

Explorer User's Guide

MetaCube™ ROLAP Option

for Informix® Dynamic Server™

Windows® 95 and Windows NT™

Version 4.0
January 1998
Part No. 000-4188

Published by INFORMIX® Press

Informix Software, Inc.
4100 Bohannon Drive
Menlo Park, CA 94025-1032

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T

his guide contains information to assist you in understanding and using MetaCube data warehousing software.

Organization of This Guide

The chapters in this guide describe MetaCube Explorer features that allow you to query a MetaCube data warehouse in multidimensional terms. Each chapter contains information on using the capabilities and features of MetaCube Explorer. Many chapters also contain tutorials that allow you to get started using the key features of the product.

The chapters of this guide correspond to the features of the Explorer interface. For example, the chapter titled “Stored Queries” describes the use of the Queries Tab page of Explorer. Although this guide can be read sequentially, from beginning to end, it is also designed to be used as a reference to the features and capabilities of Explorer. The guide includes the following chapters:

- This “Introduction” provides an overview of the guide.
- [Chapter 1, “Overview,”](#) provides general information about MetaCube Explorer.
- [Chapter 2, “Getting Started with Explorer,”](#) provides information on the basic features of MetaCube Explorer and includes tutorials from which to learn about those features. After reading this chapter and doing the tutorial exercises, you should have a good understanding of how to use MetaCube Explorer to query your DSS System and obtain reports and charts that display the results of your queries.
- [Chapter 3, “Stored Queries,”](#) provides information about queries already stored in a DSS System and how to run stored queries using Explorer’s Queries Tab page. Running stored queries is an efficient and quick way to generate standard reports.

- [Chapter 4, “Filters,”](#) describes what filters are and how they affect the results of a query. Also, this chapter describes how to use filters in the Filters Tab page by applying one or more to a query.
- [Chapter 5, “Explorer Analysis Features,”](#) describes the analysis features available to you as you specify ad hoc queries in the Ad Hoc Tab page. These features allow you to incorporate information into a report that enhances your ability to interpret the results generated by the query.
- [Chapter 6, “Explorer Reports,”](#) provides information about Explorer’s Results Mode, where query results are displayed in reports. It also describes format and data analysis features you can use while viewing a report.
- [Chapter 7, “Explorer Charts,”](#) provides information about Explorer’s Results Mode, where query results are displayed in charts. It also describes format and data analysis features you can use while viewing a chart.
- [Chapter 8, “Customizing Explorer Reports,”](#) describes ways to customize queries. Customization features allow you to generate reports specific to your own business analysis requirements. Tutorials in this chapter allow you to practice using MetaCube’s customization features.
- [Chapter 9, “Running Queries in Background,”](#) contains a description of MetaCube’s QueryBack feature for scheduling and running queries in background mode, using the QueryBack Tab page.
- [Appendix A, “Formats for Numeric Data,”](#) describes custom format options for numeric data.
- [Appendix B, “Configuring Explorer,”](#) contains information on Explorer’s configuration options, known as Preferences.

Types of User

This guide is written for those who are responsible for analyzing data about their company's business. Simply storing data in a database is not enough; the data is useful only when meaningful reports can be generated that reflect business activity and provide a focus on important data. Such reports and charts are the basis for timely business decisions that can affect the future of a company.

Documentation

MetaCube product documentation contains two key components:

- Printed documentation
- Online help

Printed Documentation

The printed documentation for MetaCube products is divided into two distinct types:

- Guides for products with graphical user interfaces.
- Manuals for application development tools.

Guides for products with graphical user interfaces contain information about the various features of the product. This information is conceptual in nature. These guides are designed to give you information about the purpose of the product and what its capabilities are.

Manuals for application development tools are reference manuals that provide technical information about the tools.

