

**ORACLE BUSINESS INTELLIGENCE SUITE
TECHNICAL OVERVIEW**

*An Oracle White Paper
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INTRODUCTION

Many organizations today use a plethora of different Business Intelligence 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 Business Intelligence technology, they still do not have the relevant information they need to take decisions quickly and effectively.

The Oracle Business Intelligence Suite is designed to meet the requirements for a new class of enterprise business intelligence solution. It is a *comprehensive* and *integrated* suite of Analytic Tools 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 consists of several products that can be used together or independently:

- *OracleBI Server* — a highly scalable, highly efficient query and analysis server that efficiently integrates data from multiple relational, unstructured, OLAP, and pre-packaged application sources, Oracle or non-Oracle.
- *OracleBI 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.
- *OracleBI Interactive Dashboard* — rich, interactive pure Web dashboards that display personalized information to guide users to precise and effective decisions.
- *OracleBI Publisher* — a highly scalable reporting engine to generate reports from multiple data sources in multiple document formats and to multiple delivery channels.
- *OracleBI Briefing Books* — reports that capture a snapshot of an Oracle Dashboard allowing the information to be viewed offline presentation style.
- *OracleBI Disconnected Analytics* — a packaged solution to offer Answers and Dashboards to mobile professionals on computers disconnected from the network.
- *OracleBI Office Plug-In* — automatically synchronizes information from Answers, Dashboards, and Reports to Microsoft Word, Excel, and Powerpoint.
- *OracleBI Delivers* — an alerting engine to capture and distribute notifications via multiple channels in response to pre-defined business events to speed decision making.

The Oracle Business Intelligence Suite is as an integrated suite sharing a common service-oriented architecture; common data access services; common analytic and calculation infrastructure; common metadata management services; common semantic business model; 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 and

The Oracle Business Intelligence Suite is an integrated suite of products designed to meet the rapidly evolving information needs of large and small organizations

integration, intelligent caching services, and clustering.

Since its introduction, the Oracle Business Intelligence product family has been one of the world's fastest growing Business Intelligence product suites. It has been adopted at 15 of the world's 25 largest companies according to Fortune Magazine and has broad adoption by the leading companies in virtually every major industry – financial services, telecommunications, health care and pharmaceuticals, manufacturing, consumer products, retailing, and transportation and logistics. This white paper explores the capabilities of the Oracle Business Intelligence Suite in detail starting with a description of some of the key design principles for the suite and following with a detailed discussion of each of the components of the Suite.

ORACLE BUSINESS INTELLIGENCE SUITE – DESIGN PRINCIPLES

The Oracle Business Intelligence Suite is designed to meet the requirements for a new class of enterprise business intelligence solution. It includes a comprehensive suite of products including ad-hoc query and analysis, OLAP analysis, interactive dashboards, reporting, proactive intelligence and alerts, mobile analytics, and more. The Oracle Business Intelligence Suite is designed around 8 primary principles:

- *Unified, Enterprise View of Information:* First, virtually every organization has information fragmented in multiple repositories and Enterprise Applications. The Oracle Suite enables organizations to define a single, consistent, and logical view of Enterprise Information across different data warehouses, multidimensional sources, and operational systems. It provides the business with a unified view of this information.
- *Unified Semantic View of Information:* Second, the Oracle Suite also allows an organization to model the complex information sources of their business as a simple, understandable, 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.
- *Pervasive Access to Information:* Third, the Oracle Suite also provides business users with the ability to access the information they need without having to wait for professional analysts. The user can access the analyses pervasively on multiple devices via multiple delivery channels while maintaining a consistent definition of the information.
- *Real-time Information Access:* Fourth, with technologies like trickle feed ETL, Business Activity Monitoring, Business Event Management and federated data access directly from transaction processing systems, the Oracle Suite allows users to combine historical and real-time information to get an up-to-the-minute view of their business.
- *Insight-driven Action:* Fifth, the pro-active intelligence facilities with Oracle Delivers and the Guided Analytics facilities of the Interactive Dashboards are designed to help business users navigate quickly and effectively to troubleshoot problems and to take action in response to business events. This is contrast to other Analytic Tools that focus on report collection.
- *Unified Infrastructure:* Sixth, the Oracle Suite has common data access services; a common analytic and calculation infrastructure; a common metadata management services; a common semantic business model; a common security model and user preferences; and common administration tools lowering operational costs and improving access to information.
- *Pre-built Analytic Solutions:* Seventh, the Oracle Suite is designed to facilitate the development of Analytic Applications quickly and easily. Oracle offers a suite of Analytic Applications built on the Oracle Business Intelligence Suite to provide faster

The Oracle Business Intelligence is designed to provide a Unified View of Enterprise Information; Unified Semantic Model; Pervasive Access to Information in Real Time; facilitates Insight Driven Action; Unified Analytic Infrastructure; a Platform for Analytic Applications; and is "Hot Pluggable"

Return-on-Investment (ROI).

