE BI INTERACTIVE DASHBOARD**

Oracle BI Interactive Dashboard makes it easy for business users to access their Business Intelligence information. Oracle BI Interactive Dashboard runs within a pure Web architecture and provides users with a rich, interactive experience by providing information that is filtered and personalized to a user's identity or role. This makes information intuitive and easy to understand and helps guide users in their decision making. Much of the content on the Dashboards is created from within Oracle BI Answers. Users work with live reports, prompts, charts, tables, pivot tables, graphics, and tickers. They

Oracle BI Interactive Dashboard runs within a pure Web architecture and provide users with a rich, interactive user experience with information filtered and personalized to a user's identity or role; making information intuitive and easy to understand.

have the ability to quickly and easily navigate to the information they need; drill in place for further analysis; modify calculations; and interact with results. Users have the ability to quickly and easily aggregate structured data from relational databases; legacy data from mainframe and other systems; as well as unstructured content from a wide variety of sources, including the Internet, shared file servers, and document repositories.

### Using Oracle BI Interactive Dashboard

Business users build Oracle BI Interactive Dashboards without any involvement from an IT specialist and no programming. They create dashboard pages and select and organize content using a web-based dashboard editor. To add content to a page, a user simply drags and drops the analysis from a web catalog in the left panel. The web catalog lists all saved content – prompts, analyses, and dashboard pages. Users interact with dashboard content by selecting prompted values and filtering data; drilling on charts or tables to access detail; changing the sort order or sort direction of columns; maintaining context and moving to a different analysis by automatically passing constraints; or selecting columns to display. Oracle BI Interactive Dashboards are flexible information containers. They can embed a corporate "portal", web page or image on the Internet/intranet, a Word document, or Excel workbook.

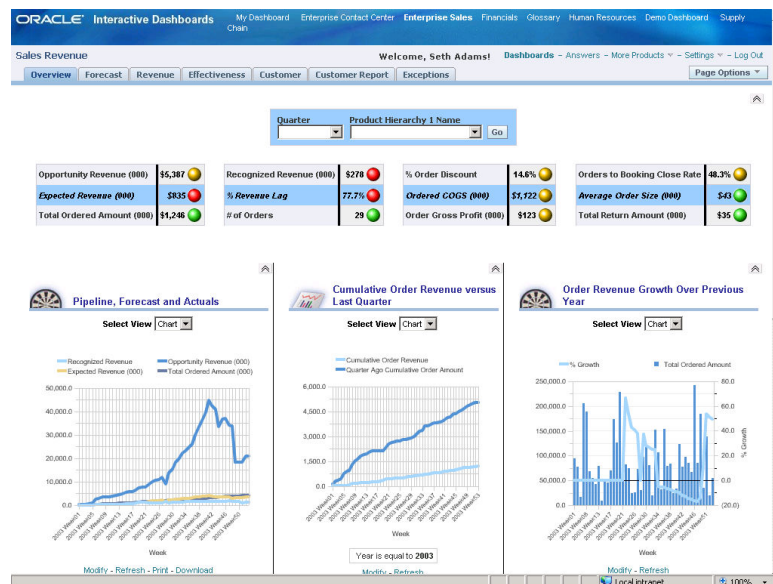


Figure 3. Oracle BI Interactive Dashboard

## Features of Oracle BI Interactive Dashboard

Some of the important features of Interactive Dashboard are:

- **Power of Analytics:** Oracle BI Interactive Dashboard provides a powerful analytic environment for business users precluding the need for them to drop into query and analysis to perform complex calculations.
- **Sharing Information Online:** Oracle BI Interactive Dashboards can be published as online work centers enabling groups of users to share information with each other.
- **Personalization:** Oracle BI Interactive Dashboards can be personalized to automatically display data based on the user's identity or role.
- **Data Filtering:** Oracle BI Interactive Dashboards can be set up so that the analyses shown are determined by data and data threshold values set by the user.
- **Sharing Information Offline:** Oracle BI Interactive Dashboards can be saved and distributed for offline use as Briefing Books or Reports. Dashboard content and data can be downloaded to Excel or PowerPoint.
- **Saved Selections:** Users can modify analyses on Oracle BI Interactive Dashboards and save the modifications for their personal use. Dashboard specifications are stored in a secure catalog on a web server.
- **Changing Styles:** Oracle BI Interactive Dashboard utilizes the cascading style sheet standards. It is possible to modify dashboard styles by changing these style sheets, even providing different styles or "skins" to different groups of users.

## Guided Analytics with Oracle BI Interactive Dashboards

Guided Analytics is a feature of Oracle BI Interactive Dashboard that enables the content and layout of Oracle BI Interactive Dashboard to change dynamically based on changes in the information being analyzed. Specifically, sections in a dashboard page can be set up and only appear when there is "interesting" information in the data. For example, a dashboard for a sales manager might contain a section that only appears when sales volumes for major products have declined in the current quarter, or if customer complaints have become a problem, a section showing the rise in customer complaints would appear.

Individual links in a dashboard can work the same way. For example, when sales volumes for major products decline, a link

Guided Analytics is a feature of Oracle BI Interactive Dashboards that enables the content and layout of Interactive Dashboards to change dynamically based on changes in information being analyzed.

could appear with a message notifying the user of the decline. Clicking on the link would bring up an analysis (or a whole dashboard page of analyses) focusing on these products. Through guided analytics, organizations can capture best practices in the use of information by one user or one division and guide other users or divisions on how to use the system in the same way. For example, it is possible to capture how an organization's best sales manager uses information to be more effective, and using guided links and navigation within dashboard pages can be used to encourage every other sales manager in the organization to use information intelligence in the same way.

## **ORACLE BI PUBLISHER**

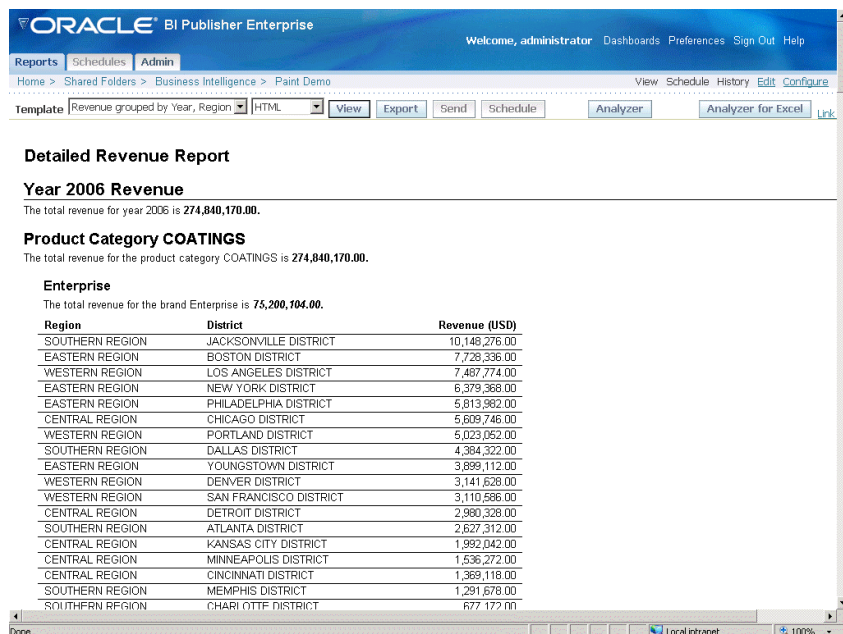
Oracle BI Publisher offers a highly efficient, scalable reporting solution with a central architecture for generating and delivering reports from multiple data sources, in multiple document formats, via multiple delivery channels, securely.