In addition to this book, printed manuals for other MetaCube products include the following:

- [*MetaCube for Excel User's Guide*](#). This guide is written for people who use Microsoft's Excel spreadsheet for business analysis. After adding in MetaCube for Excel to the Excel software, an Excel user can query a MetaCube data warehouse in multidimensional terms to obtain spreadsheet or PivotTable reports.
- [*MetaCube Warehouse Manager's Guide*](#). This guide is written for the data warehouse administrator and describes how to specify internal information (metadata) about the data warehouse so that the MetaCube components are able to access and graphically present the database for querying.
- [*MetaCube Data Warehouse Administrator's Guide*](#). This guide is written for the data warehouse administrator. It describes the overall process of developing a data warehouse and it introduces the tools for managing a data warehouse—MetaCube Secure Warehouse, MetaCube Agent Administrator, and MetaCube Warehouse Optimizer.
- [*MetaCube Application Programmer's Manual*](#). This manual is written for programmers who will write custom applications that interact with the MetaCube analysis engine. This manual describes MetaCube's OLE Automation programming interface.
- [*MetaCube SDK for Snap-Ins Programmer's Manual*](#). This manual is written for C++ programmers who will write custom measure calculations for MetaCube Explorer and MetaCube for Excel using the MetaCube SDK for Snap-Ins. The MetaCube Extension Wizard generates skeletal code that is a framework for adding custom C++ code for customized measure calculations.
- [*MetaCube SQL Optimizer User's Guide*](#). This guide describes how to use the MetaCube SQL Optimizer for connecting third-party query tools or custom query applications to the MetaCube analysis engine to access a MetaCube data warehouse. Queries are optimized to run against aggregate and sample tables, thereby significantly improving query performance against very large data warehouses.
- [*MetaCube Installation and Configuration Guide*](#). This guide describes how to install and configure MetaCube software components on both the database server platform and on PCs.

- [Introduction to New Features](#). This guide describes the new features and enhancements for Release 4.0 of MetaCube. It provides information to existing MetaCube users.

Typeface

The text in this guide uses the following set of conventions.

Convention	Meaning
<i>italics</i>	Emphasized words appear in italics. Also used for the names of MetaCube components and some terms that are specific to MetaCube Web Explorer.
boldface	Used for the names of menu options and popup menu options.
monospace	Used for information that the product displays and information that you type.

Online Help

Each MetaCube component that employs a graphical user interface includes an extensive online help system that provides step-by-step instructions on the use of the product. The help system for most MetaCube products is accessed from the Help menu and consists of the following options:

- Help Topics: a complete online help system that contains “how to” topics and procedural information on using the product.
- Context Sensitive Help: allows the user to access help specifically on a feature of the user interface. Selecting this menu option changes the cursor into a help cursor. Clicking a feature of the window with the help cursor displays help about that specific feature.
- Help on Help: For users unfamiliar with using online help systems, contains instructions on using MetaCube online help.

Note: For MetaCube for Excel, the Help system is accessed from the MetaCube menu in Excel. For MetaCube Web Explorer, the Help system is accessed from the Help button on the toolbar.

Context-sensitive help can be accessed by clicking the Help button on an application's toolbar in the main window. After clicking the Help button, clicking any feature of the window displays help about that specific feature. This is the same as clicking Context Sensitive Help on the Help menu.

When a dialog box is displayed, the **F1** key displays a help topic that describes the features of that dialog box. From that topic, the user may jump to the main help system or, in many cases, to a procedural help topic that describes how to use the dialog box. In the main window of an application, after activating an area of the window by clicking it, **F1** provides a help topic that describes that particular area of the window.

Readme Files

In addition to the printed manuals, readme files are distributed with MetaCube products. These files contain technical information, including last-minute changes to product capability or documentation. Please read these files, as they contain important information.

Related Reading

For information on data warehousing, see *The Data Warehouse Toolkit*, by Ralph Kimball (John Wiley & Sons, Inc., 1996).

Compliance with Industry Standards

The American National Standards Institute (ANSI) has established a set of industry standards for SQL. Informix SQL-based products are fully compliant with SQL-92 Entry Level (published as ANSI X3.135-1992), which is identical to ISO 9075:1992, on Informix Dynamic Server. In addition, many features comply with the SQL-92 Intermediate and Full Level and X/Open C CAE (common applications environment) standards.

Informix SQL-based products are compliant with ANSI SQL-92 Entry Level (published as ANSI X3.135-1992) with the following exceptions:

- Effective checking of constraints.
- Serializable transactions.