- *Hot Pluggable:* Eighth, the Oracle Suite is “hot pluggable” into any existing data sources; any major business application; any security infrastructure; and alongside an organization’s existing analytic tools to allow organizations to adopt the Oracle Suite without having to replace existing investments.

These principles are fundamental to the design of the Oracle Business Intelligence Suite and provide important differentiators compared to other solutions in the market today.

ORACLEBI SERVER

OracleBI Server is a highly scalable, highly efficient query 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 Analytic Server itself exposes its services through a standard ODBC 2.0 compliant interface. At a simplified level, the internal layers of Analytic Server have two primary functions: (1) compile incoming query requests into executable code, and (2) execute the code. Clients of the Analytic Server see a logical schema view independent of the source physical database schemas. Analytic 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 Analytic Server Execution Engine. In addition, the Analytic Server also has necessary server infrastructure such as session and query management, cancellation, statistics logging, monitoring, and other server administration functions.

Oracle Analytic Server is a highly scalable, highly efficient query and calculation server designed to optimize concurrency with highly efficient query processing

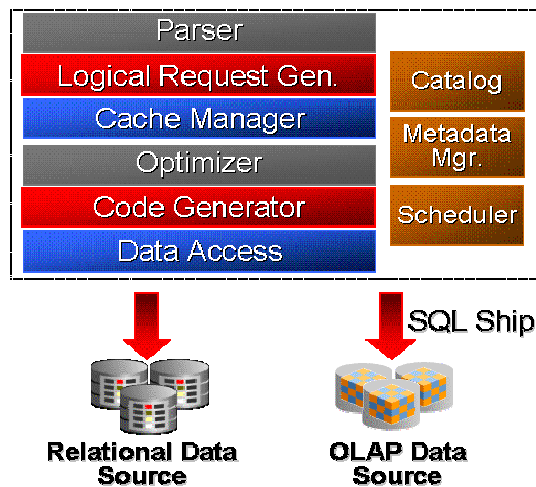


Figure – Oracle Analytic Server

The Analytic Server provides the following key services:

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 Analytic 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 Analytic 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 Analytic 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.

OracleBI 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

Code Generation

Code generation is responsible for generating 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 OracleBI 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 Analytic 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 Analytic 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:* In case, sorts required for the FULL OUTER JOIN cannot be pushed to the databases, the Analytic Server has facilities to allow sorts to be done in parallel. It ensures that no rows are lost between the two queries.
- *Merge:* The Analytic Server has sophisticated join facilities to merge two or more result sets from several parallel queries.
- *Ranking and Filtering:* It can also rank and filter rows efficiently.

Information Reliability

OracleBI 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 in one place and all analyses automatically use the new definition. In contrast, with products that capture these definitions as “reports variables” in individual report documents, a measure defined in one report may have the same name but a different definition in another report – and the possibility of having an incorrect definition in both. When definitions of report variables change, it has to be identified and modified in every report document making ongoing maintenance very expensive.

Accessing OracleBI Server Information

OracleBI Server itself 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 Oracle Analytics as if it were a 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 analytics 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. Users of these tools are also 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 ANALYTICS WEB

The Oracle Analytics Web Server generates the user interface in Oracle Answers and Interactive Dashboards used to visualize the data from the Analytic Server. It interacts with the analytics 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 Analytic Server, and caches logical SQL statements and their results; (iii) it records the specifications the user makes about how data should be presented and interacts with the charting engine to create charts; and (iv) it pivots and aggregates data after the analytics server generates the result set.

