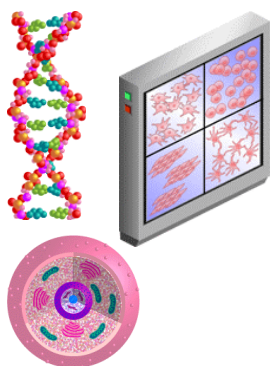


Using OracleBI Discoverer for Life Sciences Data

An Oracle White Paper
December 2004

Using Discoverer for Life Sciences Data

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INTRODUCTION

Today, in the life sciences as well as everywhere else, it is no longer good business practice to lock away valuable data on the desktop. Other users and scientists in the enterprise need to stay informed and be on top of developments. Oracle Business Intelligence is an integrated platform, ideal for the needs of life science data, which have diverse users. Leverage portal integration to publish data for specific users or a general audience, incorporate results from Oracle Data Mining that probe for hidden relationships in life science data, build navigation paths to navigate through data to detail, and highlight values that are significant using the extensive stoplight features. It is easy enough to use without training. Only a single login is required by the user, but data is automatically secured. Data can come from a large variety of sources such as OLTP, data warehouse, OLAP cubes, or Oracle Applications but the complexity is all hidden from the user.

This paper will describe what Oracle Business Intelligence Discoverer offers and show some simple use cases with sample life science data. With the help of integrated Oracle Business Intelligence tools, users will know more, and be able to do things more easily than possible before.

What is Oracle Business Intelligence Discoverer?

Oracle Business Intelligence Discoverer (henceforth known as OracleBI Discoverer or Discoverer) is an intuitive ad-hoc query, reporting, and Web publishing tool that empowers users to gain immediate access to information from data marts, data warehouses, online transaction systems and the Oracle E-Business Suite, which includes Oracle Clinicals.

This means that the user works with ordinary business terms and interactive analysis with the help of drag-and-drop, analytic templates, stoplighting, pivoting, drilling, graphs and gauges. Rank and other analytic templates use native functions of the database and are very fast unlike middle-tier support for these functions. The user does not need to know the structure of the database schema or write SQL or other programs. Users can view these interactive reports using a web browser and do not need to have another client installed locally. Users can email reports, export to Excel for further analysis and print. By publishing as portlets, users can have personalized access through OracleAS Portal.

Oracle Business Intelligence Discoverer Architecture

Discoverer features an End User Layer - metadata that serves to abstract complex data structures into easy to understand business terms. This is stored in an Oracle database, and accessed by the Discoverer Server running in the middle tier - Application Server.

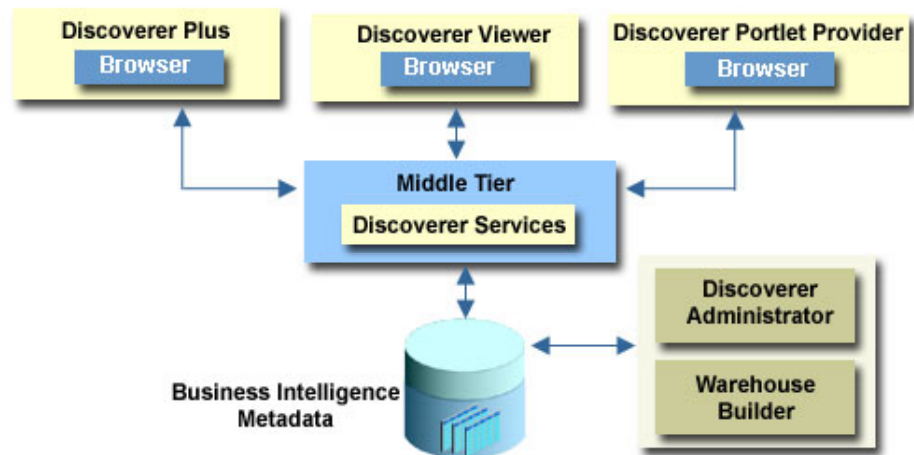
Discoverer's tight integration with the database simplifies security, scalability, data access, and metadata creation. As metadata is stored within the Oracle database, it is easily accessible to multiple users. The database is a natural repository for this type of information, and is designed to handle multiple user access. As you add clients internal or external to your organization, the Discoverer Server scales accordingly and ensures that the end user experience doesn't degrade.