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T

his chapter introduces MetaCube Explorer. This chapter discusses:

- The two version of MetaCube Explorer.
- Multidimensional queries.
- The MetaCube data warehouse.
- Filters.
- Explorer's two modes: Query and Results.
- MetaCube workbooks.
- Some MetaCube analysis features.

About MetaCube Explorer

MetaCube Explorer is a graphical data access tool that enables quick retrieval and analysis of critical business data stored in a large data warehouse. Explorer works with the MetaCube analysis engine to query data warehouses stored in an Informix database. Explorer's graphical interface displays multiple views of the information retrieved by any query. As a business analyst, you can:

- retrieve results of complex queries.
- pivot rows and columns to present data by different categories or groupings; sort report rows and columns alphabetically, numerically, and chronologically.
- drill down for more detailed information or up for a more summarized report.
- incorporate calculations into reports that provide comparisons and rankings of business data, thereby facilitating analysis of business data.
- customize reports to present user-defined views of data.

- print reports and charts.
- export data to other business analysis tools.

MetaCube software contains two versions of Explorer:

- Client/Server Explorer.
- MetaCube Web Explorer.

Client/Server Explorer runs as a standalone client/server application, while MetaCube Web Explorer runs inside a Web browser.

The user interface for the two versions is very similar. The working area of the Explorer window looks the same for both versions, with tabs, tab pages, an area containing drop boxes, an example report area, and a control area for running queries. Right-click shortcut menus are also the same for both versions. Most importantly, analysis features for the two versions are identical.

The differences between Client/Server Explorer and Web Explorer occur in the toolbar and the menu bar. The toolbar for Web Explorer is more extensive and the menu bar is not used for Explorer options. When running Web Explorer, the menu bar in the window applies to the Web browser you are using. However, when using Client/Server Explorer, the menu bar contains options for the MetaCube application.

A Multidimensional View of Data

MetaCube provides you, as a business analyst, a view of the information stored in your data warehouse that matches your understanding of your own business. If you understand your data in terms of products, time periods, and geographic locations—that is, according to what, when, and where transactions occurred—Explorer allows you to formulate queries in those same terms.

MetaCube organizes the criteria for defining queries into *dimensions*. Dimensions are different views of data—that is, different ways of organizing or constraining data. For example, a *geography* dimension might specifically contain information about the city, state, region, or country where business transactions occur. MetaCube queries thus enable you to retrieve a set of data using several different views simultaneously.

The elements of a dimension are typically organized in a hierarchy. For example, many cities belong to one state, and many states belong to one country. *Country* is at the top of this geography hierarchy, *city* at the bottom. *Country*, *state*, and *city* are, therefore, hierarchical elements in a *geography* dimension.

The hierarchies in a dimension represent the various levels of detail by which you can summarize information in a report. Using a *geography* hierarchy as described above, a report retrieving sales information from the data warehouse could summarize that data by city, by state, or by country.

One or more *attributes* describe each element of a dimension. For example, the attributes *city name* and *city size* may be associated with the *city* element of the hierarchy. Attribute values for *city name* might include values such as “Seattle,” and “Berkeley”; attribute values for *City Size* might be “large” and “small.”

Explorer presents the business data you are interested in analyzing as a set of *measures*. Measures are the numeric data derived from the business transactions stored in your data warehouse. Examples of measures are “gross revenue,” “units sold,” or “net profit.”

Attributes and measures are the essential components of an Explorer query.

Attributes are sometimes referred to as “query categories.” This name signifies that attributes are the mechanism by which MetaCube and Explorer allow you to view, or categorize, data. The *city* attribute (or query category) allows you to view data for cities; or, stated another way, data is categorized by city. One of the powerful features of Explorer is the ability to define your own query categories for viewing data. In effect you can define query categories that allow MetaCube to summarize data according to your own specification.

Measures are sometimes referred to as “query items.” Measures are the items of data you wish to appear in your report. Explorer allows you to define custom measures (query items). A custom query item, or user-defined measure, is a formula that manipulates existing data in order to incorporate other meaningful analysis data into your query results.

The MetaCube Data Warehouse

Described below are some important concepts related to accessing a MetaCube data warehouse.