When a user session begins, Oracle Analytics Web submits the user’s identity (either username/password or some other token) to the analytics server; authenticates the user; and then requests the Analytics 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 analytics server also provides

Oracle Analytics Web generates the user interface in Oracle Answers and Interactive Dashboards used to visualize the data from the Analytic Server

metadata information to Oracle Analytics Web 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 Analytics Web

Some of the important features of Oracle Analytics Web are:

- *Pure Web Environment:* Oracle Analytics Web 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 logical model of information they see in their browser.
- *Logical SQL Generation:* Oracle Analytics Web allows users to visually define queries within the Answers and Dashboard interfaces, by presenting a visual picture 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 Analytics Web sends logical SQL to the Analytics 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 Analytics Web stores these personalization definitions in a metadata catalog called the Web Catalog as an XML Schema that includes metadata about the user interface and security information such as users, groups, and roles.
- *Web Catalog Administration:* Oracle Analytics Web 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 Analytics Web offers a programming interface using the Simple Object Access Protocol (SOAP). The SOAP API that can be used to build a custom user interface or to embed Oracle Analytics functionality within existing applications. This API can be used to start and manage web sessions; retrieve results from Analytics Web in XML format; embed Analytics Web 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 Analytics Web allows web servers to be clustered for scalability. If web server processing capacity becomes a bottleneck to system performance, an administrator can configure multiple Analytic Web 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.

Having explained the core features of the Analytic Server and Analytics Web and how they work, the next sections of this document will explore Oracle Answers and Interactive Dashboards in more detail.

ORACLEBI ANSWERS

Oracle Answers provides end users with true ad-hoc query and analysis capability. It is a

Oracle Analytics Web provides a number of services such as User Interface Generation and Personalization, Logical SQL Generation, Web Catalog Administration, and Web Services Interfaces to embed user interfaces within other Applications

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.

Using OracleBI Answers

Users learn to use Answers quickly. Users work entirely with understandable models of information completely expressed in business terminology. The Answers user begins by choosing a subject area — such as "Marketing", "Sales", or "Inventory"— by selecting 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 through 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."

OracleBI Answers provides end users with true 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

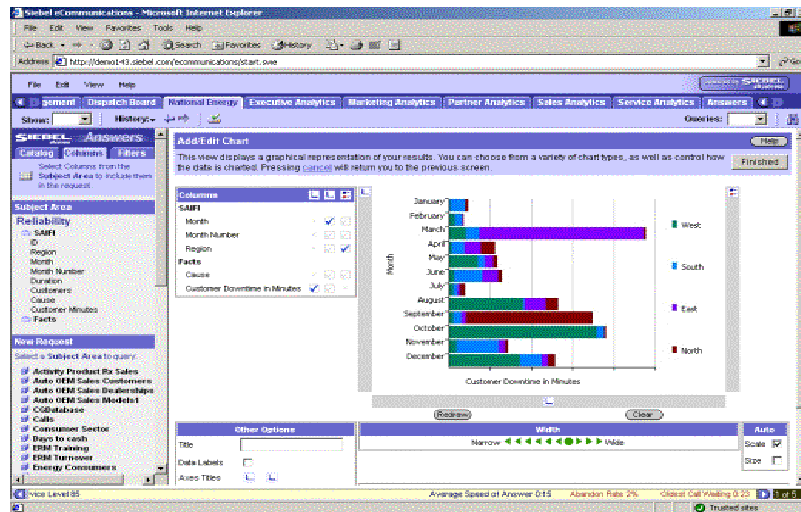


Figure – OracleBI Answers

As the user selects business terms or columns, Oracle 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 analytics server, which will interpret the logical query and create subsequent physical queries to the underlying data sources where the data is stored.

Features of OracleBI Answers

Some of the important features of OracleBI Answers are:

- *Data Storage Independence:* OracleBI Answers eliminates the need for users to understand physical data storage — in what table is the revenue for the current month stored, for instance. Measures can be selected with a single click even if the

information is stored in two separate physical databases. Oracle Answers eliminates the need for users to understand business rules, for instance, how revenue is calculated.

- *Powerful Visualization Facilities:* OracleBI 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. Unlike the report templates of other products, saved analyses 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, he or she can save the new analysis and share it 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 — OracleBI Answers does **not** impose a prescribed order in which calculations are defined such as measures first, attributes second, and filters third.
- *Personalization:* OracleBI Answers automatically filters and personalizes information for a user based on the user’s identity or role. With other products, role-specific personalization requires database administrators to define, create, and populate extra tables and views called “permission tables” that define data level filters. Oracle Answers personalizes information without relying on joins to permission tables; minimizing database changes; and making queries run more efficiently (joins to permissions tables can be expensive).