Oracle BI Publisher offers a highly scalable reporting server that generates and delivers reports from multiple data sources, in multiple document formats, via multiple delivery channels. Oracle BI Publisher reduces the high costs associated with the development, customization and maintenance of business documents while increasing the efficiency of reports management. Furthermore, it reduces a company's dependency on third party software systems that are required to format business documents. Utilizing a set of familiar desktop tools such as Adobe Acrobat and Microsoft Office users can create and maintain their own report formats based on data extracts supplied by a multitude of sources, including the Oracle BI Server. Oracle BI Publisher provides developers with precision control over report format, layout, and output—enabling the creation and distribution of “pixel-perfect” reports, regardless of graphical complexity. It is fully integrated with the other components of OBIEE and shares common metadata, security, calculation, caching, and intelligent request generation services.

## **Using Oracle BI Publisher**

Business users can quickly and easily use Oracle BI Publisher to create a report definition; define the data format for the report; schedule a reporting job to execute the report; specify the output and delivery channel for the report; and publish the report to an online document repository.

- **Defining a Report:** A business user creates the report definition using a pure Web client development environment. From this client, the user can connect to multiple data sources - including the Oracle BI Server - and define the data they would like to see published as a report.
- **Defining the Report Layout:** Once the data has been selected, a layout template for the report is defined. Users create the layout template using a commonly available tool – Microsoft Word or Excel, or Adobe Acrobat. Within these tools, Oracle BI Publisher provides a report builder wizard to define the report template and a desktop template viewer and debugger.
- **Report Delivery Format and Channels:** The user then accesses a pure Web administrative console and defines report delivery information such as users and roles authorized to access the report. In addition, new roles can be defined, as well as assigning reports to these roles and delivery channels for the reports. The user can specify multiple document formats and delivery channels for the same report.
- **Report Scheduling:** Having defined the report template, the user can then specify whether the report should be run immediately; run on a scheduled basis; review existing reports and history; or manage report jobs that are running.



**Figure 4. Oracle BI Publisher**

Oracle BI Publisher provides high performance reporting from multiple data sources, in multiple document formats, via multiple delivery channels. It supports high volume printing, scheduled report generation and bursting.

## Features of Oracle BI Publisher

Some of the important features of Oracle BI Publisher are:

- **Performance and Scalability:** Oracle BI Publisher has a highly efficient J2EE-based data extraction, formatting, and runtime engine. It can be deployed to any J2EE 1.3 compliant Application Server and exploits the scalability, concurrency, and availability facilities of the Application Server to provide highly efficient report generation.
- **Multiple Data Sources:** Oracle BI Publisher allows data from multiple structured data sources – Oracle BI Server, Oracle Databases, DB/2, SQL-Server, Informix, and Sybase Databases – and from unstructured data sources – Files, XML, Web Services, URLs – to be embedded in the same report. Oracle BI Publisher uses optimized connection pooling mechanisms when accessing data from these data sources.
- **Multiple Document Formats:** Oracle BI Publisher separates the definition of the data to be aggregated into a report from the format in which the report is to be published. A single report can therefore be simultaneously published in multiple document formats including Microsoft Word, Excel, RTF, PDF, XML, EDI, and others.
- **Multiple Delivery Options:** Oracle BI Publisher provides a variety of delivery options for generated reports. Reports can be published to online folders via WebDAV; they can be automatically attached to email for distribution; they can be send to Enterprise Print Servers; they can be placed on a file server from which they can be FTPed.
- **Batch Processing and Report Bursting:** Oracle BI Publisher is integrated with the Oracle BI Server's Job Scheduling facilities and can also be integrated with external Job Scheduling systems to drive batch reporting. It provides an easy to use administrative interface to define reporting jobs, schedule them, manage jobs, and track their status including taking corrective action if they have failed. Oracle BI Publisher supports advanced report bursting.
- **High Volume Printing:** Oracle BI Publisher provides advanced integration with Enterprise Printing Servers and Enterprise Printers (that support IPP and LCUP protocols) including queue management; capacity based distribution; failover and recovery.



- **Content Management and Search:** Reports generated by Oracle BI Publisher can be stored and managed in online folders. The online folders are themselves secured by role-based security. Documents within these folders can be searched using the powerful search facilities of Oracle Secure Enterprise Search.
- **Open Standards:** Finally, Oracle BI Publisher is based on Open Standards - Java, J2EE, XML, XSL-T, FO, RTF, PDF – allowing adoption alongside existing information technology investments and business intelligence tools.

Oracle BI Briefing Books are reports that capture the content of an Interactive Dashboard providing a way to create snapshots of dashboard pages, view them offline, or share them with others.

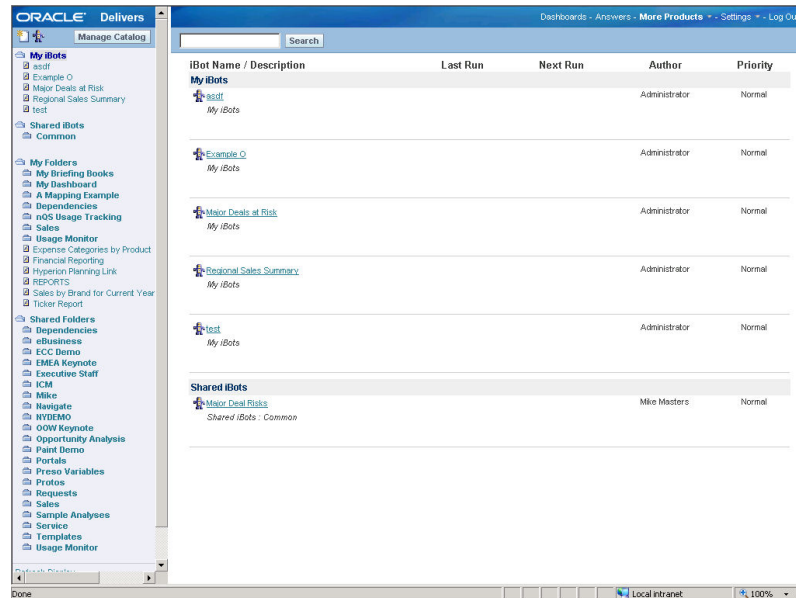
## **ORACLE BI BRIEFING BOOKS**

A Briefing Book is a report that captures the content of an Oracle BI Interactive Dashboard. It allows that content to be viewed by anyone with Briefing Book reader software. The Briefing Book provides a way to create snapshots of dashboard pages and reports, view them offline, or share them with others. Briefing Books have the same look and feel as a dashboard page. Multi-page Briefing Books have paging controls and are well-suited for presenting information to others. Briefing Books provide a way to archive the information in a dashboard and can be saved locally on a user's desktop. Users have the option to make Briefing Books "updateable" so they can be refreshed with up-to-date information from the corresponding dashboard with a single click on demand. Personalized Briefing Books can also be automatically sent to the distribution lists of users in a working group via email through Oracle BI Delivers.