DSS Systems

When you access a MetaCube data warehouse, your view of the data is known as a DSS System. This name is derived from the descriptive name of software used to query databases. MetaCube is decision support software (DSS) and therefore, the component of the data warehouse that you can query is called a DSS System.

Within a single DSS System, there may be one or more data sources. A data source consists of a central table that stores business-related measure data joined to a number of dimension and attribute tables that enable the multidimensional views of data in Explorer reports and charts.

You may query a single data source or you may specify queries to retrieve data from more than one data source that Explorer combines into a single report.

MetaCube Data Warehouse Metadata

Metadata is an internal description of the data warehouse. Metadata is actually stored in a set of database tables that were created when MetaCube software was installed. As a map of the physical tables in the data warehouse, metadata provides the information needed by the MetaCube analysis engine to access data and optimize query processing. Moreover, because the metadata describes the contents of database tables and columns in natural business terms, MetaCube uses this as a map to the DSS System in order to provide a customized view of measure data.

Your data warehouse administrator has created the metadata for the DSS Systems you and other Explorer users in your company access. The metadata enables Explorer to present an easy-to-use interface to the complex underlying database and to automatically generate all of the necessary database commands to extract the information requested by your queries.

MetaCube Filters

Explorer can retrieve precisely the data that you wish to analyze, and eliminate information that is not needed. The ability to just the pertinent data for a report or chart is achieved through the use of *filters* that are applied to queries submitted to a DSS System.

Filters

Filters allow you to limit the range of data returned for any given attribute or measure. Filters can be quite simple or very complex. For example, using filters, a query could be specifically defined to return measures that meet these criteria: sales of the five best-selling products for last week and for the same week last year, for products sold in the western or southern regions. This report would require filters on three separate dimensions. The filters needed would retrieve:

- the five top-selling products (from a *product* dimension)
- sales information for last week and the same week a year ago (from a *time* dimension)
- data for the western and southern regions of the country (from a *geography* dimension).

Filters do not influence the degree of summarization in the report or otherwise change the organizational structure of a report. A filter defines *how much* data you see, whereas the attribute defines the *level of summarization* for that data.

Comparison of Time Dimensions and Time Filters

An important dimension of almost all DSS Systems is a *time* dimension. The attributes of a time dimension may be specified in queries in order to summarize data according to specific time periods.

A DSS System may also contain time filters. The function of a time filter, however, is different. When applied to a query, a time filter eliminates data from the report based on a specific time period.

The Time Dimension

The *time* dimension in a DSS System summarizes data by time intervals. Just as data can be categorized and summarized by city, for example, data can also be summarized by periods of time. A *time* dimension is typically organized hierarchically, just as any other dimension is. For example, a *time* dimension might contain *days*, *weeks*, *months*, *quarters*, and *years*.

For example, a report that summarizes data by week organizes all data retrieved from the DSS System into summarized groups based on a calendar week.

The Time Filter

A time filter, on the other hand, actually eliminates some data from a report. A time filter can be specified to retrieve only data for the most recent week, for example. Using such a filter causes data on all transactions that occurred prior to the most recent week to be excluded from a report.

Time filters can be used in conjunction with one of the *time* dimension elements. For example, if a query specifies summarization of data by week (using the time attribute of *weeks* in a *time* dimension) and uses a time filter that eliminates all data except for the last full quarter, the resulting report would summarize data into thirteen categories, including only those transactions that occurred during the quarter.

Query and Results Modes

Explorer's graphical user interface uses two display modes:

- Query Mode
- Results Mode

Query Mode

In Query Mode, Explorer's window allows you to perform all functions related to queries. The drag-and-drop interface allows you to “grab” objects using the mouse and position them in various “drop” locations in the Explorer window.

Four tabs at the bottom of the Query Mode window allow you to pick the task you wish to perform. You may:

- run stored queries using the Queries Tab.
- specify a new, ad hoc query using the Ad Hoc Tab.
- specify and manage query filters using the Filters Tab.
- view and manage queries you have submitted for background processing using the QueryBack Tab.

You may also access many Explorer functions by right-clicking icons, drop boxes, or worksheet tabs in the Explorer window. Right-clicking an object displays a shortcut menu with options that are appropriate for the object you clicked.