Physical Data Storage Independence

OracleBI 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 Answers in this area are:

- *Combining Structured Data from Multiple Sources:* OracleBI 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 3 sources – the forecasting system, the sales system, and the general ledger.
- *Combining Relational and OLAP Data Sources:* OracleBI Answers also 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.
- *Combining Structured and Unstructured Data Sources:* OracleBI Answers also allows users to combine structured data from relational databases with unstructured data from Excel spreadsheets for example in a single calculation.
- *Combining Transactional Data with Data Warehouse Information:* Finally, OracleBI Answers also allows users to combine data from a data warehouse with information from transaction processing systems in a single calculation.

In contrast, most business intelligence products restrict users to accessing information from only a single data source in a specific calculation and some even restrict a user’s access to a single data source during an entire session.

OracleBI 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

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

Complex Business Measures

OracleBI 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 Answers are:

- *Complex Business Measures* such as these 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 Answers allows complex business measures to be calculated at the time the query is executed without having to pre-calculate and store this data.
- *Eliminates Time-based Reporting Tables:* OracleBI 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 available these measures by simply defining them in metadata eliminating the need to build and maintain such tables.
- *Derived Measures:* OracleBI Answers simplifies the use of derived measures i.e. measures that are derived and 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. OracleBI Answers allows users to define new formulas using existing measures.

In contrast, most business intelligence tools do not provide any such facilities today.

ORACLEBI INTERACTIVE DASHBOARD

Business users will access business intelligence primarily through OracleBI Interactive Dashboard. Interactive Dashboard runs within a pure Web architecture and provide users with a rich, interactive user experience by providing information that is filtered and personalized to a user's identity or role; making information intuitive and easy to understand; and guiding users to precise and effective decisions. Users work with live reports, prompts, charts, tables, pivot tables, graphics, and tickers. Users 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; and unstructured content from a wide variety of sources, including the Internet, shared file servers, and document repositories.

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; and guiding users to precise and effective decisions

Using Interactive Dashboard

Business users build interactive Dashboards without any involvement from an information technology specialist and without any programming. Users create dashboard pages and select and organize content using a web-based dashboard editor. To add content to a web page, a user simply drags and drops the analysis from a web catalog in the left panel. The web catalog is a listing of all saved content – prompts, analyses, and dashboard pages. Users interact with by selecting prompted values and filtering data; clicking on charts or tables to drill down to more detail; changing the sort order or sort direction of columns; clicking to move within context to a different analysis by passing constraints automatically with the click; or even selecting different columns to display.

Dashboards are flexible information containers. In addition to Business Intelligence content, they can embed a corporate "portal", a web page or image on the Internet or intranet, a Word document, or even an Excel workbook.

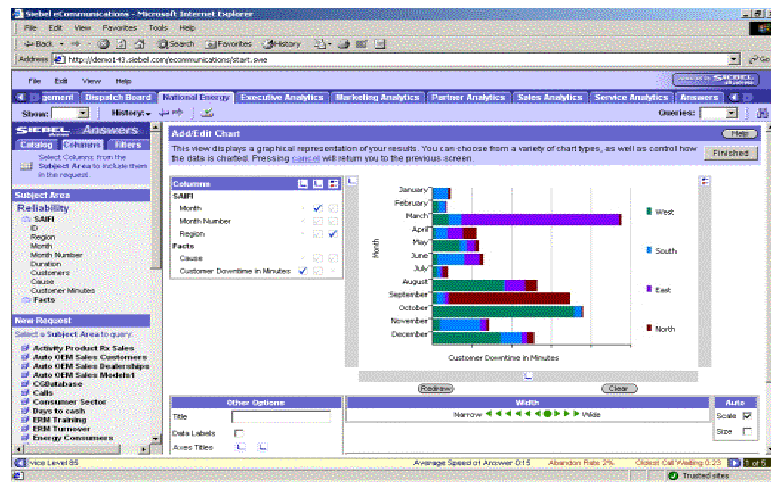


Figure – OracleBI Interactive Dashboard

Features of OracleBI Interactive Dashboard

Some of the important features of Interactive Dashboard are:

- *Full Power of Analytics:* 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:* Dashboard can be published as online work centers enabling groups of users to share information easily with each other
- *Personalization:* Dashboard can be personalized to automatically show different results depending on how the user logs-in i.e. based on the user's identity or role
- *Data Filtering:* Dashboard can be set up so that the analyses shown are determined by data and data threshold values set by the user.
- *Sharing Information Offline:* Dashboard can be saved and distributed for offline use as Briefing Books or Reports. Data on dashboards can be downloaded to Excel.
- *Saved Selections:* Users can modify analyses on dashboards and save the modifications for their own use. Dashboard specifications are stored in a secure catalog on a web

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

server.