## **ORACLE BI DELIVERS**

Oracle BI Delivers provides proactive monitoring of business information; it can identify patterns to determine whether specific problems are occurring; filter data based on data and time-based rules; alert users via multiple channels.

Oracle BI Delivers is a solution that provides the ability to proactively monitor business information; identify patterns to determine whether specific problems are occurring; filter the data based on data and time-based rules; alert users via multiple channels such as email, dashboards, and mobile devices including text messages and wireless phones; and allow users to take action in response to the alerts they have received. Alerts can be chained together. By passing contextual information from one alert to another, it is possible to execute a multi-step, multi-person, and multi-application analytical workflow. As well, Oracle BI Delivers dynamically determines recipients and personalized content to reach the right users at the right time with the right information.



**Figure 5. Oracle BI Delivers**

### Using Oracle BI Delivers

Oracle BI Delivers provides a Web-based self-service alert creation and subscription interface where users choose delivery options by creating individual delivery profiles. For example, a user might define an “out of office” delivery profile. Within a profile, delivery options can be varied according to the urgency of the alert. Alerts can be sent to individuals or groups. Users can save analyses designed in Oracle BI Answers, schedule them to run automatically, set data thresholds, and specify who is to be alerted when thresholds are exceeded. Oracle BI Delivers allows business executives to manage their organization by exception – receiving notifications and alerts from the BI infrastructure that is monitoring their organization and can quickly take action.

### Features of Oracle BI Delivers

Some of the features of Oracle BI Delivers are:

- **Create and Subscribe to Proactive Alerts:** Oracle BI Delivers presents an intuitive mechanism to allow business users to create, publish, and subscribe to proactive alerts and conditions. Users can select and schedule published requests to be executed and then delivered to them via a multitude of devices. Users can define alert conditions on data driven

thresholds on specific analytic measures and on time driven conditions.

- **Actionable iBots:** Oracle BI Delivers provides the ability for any user (not just administrators) to define their own processes, called ibots. Ibots “watch” for user-defined conditions and or thresholds upon which they notify the user. Oracle BI Delivers can take action based on a pre-defined decision tree. For example: “If supplies of Product A drop below 10,000 units, send an e-mail to me, the warehouse, and the supplier.”
- **Composite/Complex Conditions:** Oracle BI Delivers allows users to create ibots that watch for very complex conditions combining data-driven and time-based conditions on real-time and historical data.
- **Multiple Delivery Channels and Profiles:** Users can personalize how they wish to be notified (e-mail, pager, palm, phone call) at various times of day and week. Delivery profiles can be matched to individual alerts to which a user subscribes.

#### **Oracle BI Delivers and Oracle BPEL Process Manager**

Oracle BI Delivers can be configured to interact with Oracle BPEL (Business Process Execution Language) Process Manager – Oracle’s industry leading Business Process Management solution. Business users can drive an Enterprise Workflow process defined in Oracle BPEL Process Manager in response to an alert from Oracle BI Delivers. Oracle BI Delivers also interacts with other Enterprise Workflow systems such as Siebel’s workflow manger, in response to an alert.

#### **ORACLE BI OFFICE PLUG-IN**

The Oracle BI Office Plug-In integrates Business Intelligence information from the Oracle BI Server, Answers, Interactive Dashboards, and BI Publisher with the Microsoft Office environment, embedding up-to-the-minute corporate data in Microsoft Word, Excel, and PowerPoint documents. Users can share these Office documents with others over the web for collaborative decision-making.

Business users can waste a lot of time trying to cut and paste corporate data into their Microsoft Office documents. They need to determine (i) how to access data from many different systems; (ii) what security privileges they need to access this information; (iii) how to keep data in Microsoft Office current to avoid issues with

data accuracy; and (iv) determine how to protect data so that it does not get into the hands of unauthorized users. OBIEE's Microsoft Office Plug-in allows business users to add business intelligence information into Microsoft Office documents saving time; eliminating data accuracy problems; providing self-service access to information; and securely sharing information with co-workers with appropriate context.

There are some Excel users who prefer not to use specialized plug-ins. They would rather "access the data directly". In this case, ODBC connectivity enables these users to directly access the BI Server from Excel, MS Access, and other client programs.

### **Features of Oracle BI Office Plug-In**

There are several important features of the Oracle BI Office Plug-in.

- **Simplified Data Embedding:** The Oracle BI Office Plug-In makes embedding corporate data within Microsoft Office documents easy and efficient. A business user lays out a document template into which they would like to embed corporate data using Microsoft Word or Microsoft Excel. The user can easily change the layout; change the output format, and the locale (language, time zone) all within Microsoft Office. Once the user has defined the layout, they simply define a data source – either a database schema itself or a measure or dashboard within the Oracle BI Server – from which they would like to embed data into Microsoft Office. Facilities such as the Parameters Toolbar preserve analytic parameters within Microsoft Office.
- **100% Standard Microsoft Office Documents** – Unlike other Business Intelligence tools, Oracle BI Office Plug-In generates a 100% standard Microsoft Office document. This allows users to format, to re-organize the document, to use macros, to perform cell-based calculations within Microsoft Office and to integrate data from non-analytic sources into the same document. Users can also modify data filters, saved selections, rules and formulas as needed while retaining all existing formatting and calculations in Microsoft Office.
- **Simplifies Security:** The Oracle BI Office Plug-In preserves the user's security information when accessing corporate data from Microsoft Office documents. This eliminates the need to maintain a separate username/password for the user - the same username/password that the user uses to access Oracle

OBIEE's Microsoft Office Plug-In integrates information from the Oracle BI Server with the Microsoft Office environment, embedding up-to-the-minute corporate data in Microsoft Word, Excel, and PowerPoint, documents.

BI Interactive Dashboards can also be used to secure access to Microsoft Office, lowering security administration costs and simplifying maintenance.

- **Eliminates data inaccuracy:** The Oracle BI Office Plug-In eliminates data accuracy problems by allowing the user to choose to automatically refresh a single data item or all data in the Office document when the user connects to the network.
- **View Data in Context –** The Oracle BI Office Plug-In provides document recipients with greater context about the data they are accessing. By clicking on the data they are interested in, they can easily view the underlying report right from within Office.
- **Distribution:** The Oracle BI Office Plug-In allows users to share documents for collaborative decision making in a variety of ways: (i) place them online in an embedded dashboard; (ii) share them through online folders; (iii) share them through a Corporate Portal (Oracle Portal or others); (iv) share them as e-mail attachments.