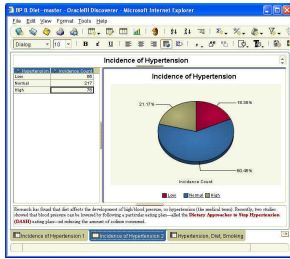
As you reach the capacity of any given server, you can easily add additional Oracle Application Servers to your implementation to support the growth in users. To boost performance over the Internet or extranet, Discoverer leverages the OracleAS Web Cache. This speeds up the response to generate the most common requests, such as lists of workbooks, or frequently queried result sets.

Discoverer Server manages client sessions for Discoverer Plus, Discoverer Viewer and Portlet Provider. These sessions manage queries and cache data that is returned to the requesting client over the Internet, and across multiple firewalls. And as a system designed for the 'real world', Discoverer supports multiple firewalls and Secure Socket Layer communications with SSO/LDAP technologies for centralized and open security architecture.

This architecture makes it very easy to support more users and meet companies' growing business needs.

Oracle Discoverer Component Map



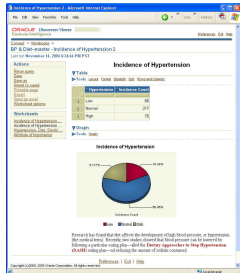


Discoverer Plus

Discoverer Plus: Discoverer Plus enable business users to query, graph and create reports. Using Discoverer Plus users can create queries, drill, pivot, slice and dice data, add analytic calculations, graph the data, share results with users, export their Discoverer reports to various formats which allows them to gain a better understanding of their business.

New in the Discoverer 10.1.2 release, Discoverer supports the OLAP option in the database, which provides multi-dimensional views to data in relational tables and analytic workspaces (AWs).

The Oracle Database has integrated OLAP and relational analytics into a single engine. It is no longer necessary to extract, migrate, and transform your data into a separate multi-dimensional engine for analysis. This means lowered administrative and maintenance costs. Best of all, this power is now easily accessible through Discoverer.

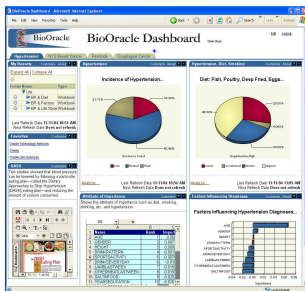


Discoverer Viewer

With this new direct OLAP access, users can perform their own multi-dimensional analysis, create reports, and share them to make better decisions. Anyone at any business or technical skill level across the company can explore large volumes of summarized data with fast response times.

Discoverer Viewer: As the end user, you use this component to view your workbooks using a Web browser. The workbooks are created in Discoverer Plus. Discoverer Viewer is the zero download, pure HTML client for viewing and analyzing all reports -- regardless of data source, relational or OLAP.

Discoverer Portlet Provider: This is the content delivery mechanism used to publish Discoverer data in OracleAS Portal. The Discoverer Portlet Provider enables users to publish three types of Discoverer portlets: a gauges portlet that displays worksheets as gauges, a worksheet portlet that displays a Discoverer worksheet, and a list of workbooks portlet that displays a list of Discoverer workbooks.



Discoverer Portlet Provider

Discoverer Administrator: Business and information technology (IT) data administrators use this component to create, maintain, and administer data and a user's interaction with that data.

Warehouse Builder: Business and information technology (IT) data administrators use this component to take data from the source or transaction system and then to cleanse and aggregate it to load in a data warehouse or data mart.