- *Changing Styles:* Dashboard obeys 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 OracleBI Interactive Dashboard

Guided Analytics is a feature of Interactive Dashboard that enables the content and layout of Interactive Dashboard to change dynamically based on changes in 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. 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 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. Though guided analytics, organizations can capture best practices in the use of information by one user or one division and guide other users or divisions 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 to direct every other sales manager in the organization to use information intelligence in the same way.

ORACLEBI PUBLISHER

OracleBI Publisher offers a highly scalable reporting server that generates and delivers reports from multiple data sources, in multiple document formats, via multiple delivery channels. OracleBI 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. Oracle 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. OracleBI Publisher is fully integrated with the other components of the Oracle Business Intelligence Suite and shares common metadata, security, calculation, caching, and intelligent request generation services.

Oracle 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 and in the right format

Using OracleBI Publisher

Business users can quickly and easily use OracleBI 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 a report definition using a pure Web rich client development environment. From this Web client, the user can connect to multiple data sources including the Oracle Analytic Server and define the data he or she would like to see published as a report.
- *Defining the Report:* Once the user has defined the data for report, he or she defines a

layout template for the report. Users can define the layout template using a variety of commonly available tools – Microsoft Word, Adobe Acrobat, or Microsoft Excel. Within these tools, Oracle Publisher provides an easy to use report builder wizard to define the report template and a desktop template viewer and debugger.

- *Report Delivery Format and Channels:* The user then goes to a pure Web administrative console and define a variety of facilities – users and roles authorized to access the report; define new roles and assign 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; look at existing reports and their history; and manage report jobs that are running.

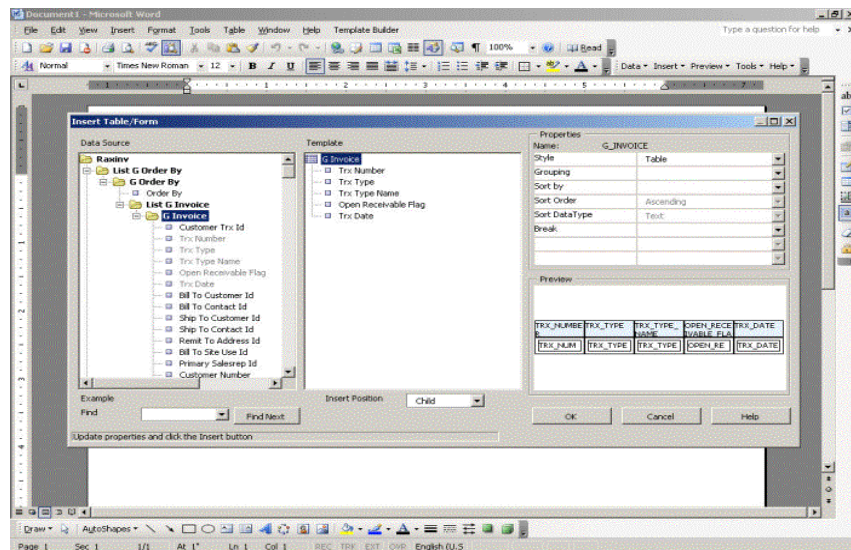


Figure – OracleBI Publisher

Oracle 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 OracleBI Publisher

Some of the important features of OracleBI Publisher are:

- *Performance and Scalability:* OracleBI 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:* OracleBI Publisher allows data from multiple structured data sources – OracleBI Server, Oracle Databases (8i, 9i, 10GR1, 10GR2), IBM DB/2, Microsoft SQL-Server, Informix, and Sybase Databases – and from unstructured data sources – Files, XML, Web Services, URLs – to be embedded in the same report. OracleBI Publisher uses optimized connection pooling mechanisms when accessing data from these data sources.
- *Multiple Document Formats:* OracleBI 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:* OracleBI 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 sent to Enterprise Print Servers; they can be placed on a file server from which they can be ftp'ed.
- *Batch Processing and Report Bursting:* OracleBI Publisher is integrated with the Analytic 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, to schedule them, to manage jobs, and to track their status including taking corrective action if they have failed. Oracle Publisher also supports advanced report bursting.
- *High Volume Printing:* OracleBI 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 OracleBI 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, OracleBI Publisher is based on Open Standards - Java, J2EE, XML, XSL-T, FO, RTF, PDF – allowing users to adopt it easily alongside their existing information technology investments and business intelligence tools