Oracle BI Office Plug-In integrates with the familiar Microsoft Office environment to provide business users with an easy and efficient way to embed accurate, updateable data into their documents, spreadsheets, and presentations. Resulting Office documents can be shared securely with others for collaborative decision-making. The Oracle BI Office Plug-In simplifies security, is easy to install via the auto-update mechanism of Microsoft Office, and eliminates data inaccuracy with the live update feature.

## **ORACLE BI DISCONNECTED ANALYTICS**

Oracle BI Disconnected Analytics provides broad analytical functionality for the mobile professional, enabling interactive dashboards and ad hoc analysis on a laptop computer while disconnected from the corporate network. It provides the same intuitive interface for users whether they are working in a connected or disconnected mode. Oracle BI Disconnected Analytics leverages advanced data and metadata synchronization capabilities to move data; analytic metadata; dashboards; saved selections; filters to the mobile laptop environment. Oracle BI Disconnected Analytics allows for full and incremental synchronization of data with enterprise data sources. Data is personalized for each user, maintaining all role-based security and visibility, and is compressed during

Oracle BI Disconnected Analytics provides broad analytical functionality for the mobile professional, enabling interactive dashboards and ad hoc analysis on a laptop computer while disconnected from the corporate network.

synchronization, resulting in minimal data set size and fast synchronization times.

Oracle BI Server has an extensible, open connectivity layer with a set of adapters that are responsible for communicating with source data servers.

## ORACLE ANALYTICS ADAPTERS

Oracle BI Server has an extensible and open connectivity layer with a set of adapters that are responsible for communicating with source data servers. An Oracle Analytics Adapter is a dynamically loaded library that can be configured to run within the Oracle BI Server process itself or in an external process. Individual adapters have been built to communicate with for the following systems:

- *Relational Database Systems*: including Oracle, UDB DB2, OS390 DB2, AS400DB2, SQL Server, Teradata, Red Brick, Informix, Sybase, and Microsoft SQL-Server.
- *Various Host Data Sources* including VSAM, IDMS, IMS, and CICS.
- *Enterprise Applications* including Oracle, Peoplesoft Enterprise, JD Edwards Enterprise One, Oracle e-Business Suite, and SAP R/3 and mySAP.
- *OLAP Sources* including Oracle Database OLAP Services, Microsoft Analysis Services Cubes, Hyperion Essbase, and SAP BW Infocubes.
- *XML Data Sources* including access to other types of data servers (e.g., other non-relational servers), Microsoft Excel spreadsheets, and Web Services.

## MISSION CRITICAL PERFORMANCE, SCALABILITY, AND RELIABILITY

Oracle BI Server has a number of performance, scalability, and reliability optimizations to provide optimal performance and scalability whether users are constructing new analyses; changing the visualization of an existing analysis; or refreshing several analyses embedded on a single dashboard. The most important performance and scalability features are described below.

Oracle BI Server offers several performance and scalability optimizations including custom heap memory management to avoid memory contention issues; hashing to avoid central locking; specialized synchronization mechanisms such as spin latches; parallel query and computation execution engines; and high-throughput connectivity adapters.

## Highly Efficient Oracle BI Server Design

The Oracle BI Server offers several performance and scalability optimizations including custom heap memory management to avoid memory contention issues; hashing to avoid central locking; specialized synchronization mechanisms such as spin latches; parallel query and computation execution engines; and high-throughput connectivity adapters. When performance requirements exceed the capability of a single server, Oracle BI Servers can be clustered together with session replication and automatic fail-over.

## Highly Efficient Data Sourcing and Aggregation

Oracle BI Server minimizes data retrieval time by selecting the most efficient data sources to satisfy user queries. It is aware of and automatically selects "aggregate tables" in relational databases. Pre-aggregating and storing additive information is the standard practice for improving the query performance of relational databases. When users request information at a high "grain" of aggregation, the Oracle BI Server can use the pre-aggregated sources instead of requiring the database to add up the detail at report time. Oracle BI Server can select appropriate summary tables in lieu of the detail table based on where the requested columns are located in their respective hierarchies.

## Exploiting Database Facilities

Oracle BI Server also optimizes performance and minimizes network traffic by exploiting the native capabilities of the available relational database platforms. When generating SQL (or other query languages), the Oracle BI Server is aware of the functions and language constructs that the database supports and generates highly optimized target-specific SQL. The Oracle BI Server "function-ships" this optimized SQL to the database conducting as much processing as possible in the database itself. Examples of such differences between databases include string processing, statistical and mathematical functions; logical if-then-else statements; expression maps in HAVING clause; and others. Conversely, if the database platform does not support a function or a SQL feature, the Oracle BI Server will itself compensate for the missing functionality using its own computation and data processing engine. By doing so, it exploits the advances in query optimization, indexing, data partitioning and other technologies in relational databases. Note that the Oracle BI Server can perform a superset of the data manipulation and calculation capabilities of SQL-92

compatible database products. This ability to customize the query language to the platform and to compensate for missing functionality is unique to the Oracle BI Server.

### **Connection Pooling**

The Oracle BI Server can be configured with one or multiple connection pools for each database. The administrator can specify a maximum number of database connections to keep open until they are unused for a specified period. As the query load increases, the number of open connections increases in the connection pool. When the maximum number is reached, the server will queue new connection requests. This prevents database servers from being overloaded. With more than one connection pool configured per database, specific users or groups of users can be assigned to specific connection pools. This allows an administrator to give certain groups higher priority.

### **Query Reuse and Caching**

When multiple users access the Oracle BI Server, many queries will have similar content allowing the Oracle BI Server to intelligently re-use previous query results, a capability called "query caching".

These are the caching methods available:

- **Web Server:** Oracle Analytics' Web Server caches queries and query results. When a user submits a query, the web server examines the logical SQL to see if it matches an existing cached query. If it does, then the Web Server uses the results without re-submitting logical SQL to the Oracle BI Server. As a user generates new data views, manipulates a pivot table, or returns to a recently viewed dashboard page, the Web Server uses cached results. The user can explicitly "refresh" the query if needed.
- **Oracle BI Server:** Query caching also occurs inside the Oracle BI Server. The Oracle BI Server saves each logical query and all its components – the text of the logical SQL, the time and date of the query, the list of physical tables used in the SQL (or other query language), and the results of the query. The Oracle BI Server will analyze each new query it receives and determine whether it can answer it using cache.
- **Database Server:** The Oracle BI Server also allows queries that require extensive database processing to be pre-

Oracle BI Server offers query reuse and caching at the Web Server and within the Analytic Server reducing database workload and network traffic while improving dimensional browsing performance.