Business Intelligence Metadata: This component, a server-based layer of metadata, hides the complexity of the underlying relational database so that you can interact with the online dictionary using ordinary business terms.

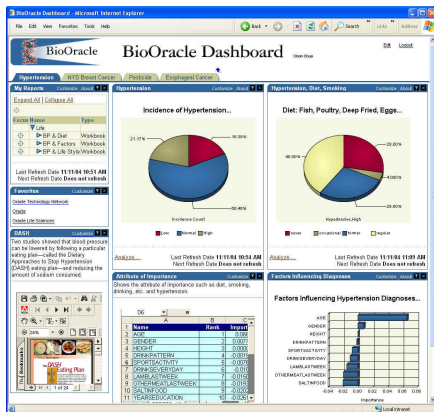
Know More

Use Case 1: Reports on Sample Hypertension Data

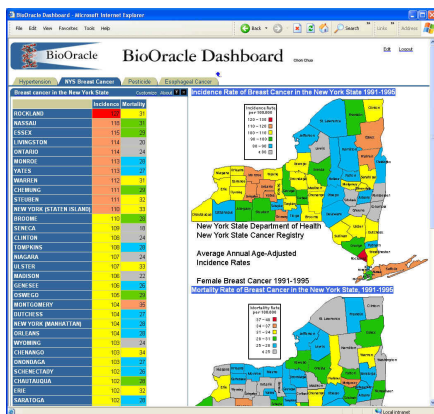
This report shows clinical data including survey data from patients. The sample clinical data includes blood pressure taken at the doctor's office, long-term hypertension diagnosis, age and survey of patient risk factors such as smoking, drinking, consumption of salt, red meats, dairy products, fruits and so on.

Oracle Data Miner had been used on the data to rank the patient risk factors and the results presented by Discoverer in OracleAS Portal. This report is not a passive report but an interactive one. Any viewer of the report can easily drill into the report for more details and can further pivot, sort, stoplight, graph the data presented. Users can derive a better understanding of the important attributes associated with long-term hypertension diagnosis.

In summary, this example shows how easily and quickly life sciences data can be presented to a wider audience as well as how interactive the report are.



Use Case 1: Reports on Sample Hypertension Data



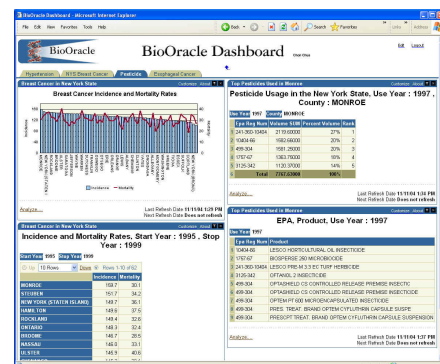
Use Case 2: Reports on Breast Cancer Data

Use Case 2: Reports on Breast Cancer Data

This report shows both incidence and mortality rates of breast cancer for New York State presented on a static map. Users can see areas on the map to take them to detailed breakdown of the data by counties in New York State. The crosstab report shows counties with an exceptionally high rate of breast cancer highlighted. This helps to focus attention on these areas. Users can drill to more detailed data from this report as well.

In summary, useful and attractive public health reports for government agencies such as these are easily created in Discoverer. The ability to go from the aggregate to higher levels of detail allows users to probe for outstanding issues. These types of reports may also be useful to health provider networks and insurance companies.

To get more information on how to use OracleBI Discoverer with Oracle MapViewer see the [“Use Location Information in Enterprise Reporting”](#) white paper on OTN.