ORACLEBI BRIEFING BOOKS

A Briefing Book is a report that captures the content of an OracleBI Interactive Dashboard allowing the information to be viewed by anyone with briefing book reader software. The Briefing Book provides a way to create snapshots of dashboard pages, 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 also provide a way to archive the information in a dashboard. Briefing Books can be saved locally on a user's desktop. Users have the option to make briefing books "updateable" so they can be updated with up-to-date information from the corresponding dashboard with a single click whenever the user chooses. Personalized Briefing Books can also be automatically distributed to distribution lists of users in a working group via email through Oracle Delivers.

OracleBI 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

ORACLEBI DELIVERS

OracleBI Delivers is a proactive intelligence solution that provides the ability to monitor business information; identify patterns to determine whether specific problems are occurring; filter the data based on data and time-based rules; to 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. Furthermore, OracleBI Delivers can dynamically determine recipients and personalized content to reach the right users at the right time with the right information.

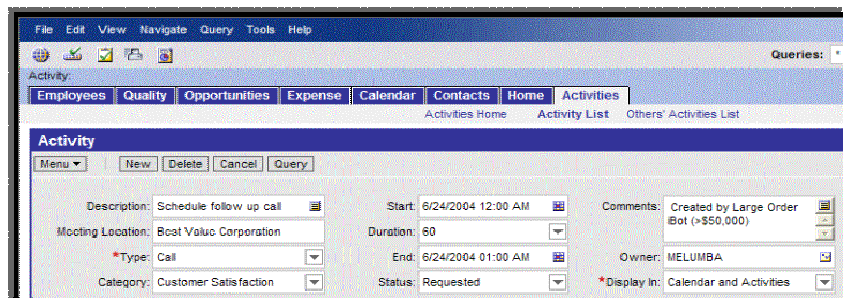


Figure – OracleBI Delivers

Using OracleBI Delivers

Delivers provides a Web-based self-service alert creation and subscription portal where users choose delivery options by creating individual delivery profiles. For example, a user might define a delivery profile to be used when he or she is out of the office. Within a profile, the 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 Answers, schedule them to run automatically, set data thresholds, and specify whom they want to be alerted when thresholds are exceeded. OracleBI Delivers allow business executives to manage their organization by exception – they receive notifications and alerts from the business intelligence infrastructure that is monitoring their organization and can take action quickly and effectively.

Features of OracleBI Delivers

Some of the features of OracleBI Delivers are:

- *Create and Subscribe to Pro-active Alerts:* OracleBI 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 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 BOTS:* Beyond this, however, OracleBI Delivers provides the ability for any user (not just administrators) to very easily define their own processes, called bots, which will “watch” for user-defined conditions and or thresholds and notify the user. Further, OracleBI Delivers can take actions based on a pre-defined decision tree. A simple example might go like this: “If supplies of Product A drop below 10,000 units, send an e-mail to me, the warehouse, and the supplier.”
- *Composite/Complex Conditions:* OracleBI Delivers allows users to create bots 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.

OracleBI Delivers and Oracle BPEL Process Manager

OracleBI Delivers can also be configured to interact with Oracle BPEL Process Manager – Oracle’s industry leading Business Process Management solution. A business user can drive an Enterprise Workflow process defined in Oracle BPEL Process Manager in response to an alert from OracleBI Delivers. OracleBI Delivers can also interact with

Oracle Delivers is a proactive intelligence solution that provides the ability to monitor business information; identify patterns to determine whether specific problems are occurring; filter the data based on data and time-based rules; to alert users via multiple channels; and allow users to take action in response to alerts

other Enterprise Workflow systems in response to an alert.

ORACLEBI OFFICE PLUG-IN

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

Business Users waste a lot of time trying to add corporate data in 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 of the data you use; and (iv) determine how to protect data so it does not get into the hands of unauthorized users. Oracle Business Intelligence Suite's Microsoft Office Add-in allows Business Users to add Intelligence to 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.