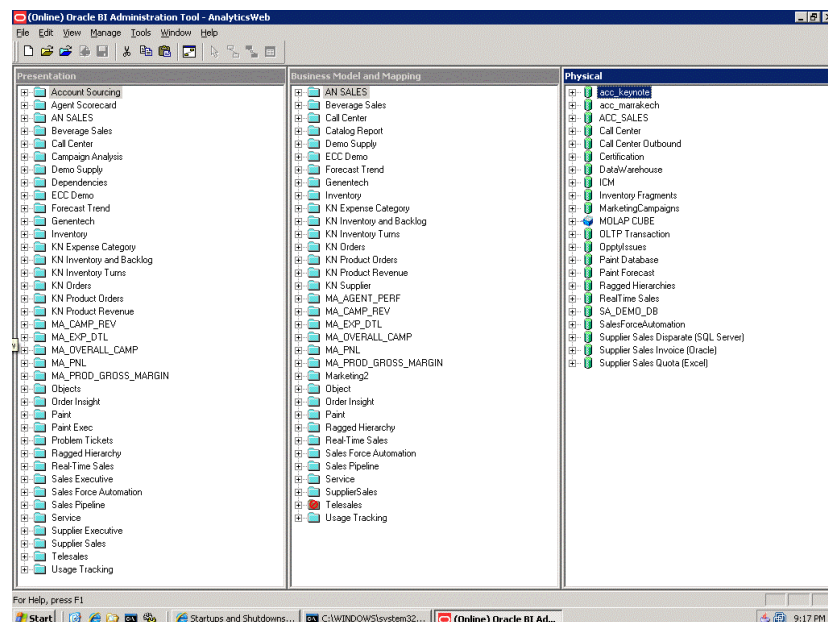


scheduled to run so that results are already available when users open their dashboards.

A frequently experienced benefit of caching is improved dimensional browsing performance. Since it has been estimated that 80% of user queries to a data warehouse are pure dimensional browses, this results in a significant reduction in database activity and improves the responsiveness of the system.

# ORACLE BUSINESS INTELLIGENCE ADMINISTRATOR

During system installation, an Oracle BI administrator specifies the content of physical table sources using a graphical administration tool. At runtime, the administrator uses these physical table content descriptions to mix and match physical table sources to answer the logically requested data. The administration tool has been designed with wizards, utilities, and interface design elements to help the administrator work efficiently with real-world, large-scale enterprise metadata. A calculation wizard helps administrators write formulas (e.g. percent share) and assures their correctness, while an Aggregate Persistence Wizard enables the administrator to automate the creation of aggregate tables and their mappings into the metadata. Project management features also enable multiple administrators to simultaneously work on the metadata repository.



**Figure 6. Oracle Business Intelligence Administrator**

## **Features of Oracle Business Intelligence Administrator**

Some of the key features of the Oracle Business Intelligence Administrator are:

- **Change Management:** The Oracle Business Intelligence Administrator provides a number of change management services. For instance, a rename wizard makes it easy to change the names of multiple objects at once, substituting text, changing case, and adding prefixes or suffixes. This makes it easy to drag and drop physical columns into the business model layer to give them more meaningful, readable logical names. The administrator can set the aggregation rule for a group of logical columns all at once, rather than one at a time.
- **Metadata Administration:** To make working with large repositories easier, the administration tool enables the administrator to structure and organize metadata, for instance by using folders to organize objects. The administrator can put all dimension tables in a single folder and all hierarchies into a different folder or alternatively put a dimension table and its related hierarchies in the same folder and use graphical icons to mark objects for specific purposes.
- **Dependency and Impact Analysis:** A query utility allows the administrator to find metadata objects by type, while filtering on properties and relationships to other objects. For example, an administrator could find all logical columns that are dependent on specific physical table or column to determine what “business objects” will be affected if a certain physical column is deleted in the database.
- **Export-Import:** The administration tool provides facilities to export and import metadata in order to move systems from staging to production environments and to export metadata to files for the purposes of documentation. A repository documentation utility generates a list of presentation columns, business model columns they correspond to, formulas, and physical sources they map to.
- **Multi-User Collaboration for Administration:** The administration tool can be used in both "offline" and "online" modes. Online edits take effect immediately after they are checked in without re-starting the server. The offline mode allows multiple administrators to edit a metadata repository concurrently. As

objects are selected for editing, they and objects that depend on them are automatically checked out and are available on a read-only basis to other administrators. They become available for editing again after they have been checked in. The administration tool and Oracle BI Server can be used in concert with any popular Source Code Management System.

- **User Administration:** The administration tool offers a way to view (and terminate) current user sessions; see the variables being used in each session; list the available cache entries by subject area, user, or physical table; and report on the recent history of cache usage. Usage logs written by the Oracle BI Server(s) can provide a basis for understanding usage patterns, response times, and load variations. This information is useful for diagnosing and tuning systems.

## **OBIEE KEY DIFFERENTIATORS**

The sections above provide a detailed technical overview of OBIEE. Let's briefly summarize some of the key technical differentiators between OBIEE and other Business Intelligence tools:

- **Unified Enterprise View of Information:** First, OBIEE enables organizations to combine enterprise data from multiple databases, enterprise applications, OLAP sources, and unstructured data sources in a single unified Enterprise View of Information and in a single calculation.
- **Unified Semantic View of Information:** Second, OBIEE allows an organization to model the complex information sources of their business in a simple, understandable, semantically unified, logical business model. This model-centric view (as compared to report-centric view of information) allows organizations to share the same definition for analytic measures/information across disparate users who may be calculating this information from disparate data marts and warehouses.
- **Pervasive Business Insight:** Third, OBIEE is the only suite that provides business users with access to the information they need, when they need it, on multiple devices via multiple delivery channels, while maintaining consistency in the definition of the calculations, without having to wait for professional analysts.
- **Real Time Predictive Insight:** Fourth, OBIEE allows business users to combine historical data and real-time information to

OBIEE has several key technical differentiators when compared to other Business Intelligence tools on the market today.

get an up-to-the-minute view of their business – not just “what happened” but “what is happening?”

- **Insight Driven Actions:** Fifth, the pro-active intelligence and Guided Analytics facilities of OBIEE help business users navigate quickly to troubleshoot problems and take action. Other tools are primarily focused on reporting what happened.
- **Business Process Optimization:** Sixth, the integration between the OBIEE and Oracle BPEL Process Manager is designed to help integrate Business Insight to drive Business Process Optimization – a feature Oracle calls “sense and respond.”
- **Fastest Time to Value:** Finally, with its unified infrastructure and its support for Pre-Packaged Analytic Applications, OBIEE provides the fastest time-to-value for Business Intelligence investments in the market today.

## **OBIEE PLUS**

With the acquisition of Hyperion Solutions, Oracle acquired a mature set of widely deployed, specialty Business Intelligence reporting tools. In conjunction with OBIEE, they form the Oracle Business Suite Enterprise Edition Plus (OBIEE Plus), offering Oracle BI customers even greater breadth of functionality in their drive to deploy Business Intelligence across the enterprise. These “Plus” tools offer significant, complementary functionality to OBIEE. These areas include strong integration with multidimensional data sources such as Essbase, a report centric approach to query and reporting, as well as native access to SAP data.