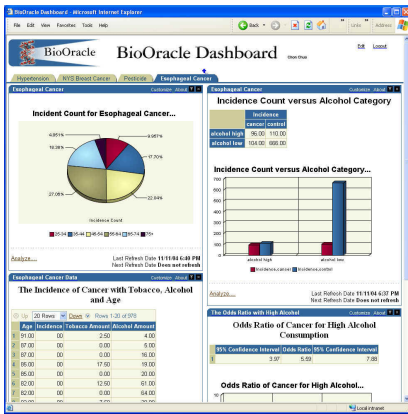


Use Case 3: Reports on New York State Pesticide Usage

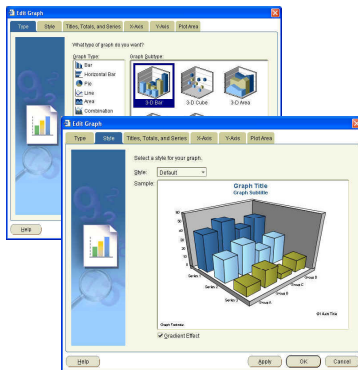
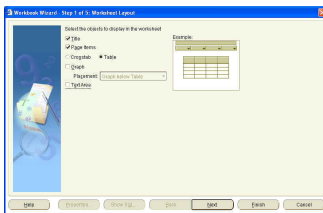
Use Case 3: Reports on New York State Pesticide Usage

While a report such as the previous one can be use, here the use of parameters is demonstrated. Parameters allow users to change the subset of data that is displayed in the report to correspond to the factors they are interested in. When a parameter is specified it can be used to update the not only the crosstab but also the graphs associated with it. Unlike a static report, parameters allow each user to look at the data they are most interested in. In this way, one report can serve many users who have different needs and it is not necessary to create separate reports for each subset of the data.

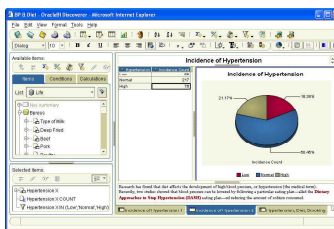
In summary, this example shows the usefulness of parameters for providing reports to a wide audience with different needs in a customizable fashion.



Use Case 4: Reports on Esophageal Cancer Data



Wizards for multi-step tasks



Drag and drop layout

Use Case 4: Reports on Esophageal Cancer Data

This simple report shows some calculations using esophageal cancer data with stoplighting for risk cases. Data is partitioned into heavy drinkers and non-heavy drinkers, heavy smokers and non-heavy smokers. The odds ratio and the 95% confidence interval for the odds ratio are calculated. These numbers represent the relative increase in risk for heavy drinkers and smokers.

In summary, while this does not fully demonstrate the calculation capabilities, Discoverer does enable the user to quickly create reports with calculations relevant to the life sciences over and above reporting on the data. Users can use the statistical and analytical functions as well.

Do More

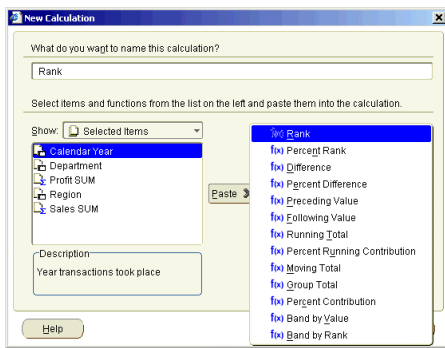
The industry is moving away from standalone solutions towards integrated offerings because of demand from customers frustrated with time and cost. This paper presents the tightly integrated Oracle business intelligence solution for use in the life science industry. Discoverer makes it easy to construct highly interactive reports including extensive support for analytic calculations. These can be published in OracleAS Portal as portlets, emailed to other users, printed, exported to Excel and so on. Thus users can now do more than ever before.