Features of OracleBI Office Plug-In

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

- *Simplified Data Embedding:* The Office Plug-In makes embedding corporate data within Office documents easy and efficient. A business user lays out a document template into which he or she would like to embed Corporate data using Microsoft Word or Microsoft Excel. The user can also quickly and easily change the layout, change the output format, and the locale (language, time zone) within Microsoft Office itself. 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 Analytic Server – from which they would like to embed data in Office. Facilities such as the Parameters Toolbar preserve analytic parameters within Office.
- *100% Standard Microsoft Office Documents* – Unlike other Business Intelligence tools, Oracle's Office Plug-In generates a 100% standard Office document. This allows users to format, to re-organize the document, to use macros, to perform cell-based calculations within 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 Office.
- *Simplifies Security:* The Office Plug-In also preserves the user's security when accessing corporate data from 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 Interactive Dashboards can also be used to secure access to Office, lowering security administration costs and simplifying maintenance.
- *Eliminates data inaccuracy:* The Office Plug-In also eliminates data accuracy problems by allowing the user to choose to automatically refresh a single data item or all the data in the Office document when the user connects to the network.
- *View Data in Context* – The Office Plug-In also helps provide 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 – from within Office.
- *Distribution:* The Office Plug-In also allows users to share documents for collaborative

Oracle Business Intelligence's
Microsoft Office Add-In
integrates Business
Intelligence information from
the Analytic Server and
Reports with the Microsoft
Office environment,
embedding up-to-the-minute
corporate data in Microsoft
Word, Excel, and PowerPoint,
documents

decision making in a variety of ways: (i) Place them online in an embedding 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.

To summarize, therefore, Oracle Business Intelligence Suite's Office Plug-In integrates within the familiar Microsoft Office environment to provide Business Users with an easy and efficient way to embed accurate, up-datable data in their documents, spreadsheets, and presentations. Any resulting Office documents can be shared securely with others for collaborative decision-making. The 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.

ORACLEBI DISCONNECTED ANALYTICS

OracleBI Disconnected Analytics provides full analytical functionality for the mobile professional, enabling interactive dashboards and ad hoc analysis to be done 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. OracleBI Disconnected Analytics leverages advanced data and metadata synchronization capabilities to move data; analytic metadata; dashboards; saved selections; filters; and other information to the mobile laptop environment. OracleBI 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 synchronization, resulting in minimal data set size and fast synchronization times.

OracleBI Disconnected Analytics provides full analytical functionality for the mobile professional, enabling interactive dashboards and ad hoc analysis to be done on a laptop computer while disconnected from the corporate network

ORACLE ANALYTICS ADAPTERS

Oracle Analytic 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 Analytic Server process itself or in an external process. Individual adapters have been built to communicate with for the following systems:

- *Relational Database Systems:* including Oracle7, Oracle8, Oracle 9i, Oracle 10GR1, Oracle 10GR2, Oracle 10G RAC, 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, 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.

Oracle Analytics Adapters are updated to match database versions and new functionality.

MISSION CRITICAL PERFORMANCE, SCALABILITY AND RELIABILITY

Oracle Analytics 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

OracleBI Server has an extensible and open connectivity layer with a set of adapters that are responsible for communicating with source data servers

described below.

Highly Efficient Analytic Server Design

The Analytics 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, analytic servers can be clustered together with session replication and automatic fail-over.

Highly Efficient Data Sourcing and Aggregation

Oracle Analytic Server minimizes data retrieval time by picking 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 analytics server can use the already-aggregated sources instead of asking the database to add up the detail. Sometimes there can be multiple sources at the same level of aggregation. For example, data may be aggregated by month, with the last three years of information stored in 36 separate tables. Because the Analytic Server's metadata has a description of the contents of each of these tables, when a user submits a query and filters on a specific month, the server will select the one table needed to satisfy the query.

Exploiting Database Facilities

OracleBI Server also optimizes performance and minimizes network traffic by exploiting the native capabilities of the available database platforms. When generating SQL (or other query languages), the Analytic Server is aware of the functions and language constructs the database supports and generates highly optimized target-specific SQL. The Analytic 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 analytics 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 Analytic 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 Analytics Server.