## **HYPERION FINANCIAL REPORTING**

Hyperion Financial Reporting delivers book-quality financial analysis and reports targeted at meeting the unique requirements of the Finance department or any department that requires very highly formatted multidimensional reporting. It turns enterprise data from sources such as Hyperion Financial Management, Hyperion Planning, Hyperion Essbase, as well as SAP BW and SQL Server Analysis Services into operational insights by providing board room quality financial reports in a variety of formats and for a range of audiences. These formats include HTML, PDF, and Microsoft Office and can be distributed either as live data or as static snapshots of data at specific points in time. Financial Reporting provides powerful

Hyperion Financial Reporting enables the production of highly formatted, book quality GAAP compliant financial and management reports in multiple output formats such as Web, PDF, Microsoft Office, as well as supporting the emerging XBRL standard.

business analytic features such as conditional suppression and automatic calculations that can be used to focus and filter reports.

### Using Financial Reporting

A graphical, object-based interface enables the rapid creation of reports that combine grids of data and text, charts, graphs, and images. In addition, a library of reusable report components simplifies and streamlines the process of building and maintaining complex reports. Users have complete control over layouts, formatting, fonts, and colors, as well as a flexible range of output options enabling wide distribution via print, HTML Web pages, PDF, and online viewing. Reports can be delivered on demand or scheduled for later distribution—enhancing an organization's financial planning, management, and control. Financial Reporting has the ability to create and save batches of reports in a repository and then send e-mail alerts when reports are ready to be viewed. Inside a standard Web browser, business users can employ Financial Reporting to interact with data by changing report selections, page members, and navigation options.

And all of this can be accomplished with minimal involvement from IT staff.

Eden Corporation Statement of Income Total Geography Jun			
Report Run Date: 05-Sep-06 5:10:01 PM by demoadmin			
Jun			Y-T-D (Jun)
Actual	Plan	Var %	Actual
\$ 157,041,183	\$ 136,812,611	\$ 13.13%	\$ 704,561,434
106,377,180	87,998,695	-20.68%	453,630,289
50,664,003	50,813,916	-0.30%	250,931,146
32.3%	36.6%	-	35.6%
395,186	394,898	2.46%	2,336,748
639,593	641,522	0.30%	3,553,351
495,964	495,507	-0.09%	2,697,474
969,598	960,989	0.15%	4,651,379
2,346,756	2,344,359	-0.10%	10,944,073
6,661,324	6,668,507	0.11%	34,086,432
2,114,102	2,115,227	0.05%	9,540,486
342,200	343,360	0.34%	1,590,949
3,011,415	3,042,316	1.02%	13,092,188
0	0	0.00%	0
16,956,098	17,006,685	0.30%	82,503,079
33,707,905	33,807,231	-0.29%	168,428,067
-3,790,603	-3,833,059	-1.11%	-15,205,672
\$ 29,917,302	\$ 29,974,172	\$ (0.19%)	\$ 153,222,395
			\$ 113,273,725
			\$ 35.27%

Figure 7. Hyperion Financial Reporting: Sample Report

## Features of Financial Reporting

Some of the key complementary features of Hyperion Financial Reporting are:

- *Depth of OLAP / Multidimensional features access:* Financial Reporting is designed specifically for financial and management reporting on multidimensional data sources. Dynamic member selection functions (e.g. Children, Descendants, Bottom, etc.) can be used for defining report metadata based on hierarchal locations of members. Conditional formatting and suppression can be applied based on member location in the hierarchy and account type. In addition, data is rendered in a cross-tab grid that exposes asymmetric queries and Microsoft Excel-like formatting capabilities with the ability to insert data, formula or text rows and columns.
- *Unique Performance Management Features:* Financial Reporting exposes reporting on PM data sources, where data source features (e.g. Hyperion's Financial Management, Planning and Essbase) are available to end users. Some of these features include cell text and file attachments, annotations, line item and supporting detail, Organization by Period reporting and multiple hierarchy selection. In addition, financial intelligence functionality is exposed via Financial Reporting's ability to recognize data source account types (e.g. Income, Expense, Asset, Liability) in calculations, as well as in other features.
- *XBRL Support:* eXtensible Business Reporting Language (XBRL®) is a freely available electronic language for financial reporting that is based on the eXtensible Markup Language (XML). XBRL provides financial communities with a standards based method to prepare, publish, reliably extract, and automatically exchange financial statements of publicly held companies. Financial Reporting users can consolidate, analyze, approve and then report financial results in XBRL formats—all within a single system and with minimal effort.

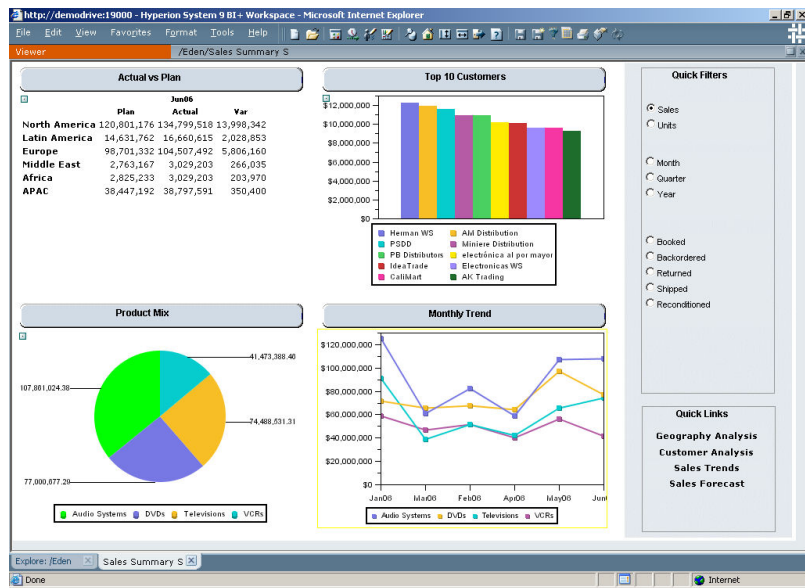
Hyperion Web Analysis provides a context driven, thin client interface for the presentation and reporting of multidimensional data with powerful point and click features such as slice, drill, pivot, drag and drop and a variety of flexible displays such as charts, grids, and pin boards.

## **HYPERION WEB ANALYSIS**

Hyperion Web Analysis delivers out-of-the-box, multidimensional Web-based interactive analytics, presentation, and reporting to the enterprise. It provides executives, business users, and analysts with intuitive, highly graphical user-directed query and analysis capabilities accessed through a context-driven, thin client user interface. It accesses data from enterprise sources such as Hyperion Financial Management, Hyperion Planning, Hyperion Essbase, as well as SAP BW and SQL Server Analysis Services. Web Analysis supports drill-through to relational sources, including drill-through to URL. The extreme ease of use provided through this “OBIEE Plus” module has lead to fast adoption and quick return on investment with a minimal amount of training.