Easily Create Reports

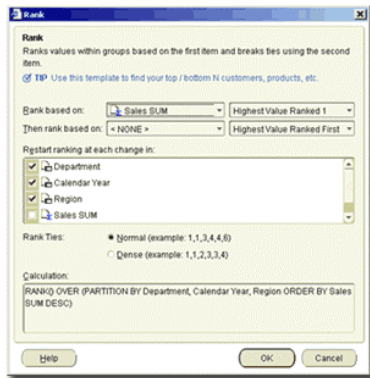
Creation and editing of reports is through wizards. The user just selects the items he wants and drops them on a layout template. Other wizards are provided for creating calculations, stoplighting and scheduling. This point-and-click or drag-and-drop technique is familiar with most users so no training is required, but in case of difficulty interactive hints are provided as well. Drilling up and down is provided automatically from the administrator-defined hierarchies. The right mouse menu contains context sensitive shortcuts to help the user perform common tasks. In this release there are more than 70 types of graphs and graph sub-types as well as gauges portlets for visualizing data. These graphs and gauges portlets are fully interactive and it is easy to link the graph to a crosstab so that changes to the data selected in the graph are reflected in the crosstab and vice-versa.

The following ease of use improvements simplifies the tasks of creating reports.

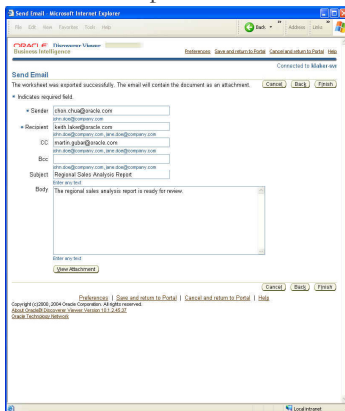
- Point and click simplicity
- Drag and drop layout
- Interactive hints
- Right-click for useful options
- Wizard for multi-step tasks



Analytic Functions Templates:
Lists of Analytic Calculation
Templates



Rank Template



Email: Share reports as email
attachments

Easily Create Calculations

Users can create calculations using Discoverer’s calculation builder. To help users set up analytic calculations, Discoverer offers new templates to guide users through the process by using basic business terms. These templates enable users to set up their most commonly used business analytics without knowledge of SQL. The list of analytic templates includes the templates to create rank, percent rank, difference, percent difference, preceding value, following value, running total, percent running contribution, moving total, group total, percent contribution, band by value and band by rank.

Similarly, users specify OLAP calculations using simple terms rather than the OLAP programming syntax. These calculations are available out of the box as calculation templates. They are divided into categories such as basic arithmetic, advanced arithmetic (cumulative total, index, percent markup, percent variance, rank, share, variance), prior and future comparison (prior value, difference from prior period, percent difference from prior period, future value), and time frame (moving average, moving maximum, moving, minimum, moving total, year to date). The quality of calculation support in Discoverer makes it a leader among reporting tools, many of which require programming expertise for this.

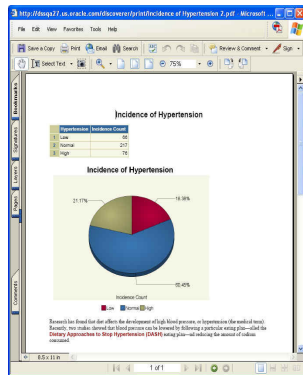
The figures on the left show how many types of rank calculations can be specified using an analytic template dialog. By merely clicking through the dialog selections, the user selects the group over which rank is to be calculated (partition), ordering relationship within the group, rank ties (normal or dense) and so on.

Easily Report and Publish Your Findings

To turn insight into action, you often need to share your discoveries with other researchers in the community – a great opportunity to a research team or key performance indicators to all your users. And we provide tremendous flexibility in how, when, and to who you want to share your insights.

First, Discoverer is completely integrated with OracleAS Portal. You can visually design rich dashboards that can be customized for every user in your organization.

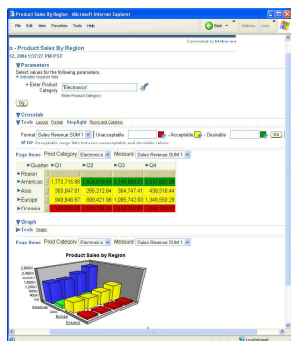
Or if you prefer, you can email your findings – great for reaching users on the road. Discoverer Viewer users will now be able to email their worksheet content in any of the export formats (Excel, PDF, HTML, text, CSV, etc.) as an attachment.