Using Client / Server Explorer, functions may be accessed from the toolbar or from the menu bar. However, using Web Explorer, the menu bar is not used and Explorer functions are all accessed from the toolbar. Tool tips display to show you what operations you can perform with the buttons on the toolbar.

Results Mode

MetaCube query results are displayed in Results Mode. Explorer provides a variety of table (or spreadsheet) and chart formats for results. In Results Mode, you can manipulate the report table or the chart to reformat the presentation. For example, in a report, you can pivot the data so that information that was originally displayed in rows displays in columns or by page. Charts in a variety of formats—pie, bar, line, and area—can be rotated to better display relationships among data points. Reports and charts display in color and in various font styles.

MetaCube Workbooks

When you work with Explorer, you create and use MetaCube workbooks that contain individual worksheets. Each worksheet in the workbook contains a single query. After the query is run, the results of that query are also contained in the same worksheet in the form of either a spreadsheet-like report or a chart.

When you save the workbook, both the query and its results are saved. When you reopen a workbook, each worksheet in it appears in the state it was in when you saved the workbook.

Some MetaCube Functions

Explorer facilitates a wide variety of business analysis and reporting functions. Some of them are described in this section.

Drill Up, Down, and Across

Drilling is an operation that allows you to obtain new or additional information in a report without running or rerunning a query. The ability to “drill” for information is possible because the elements of a dimension are typically organized in a hierarchy (see [“A Multidimensional View of Data” on page 1-4](#)). The MetaCube analysis engine understands the hierarchical nature of dimensions and is able to traverse dimensions to retrieve information summarized at different levels or to retrieve additional information.

The hierarchies in a dimension represent the various levels by which you can summarize data in a report. You can easily “drill down” in a highly summarized report, for the entire country, for example, to a more detailed level, such as by region or by city. You can also “drill up” in a detailed report to view more summarized data.

MetaCube's drill across capability provides two types of capabilities:

- you may drill across to other dimensions in the data source in order to increase the “dimensionality” of the results; when you add an attribute from another dimension, summarization of data becomes more granular;
- you may retrieve data from another data source in your DSS System. This allows inclusion of similar or related data in a single report for the purposes of comparison.

Sampling and Sample Tables

Explorer's sampling feature allows you to attain improvements in retrieval time for queries against very large DSS Systems. During retrieval of information from any database, performance is directly related to the number of rows that are processed, so running against large database tables causes queries to run slowly.

The MetaCube sampling feature provides an alternative solution for querying very large data tables. Smaller statistically valid tables, called sample tables, can be used instead. By running queries against these tables, randomly generated from the larger tables, you can obtain highly accurate results while maintaining good performance.

Your data warehouse administrator can create, for example, a sample table containing 10,000 records, that is randomly created from an original table containing 100,000,000 records. Processing against the smaller 10,000-row sample table results in noticeable performance improvement.

With Explorer's Sampling feature enabled, you can query sample tables, indicating the level of confidence and the degree of accuracy you require, and obtain Explorer reports many times faster than you might otherwise be able to do.

Measure Calculations

One of Explorer's analysis features, called a *measure calculation*, allows you to compare data in a report in terms of moving averages and sums, rankings, and a large number of percentage and percentile calculations. Measure calculations provide meaningful insight into the retrieved data so that business trends and other analyses can be easily seen in reports.

Custom Comparisons

Explorer provides a *custom comparison* feature that allows you to quickly retrieve data for one or several attributes and display the results in the same report.

The custom comparison is a feature that might be used to produce a report that compares regional sales with total country sales, for example. A custom comparison might also be used to retrieve data that shows gross revenues for each of, say, five cities for certain products. With this information contained in columns of the report, other analysis calculations can then be added that compare the columns of data.

QueryBack

You can submit a query to the DSS System for background processing, using MetaCube's *QueryBack* feature. When you submit a query to QueryBack, MetaCube:

- schedules the query for execution.
- stores the SQL commands in the database until they are scheduled to execute.
- executes the commands at a scheduled time.
- stores the results in the database.