Connection Pooling

The analytics server can be configured with one or multiple connection pools for each database. The analytics 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

OracleBI 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

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 Analytic Server, many queries will have similar content allowing the Analytic Server to intelligently re-use previous query results, a capability called "query caching". There are two kinds of caching in the system:

- *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 analytics 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.
- *OracleBI Server:* Query caching also occurs at the analytics server. The analytics 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 analytics server will analyze each new query it receives and determine whether it can answer it using cache.
- *Database Server:* The Analytic Server also allows queries that require extensive database processing to be pre-scheduled to run so results are already available when users open their dashboards.

OracleBI 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

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 Analytics administrator specifies the content of various physical table sources using a graphical administration tool. At runtime, the navigator uses these physical table content descriptions to mix and match physical table sources to answer the logically requested data.

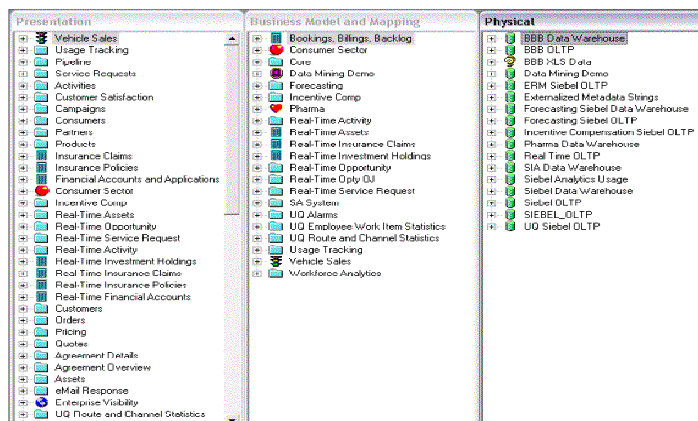


Figure – Oracle Business Intelligence Administrator

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. a share calculation) and assures their correctness, while a Time Series Wizard enables an administrator to create hundreds of time series comparison measures (e.g. sales last year, % change vs. last year, ratio of sales to last year, etc.) in a matter of seconds. Project management features also enable multiple administrators to simultaneously work on the metadata repository.

Features of Oracle Business Intelligence Administrator

Some of the key features of 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 in 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 Analytic Server can be used in concert with any popular Source Code Management Systems.
- *User Administration:* The administration tool also offers a way to view (and terminate) current user sessions; to see the variables being used in each session; to list the available cache entries by subject area, user, or physical table; and to report on the recent history of cache usage. Usage logs written by the analytics server(s) can provide a basis for understanding usage patterns, response times, and load variations. This information is useful for diagnosing and tuning systems.

Oracle's Business Intelligence Suite has several important differentiators compared to other Business Intelligence Tools in the market today

ORACLE BUSINESS INTELLIGENCE SUITE – KEY DIFFERENTIATORS

The sections above provide a detailed technical overview of the Oracle Business Intelligence Suite. It is important to briefly summarize some of the key technical differentiators between the Oracle Suite and other Business Intelligence tools today:

- *Unified Enterprise View of Information:* First, the Oracle Suite 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, the Oracle Suite also 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, the Oracle Suite 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, the Oracle Suite allows business users to combine historical data and real-time information to get an up-to-the-minute view of their business – not just “what happened” but “what is happening?”
- *Insight Driven Actions:* Fifth, the Oracle Suite’s pro-active intelligence and Guided Analytics facilities help business users navigate quickly and effectively to troubleshoot problems and to take action. Other tools are primarily focused on reporting as opposed to driving action.
- *Business Process Optimization:* Sixth, the integration between the Oracle Suite 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, the Oracle Suite provides the fastest time-to-value for Business Intelligence investments in the market today.

Recognizing these important differentiators, many of the world’s leading organizations use Oracle Business Intelligence Suite as their enterprise Business Intelligence platform.

CONCLUSION

Many organizations today use a plethora of different Business Intelligence tools and Applications to collect information from a variety of source, analyze it, and share it with 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 is designed to meet the requirements for a new class of enterprise business intelligence solution. It is a *comprehensive* and *integrated* suite of Analytic Tools 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 Suite includes 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. It offers the fastest time-to-value when compared with other Analytic Tools in the market today and is widely used by the World's leading companies in virtually every industry.

ORACLE FUSION MIDDLEWARE

**Oracle Business Intelligence Suite EE – A Technical Overview
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