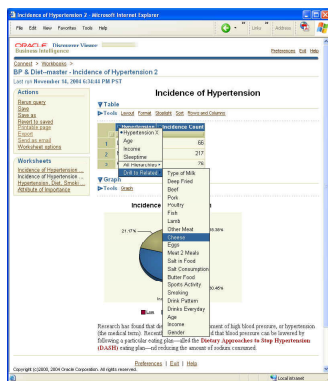
PDF: High Fidelity Printing



Personalized Dashboard



A report with stoplighting format



Drill: Drill to any level

For users more comfortable with Excel worksheets, Discoverer not only exports data, but it also creates Excel pivot tables.

You can also create professional Adobe PDF documents, allowing users to create hard copies of reports on demand.

Or you can even let users look at your finding LIVE in Discoverer's read-only report viewer. Users can change the layout, drill up and down levels, and more – all without changing your original report.

With Oracle BI Discoverer, you can deliver the right message to anyone, anywhere, and at any time.

Easily Create Personalized Portals

The Oracle Business Intelligence suite integration with Oracle Application Server offers a complete and integrated run-time infrastructure for your web applications at a low cost. The tight integration between OracleBI Discoverer and OracleAS Portal empowers users to publish their favorite reports or list of reports to OracleAS Portal and enable other users in the organization to easily access the information by subscribing to these portal pages.

A portlet is information placed within a region on a portal page. All portlets come from a data source registered with OracleAS Portal, called a portlet provider. OracleBI Discoverer is a portlet provider to OracleAS Portal.

You can personalize your portlet view of a published worksheet by changing parameter values, formats, layout, graph types and so on. These preferences are associated with each user and do not change the original worksheet.

Also, when users view Discoverer worksheets published to Portal, each user can personalize their view of the Portal page and Discoverer portlets. Discoverer supports personalization such as:

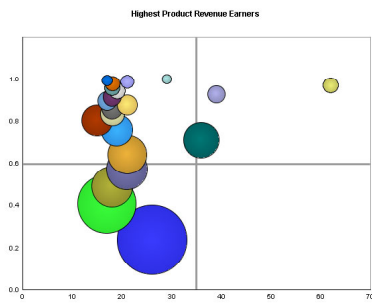
- Stoplighting: Users can set high/lo thresholds for red/yellow/green visual indicators.

You can specify conditions to highlight data in reports that exceeded the threshold values set. This includes specific values or ranges of values. This is an excellent way to construct dashboard reports especially when used in conjunction with the Discoverer portlet provider.

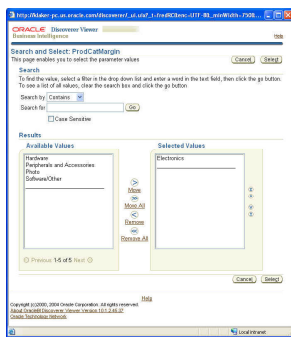
- Drills: drill into the data to the level that meets your needs

You can perform interactive analysis easily through new support for:

- Drill to detail
- Drill out to external applications
- Drill on graphs
- Page items: look at a specific slice of the data