You may schedule a query to run in background mode, as a QueryBack job, when you first submit it. Explorer's QueryBack Tab allows you to view the QueryBack queue to verify that your job is successfully submitted. Later, you may retrieve the results of the job into a worksheet using the QueryBack Tab.

Using the scheduling capabilities of QueryBack, you can generate reports on a weekly, monthly, or quarterly basis, as well as submit long-running jobs to process during off hours on the database server.

Getting Started with Explorer

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T

his chapter is an introduction to using MetaCube Explorer. It explains the basic features of Explorer and provides short tutorials that you can follow, using the MetaCube demonstration database, to learn about how to use Explorer.

After reading this chapter and doing the tutorials, you should have an understanding of the most important features of MetaCube Explorer. You will have seen the two working modes of Explorer—Query Mode and Results Mode—and understand how to run queries, change the format of reports as well as the data contained in reports, and how to create a chart based on the data retrieved by a query.

The examples appearing throughout this guide use the demonstration database supplied with the MetaCube decision support software. You will need access to this demonstration database in order to do the hands-on tutorials provided in this guide. The demonstration DSS System consists of two data sources; the one named Sales Transactions is used for the tutorials. The Sales Transactions data source tracks sales of electronic equipment in two regions and six cities in the U.S. over a time period from January 1, 1996, to March 31, 1997. The Sales Transactions data source has four dimensions—*Product*, *Geography*, *Time*, and *Channel*—each of which contain a variety of attributes with which to formulate queries. The sample measure data include Units Sold, Gross Revenue, Incurred Cost, Net Profit, and Percent Margin.

The Explorer Interface

The Explorer user interface behaves like that of most standard Windows applications. Its window design enables operations related to running queries, viewing reports, and designing charts. Dialog boxes enable the use of Explorer's analysis features.

Drag and drop

Much of Explorer's user interface provides standard drag-and-drop functionality. When you start to drag an icon, valid drop areas become highlighted with color to indicate where you can drop the icon. You can use drag and drop for many functions in Explorer.

Explorer toolbar and menu bar

In Client/Server Explorer, frequently used features are available from the toolbar. MetaCube analysis functions are available from the menu bar.

In Web Explorer, all MetaCube features are available from the toolbar, since the menu bar is for the Web browser and is not used by Web Explorer.

Other Windows interface techniques

Other standard Windows interface techniques are available in Explorer. In Query Mode, double-clicking attribute, measure, filter, or query icons automatically “drops” them into appropriate drop boxes in the window. In both Query Mode and Results Mode, right-clicking attribute names or measure names, as well as other areas of the screen, displays relevant shortcut menus.

Tool Tips and Balloon help

For information about the individual buttons on the toolbar, position the mouse pointer over the button. Hold the mouse stationary for a moment to display balloon help for that button.

For a description of the icons in Explorer's Query Mode, right-click and hold the mouse button down over the icon you wish to learn about. Explorer displays a short description of the item. Balloon help for DSS System icons is specifically written by your data warehouse administrator.

Online Help for Explorer

A full online help system is available for MetaCube Explorer.

- For Client/Server Explorer, the Help option on the menu bar provides access to online help.
- For Web Explorer, the Help Options button on the toolbar provides access to online help.

The Explorer online help system provides the following:

- **Help Topics:** the full help system for Explorer. Contains step-by-step instructions for performing function in Explorer as well as information on how to get started using Explorer.
- **Context Sensitive Help:** allows you to click on a feature of the Explorer main window to get information specifically about that feature. You can also get context sensitive help by clicking the Context Sensitive Help button on the toolbar.
- **Help on Help:** a help system on using Windows Help. If you are unfamiliar with using Windows online help systems, Help on Help can assist you.

In Explorer dialog boxes, you can obtain a description of the features of the specific dialog box you are viewing by pressing the **F1** key. Many help topics for dialog boxes contain Related Procedure buttons that display step-by-step procedures for using the dialog box. The Contents button displays the contents for the Main Topics help system, where you can access any help topic available for Explorer.

Note: The F1 key to access online help does not function in the main Explorer window.

The Query Mode Screen

Explorer's Query Mode screen is designed to allow you to perform all the MetaCube operations and analysis functions related to specifying and running queries.