### **Using Web Analysis**

With this interface, business users can visualize multidimensional information in a way that makes sense to them. It enables ad hoc analysis functionality that gives Web Analysis users the independence to create their own views and rapidly explore vast quantities of data with “point and click” ease. It provides a broad range of flexible, easy to use display types including grids, charts, and pin boards. Exceptions are highlighted through the use of traffic lighting. Charts, grids and pin boards are typically assembled into dashboards where multidimensional data can be dynamically filtered and updated by radio buttons, combo boxes, as well as other data selection and filtering controls. These highly interactive dashboards are created using the code free web based layout capabilities of Web Analysis. Users have complete control over layouts formatting, fonts, and colors, as well as a flexible array of output options. Advanced analytic navigation allows multiple selections with a single click. This includes capabilities such as sorting, top-to-bottom ranking and complex OLAP selections including subsets and restrictions.



**Figure 8. Hyperion Web Analysis: Sample Dashboard**

### Features of Web Analysis

Some of the important complementary features of Hyperion Web Analysis are:

- Depth of OLAP access / Multidimensional features access:**  
 Web Analysis has historically been the primary analytic presentation tool for interaction with Hyperion Essbase data. Its comprehensive OLAP functionality is also oriented toward other multidimensional data sources as listed above. Dynamic member selection functions (e.g. Children, Descendants, Bottom, Subsets, etc.) can be used for defining report metadata based on hierarchal locations of members. Web Analysis has ragged hierarchy support, multiple drill options, advanced data suppression, and alias table control. Web Analysis also exposes the Essbase “write back” feature which enables the creation of input templates within applications that need to update the Essbase repository (such as forecasting or scenario analysis) - under security.
- Interactive graphic analysis with rich visualization and analysis:**  
 Web Analysis views can be assembled into dashboard presentations so that any level of user (e.g. Power user vs. Information Consumer) can easily navigate the data. Users can view their data by drilling up or down through any hierarchy,



pivoting any dimensional axis, and drilling to other reports that may contain transactional detail. Views typically contain a variety of objects, including grids, charts, pin boards (e.g. graphical representation and navigation of data on a map), as well as links to other reports and member selection controls such as combo boxes, slider bars, and radio buttons. Data can be highlighted via conditional formatting (color coded exceptions) and advanced filtering (top n/bottom n reporting). As well, business users create their own local calculations.

- *Rapid application development with quick codeless views:* Web Analysis is ideal for developing dashboard-like reporting and analysis presentations, accessing applications such as management reporting, product profitability analysis, performance management, and promotional effectiveness. Complex views can be easily created in a simple, drag and drop environment without the need for any code. With the wide variety of components available for content navigation, users are given the look and feel of an interactive dashboard.

## **HYPERION INTERACTIVE REPORTING**

Hyperion Interactive Reporting offers an intuitive environment where users can transform data directly from heterogeneous sources into meaningful ad hoc query and reporting offering features such as sorting, ranking, filtering and the creation of computed items.

Hyperion Interactive Reporting helps individuals and departments quickly transform data directly from heterogeneous (and multiple) data sources – including the Oracle BI Server - into meaningful business intelligence. With powerful, user-directed query and analysis capabilities via an intuitive interface, business users can get the information necessary to drive good business decisions. The result: easy-to-access contextual, personalized information that can be used to pinpoint problems, spot trends, and respond to shifting business conditions.

Business users are able to pull together data directly from disparate sources to create understandable charts, pivots, reports and dashboards. Direct to source, “report-centric” uses cases include: early stage BI application life cycle such as rapid prototyping; situations where the data model is evolving and data sources are numerous; “one off” analysis; and situations where a quick turnaround time precludes building an enterprise model. For fast deployment with access to data locked in transactional system, Hyperion Interactive Reporting synthesizes information from multiple analyst reports, presentations, and spreadsheets to deliver a wide-ranging view of organizational performance.

## Using Interactive Reporting

The complexity of most BI tools has prevented many non-technical users from taking advantage of them—in the end limiting these tools’ usefulness because only a small subset of an organization’s users actually adopts them for their workflows. Not so with Hyperion Interactive Reporting. By providing drag-and-drop functionality, Hyperion Interactive Reporting’s thin client interface lets even the most non-technical users quickly create their own analyses without having to construct an enterprise semantic model. Power users, analysts, and IT professionals simply create common data models, which users then access, selecting the information they want to view, specifying how that information is sorted, defining filters, and creating computed items. The intuitive user interface hides the complexity of the most complex data sources, enabling users to simply select fields of interest, and get results. These same users can choose among a variety of options for displaying those results, including charts, gauges, and pivots for “cross-tab” style reporting. Conditional formatting further enables a management-by-exception paradigm. Further easing adoption, Hyperion Interactive Reporting allows mobile employees, customers, and partners to view business information even when they’re offline—for example, making it possible for managers to prepare presentations with rich analytic content while traveling to a meeting.

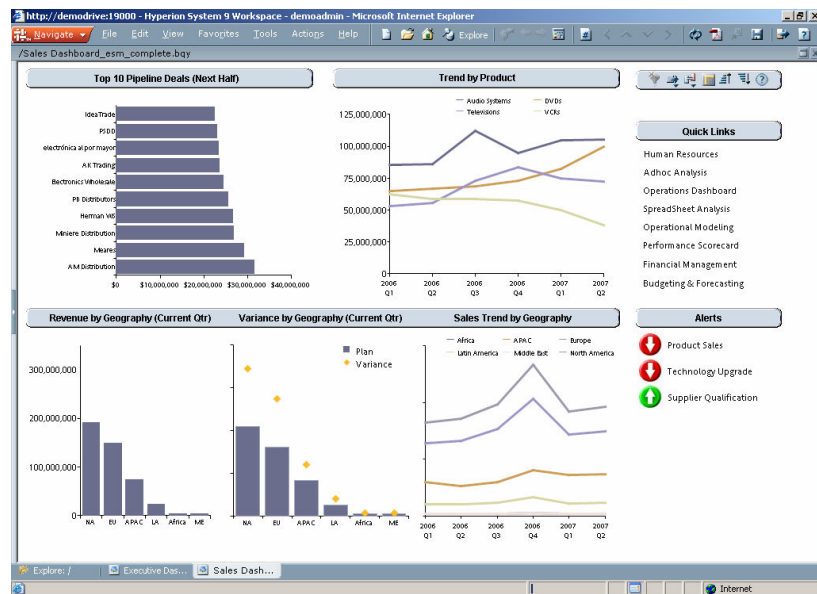


Figure 9. Hyperion Interactive Reporting: Sample Dashboard

## Features of Interactive Reporting

Key complementary features of Hyperion Interactive Reporting include:

- *Application Style Dashboards:* Interactive Reporting provides a 'drag and drop' dashboard creation environment. Users can create robust dashboards within a wizard driven environment, without code, in eight easy steps. Additionally, by utilizing a fully exposed object model for all Interactive Reporting components along with a java script based Integrated Development Environment (IDE) users can create highly customized dashboards to deliver specific and detailed custom analytic applications.
- *Disconnected analysis:* For the power user that requires powerful analytics while 'disconnected', Interactive Reporting meets their needs. Interactive Reporting can quickly connect to a Spreadsheet, Access Database or any other ODBC compliant data source to allow the analyst to utilize these 'one off' data sources in conjunction with the information retrieved from standard corporate IT systems.
- *First to query:* Since Interactive Reporting provides direct connectivity to a wide variety of heterogeneous data sources, this provides users with the ability to quickly connect to and query information from single or multiple database sources without the need for a semantic layer. In addition, Interactive Reporting can take advantage of the Oracle BI Server and the power of the common enterprise information model. By treating the Oracle BI Server as an ODBC data source, Interactive Reporting can directly leverage the OBIEE presentation layer for reporting and analysis. Providing the power and flexibility to the user community to choose to query directly against the database or use the Oracle BI Server is a key feature of Interactive Reporting.

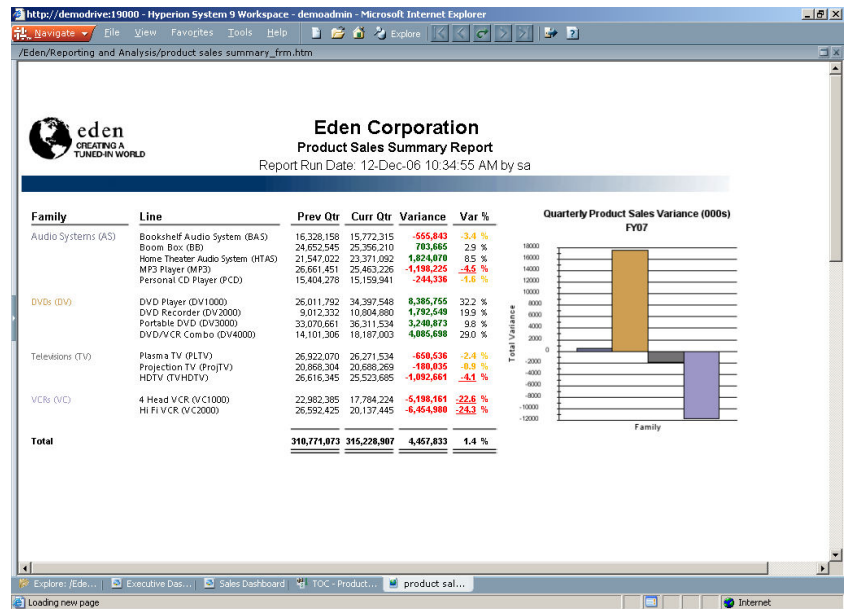
Hyperion SQR Production Reporting is a high performance engine for pixel perfect report creation, spanning multiple data sources including SAP R/3, and incorporating a powerful development language for advanced data processing and report formatting.

## **HYPERION SQR PRODUCTION REPORTING**

The success of a high volume, report generation solution often hinges on two factors—performance and the ability to consolidate information from multiple data sources. SQR Production Reporting provides that context by consolidating data from a variety of sources such as SAP R/3 for example, into a single cohesive and highly formatted report. This “OBIEE Plus” component generates high-volume, pixel-perfect reports offering built-in security, automatic versioning, report categorization, and archiving. Within the powerful SQR development language, developers can simplify the use and design of these complex reports by providing easy-to-use navigation, tables of contents, and search capabilities. When the complexity of a report is not reasonably handled within the Microsoft Word environment, SQR manages the most demanding report layout requirements with absolute precision. Due to its distributed processing architecture, Hyperion SQR Production Reporting can generate massive reports quickly and easily, and at specified times—a mission-critical need for many organizations.

### **Using SQR Production Reporting**

SQR Production Reporting has long been an industry mainstay for production reporting, providing secure delivery of reporting content to large numbers of users. It enables the production of reports that executives, analysts, and customers can access via a Web browser; interact with according to access privileges; and then print, download, or e-mail automatically.



**Figure 10. Hyperion SQR Production Reporting: Sample Report**

### Features of SQR Production Reporting

Key complementary features of Hyperion SQR Production Reporting are:

- *Powerful reporting language:* SQR combines procedural language flexibility with support for full SQL commands – creating a functionally rich environment for high volume, pixel perfect report generation. DML and DDL support allows for write-back scenarios to Relational Data Sources to update data or applications. Complex queries leverage dynamic SQL, stored procedures, lookup tables, cursor management and break logic. SQR has the ability to process high volumes of data in memory structures such as arrays and lookup tables.
- *Adapts to the changing demands of the organization:* SQR reports are portable across OS/DB platform combinations reducing development and administration overhead. There is a wide array of implementation options - as a separate reporting engine, embedded within an application and/or to provide data transformation services. Secure bursting secures multiple levels of a single report for distribution based on user profiles.

- *Broad Data Source and data access support:* SQR allows multiple data sources to be utilized in a single report. Relational (native, ODBC, JDBC), Multidimensional applications (Essbase, SAP R/3 & SAP BW, MSFT OLAP, XML as well as other legacy formats.

## CONCLUSION

Many organizations today use a plethora of different Business Intelligence tools and BI applications to collect information from a variety of source, analyze it, and share it with business users. These tools are not easy to use; have functional limitations; do not scale well as data and user volumes grow; and are difficult to manage. Executives find that despite their continued investments in Business Intelligence technology, they still do not have the relevant information they need to take decisions quickly and effectively.

The Oracle Business Intelligence Suite Enterprise Edition Plus is designed to meet the requirements for a new class of enterprise business intelligence solutions. It is a *comprehensive* suite of Business Intelligence Tools and infrastructure designed to bring greater business visibility and insight to the broadest audiences of users, allowing any user in an organization to have Web-based self-service access to up-to-the-moment, relevant, and actionable intelligence. The Oracle BI Suite Enterprise Edition Plus delivers a comprehensive set of capabilities that span ad-hoc query and analysis, OLAP analysis, interactive dashboards, reporting, proactive intelligence and alerts, mobile analytics, and more. It offers a unified view of Enterprise Information; empowers business users and analysts with pervasive insight; and combines real time and historical intelligence with alerting to drive actions to improve business performance. Oracle Business Intelligence Suite Enterprise Edition Plus offers the fastest time-to-value of any Business Intelligence offering on the market today.



Oracle Business Intelligence Suite Enterprise Edition Plus – Technical Overview  
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Author: John Brkopac

**Oracle Corporation**  
**World Headquarters**  
**500 Oracle Parkway**  
**Redwood Shores, CA 94065**  
**U.S.A.**

**Worldwide Inquiries:**  
**Phone: +1.650.506.7000**  
**Fax: +1.650.506.7200**  
**oracle.com**

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