Bubble graph and gauges set portlet



Parameters support

- Graph type: choose the visualization that works best for you
 - Using the Discoverer graphs, you can create “boardroom quality” presentations. There are 70+ graph types, with wizards for formatting various graph components (layout, legend, series, axes). With the intuitive custom formatting tools, a novice end user can easily create compelling presentations for senior management. Another benefit is the support for printing, with zoom capabilities that allow users to specify the range to print (for example, all page items or any subset of page items). Graphs are also interactive, allowing users to explore the data by drilling or pivoting.
- Gauges portlet providers: A gauge is a type of visualization used for presenting data within a range of values.
 - A needle indicator might present a value in relation to low, acceptable, and high thresholds.
 - The value ranges reflect key performance indicators (KPIs) for a business.
 - Gauges are commonly used in dashboard type applications.
- OracleBI Discoverer has the following parameter support:
 - Cascading list of values (LOVs): As you pick parameter values, subsequent parameter value choices are filtered by your previous selection. Example, you pick Region = East; now the City parameter values are filtered to just the cities in the Eastern region.
 - Descriptive LOVs: You can populate an LOV from a descriptive column (for example, part description) but run the query with the corresponding value in a numerical column (for example, part number). This enhances performance as it is typical for a numeric column to be indexed.
 - Optional and mandatory parameters: You may choose to leave a parameter blank and the query will run as though all values have been selected. Example, you leave the Region parameter blank, so the query will execute for All regions, East, West and Central.
 - Support for keywords/tokens such as SYSDATE, USER & NULL: For example, the default parameter value is always populated with Today's date.

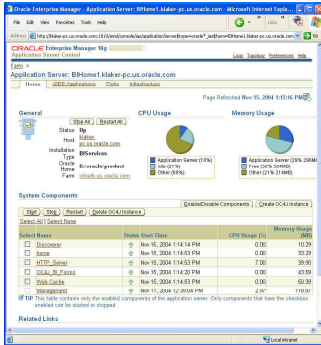
Spend Less

Discoverer is included with Oracle Business Intelligence Suite.

Ease of Administration

Single Administration Console in the Middle Tier

Tight integration with Oracle Enterprise Manager (OEM) provides a rich set of configuration and runtime administration tools over the Web. OEM provides performance metrics, such as CPU and memory usage, and at multiple levels from overall Discoverer usage to each individual user session. OracleBI Discoverer introduces logging and optional diagnostic information that may be enabled and viewed within OEM.



Single middle tier administrative tool

Setup and Maintenance

The administration of Discoverer is designed with the same ease of use in mind as Discoverer's user interface. Wizards, tutorials, online help, etc. support managers, which facilitate rapid development and deployment. Metadata is pulled from a number of sources including the on-line dictionary, any external metadata source using a set of standard interface tables and views or populated via the Oracle Warehouse Builder (OWB) Common Warehouse Metadata (CWM) bridge. Managers default common configuration parameters, such as converting field names, defining data types, joins, and generating lists of values.

The power users who manage the Discoverer metadata distribute patches to support changing business requirements via granular import/export of metadata. This allows Discoverer managers to add or modify existing metadata without disturbing unrelated business views. The changes done in one environment can be easily incorporated into another that improves flexibility, productivity and availability. Users are free to continue using Discoverer while managers maintain multiple development, test, and deployment environments.

Discoverer provides a programmatic access to common Administrative functions that enables Discoverer managers to install, manage and maintain their business areas and workbooks by simply running commands from any platform supported by Oracle Application Server. All Discoverer customers, especially those using Oracle E-Business Suite benefit from this feature, as they may want to manage their Discoverer metadata remotely from a Unix machine.

Administrative Reporting

Discoverer automatically tracks statistics regarding users queries, including columns and tables requested, estimated run time, actual run time, and other system level information within its metadata. As this is stored within a relational database schema, it is accessible to any SQL tool, including Discoverer.

Discoverer provides a series of worksheets that have statistical information on query usage. For example, search for workbooks owned by a specific user; see who these workbooks have been shared with; report on long running queries; or see counts of which folders were accessed the most.

Of course, IT managers can easily create their own management reports in Discoverer. So whether you need to identify your top ten users, or the most commonly requested reports, last week, last month, or last year, Discoverer provides the insight you need. This information is extremely helpful to proactively meet IT management requirements.

Automatic Summary Management / Query Redirection

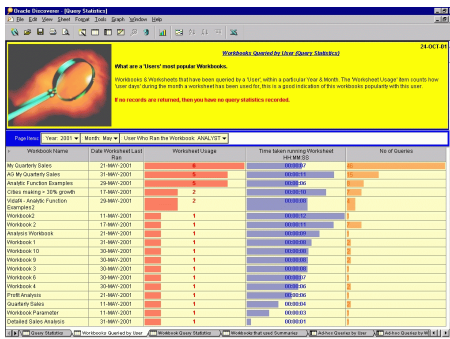
In a relational database, users often summarize detail data on the fly to find aggregate values. This results in time consuming and resource intensive queries that dramatically affect performance of the system. Factor in that the typical system supports dozens, hundreds, or thousands of users performing similar types of queries and it becomes clear that a better solution is required. In either case, requests for aggregated results are *automatically* redirected to pre-summarized data, reducing total elapsed time for queries without user intervention. This reduces the amount of data to be searched while also reducing or eliminating the need for extensive calculations.

Discoverer summary management provides faster performance with less administration. Administrators fully automate and optimize summary management as the summary redirection capability automatically adapts to system usage. This wizard-based feature simplifies the summary creation process by recommending and creating summaries based on criteria set by the Discoverer administrator, the summary policy. The administrator need only define the summary policy once and the policy will be executed without any further intervention, with the actual set of summary tables *dynamically* adjusting with system usage.

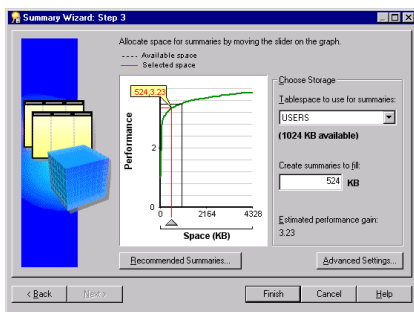
Simplified Connections / Single Sign on

OEM also manages Discoverer public connections. OEM configuration management enables Discoverer managers to view and configure Discoverer services in the middle tier, create or switch on/off user defined connections, set a connection's default locale, switch on/off OracleAS Single Sign-On (SSO) for Discoverer, and more.

Each Discoverer connection consists of a database user name, database password, database name, Oracle Applications responsibility (optional), language and a



Administrators analyze usage statistics from predefined reports



Fully automated and optimized summary management

Discoverer metadata. Discoverer login details are saved in the Oracle Application Server infrastructure database when a connection is created. From then on, you can connect to Discoverer simply by clicking on a connection name in Discoverer Web clients.

Connections are private -- available to a single user or public -- available to all Discoverer users. Users manage private connections, create new private connections, modify existing connections and change their passwords either on demand or when expired.

Support for OracleAS Single Sign-On enables users to log on to Discoverer once and access multiple databases and business views. Within the same browser session, Discoverer enables you to use other SSO compliant applications such as OracleAS Portal, without logging in again.

CONCLUSION

Without an integrated business intelligence platform, users cannot share life science data easily. The tight integration of Oracle Business Intelligence offering means that data can be brought into the database and very quickly reported upon using Discoverer and OracleAS Portal. These are not static reports but highly interactive reports where users can subset, filter, highlight exceptions, sort, aggregate, pivot, and drill to detail right from their web browser. Users can further export the report in different formats including the Excel format for further processing and obtain a high quality printout of the report.

In addition, the Discoverer reporting infrastructure is easily administered. Thanks to the facilities of Oracle Application Server, managing a cluster of machines to support thousands of users is nearly as easy as managing one. Similarly, users can be easily given access to data from relational OLTP, data warehouse and multi-dimensional OLAP cubes. Last, but not least, users do not have to create and manage summary tables to improve performance of queries themselves. Summarizing data, managing these summaries and accessing summarized data is automatically done. Together, these ease-of-use, calculation support, tight integration, scalability, performance and ease-of-administration features make Discoverer an ideal reporting platform for the life sciences.



Using Discoverer for Life Sciences Data
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