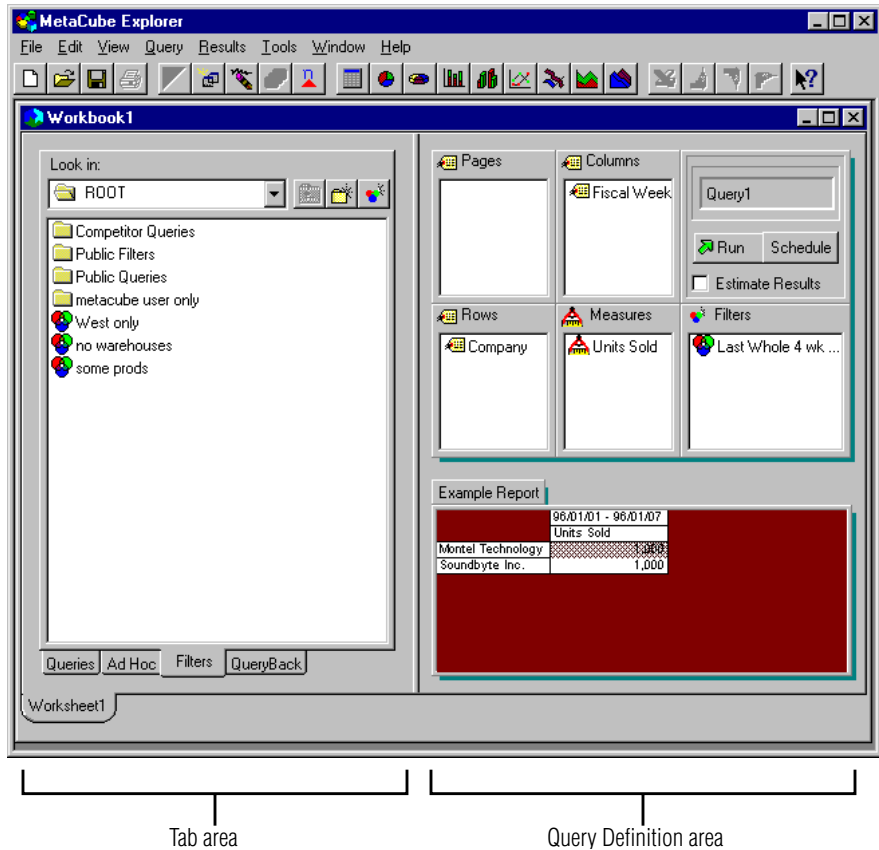


Figure 2-1 Query Mode screen

The screen is divided into two main sections:

- the Tab area, with four tabs and their corresponding Tab pages.
- the Query Definition area, with drop boxes, a Control area, and an Example Report display.

The Queries Tab

This tab is related to running stored queries. Stored queries are defined by your data warehouse administrator and are saved in the database. They are displayed in the Queries Tab page in a directory that is much like the file directory on your Windows PC.

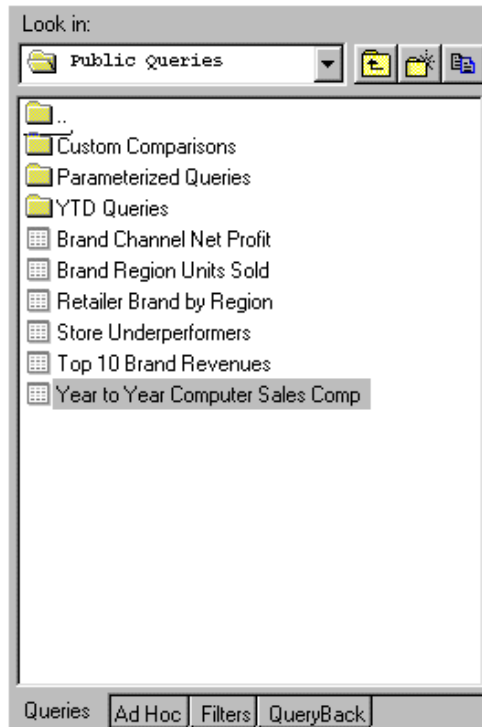


Figure 2-2 *The Queries Tab page*

The icons in the Queries Tab page represent previously specified queries stored in the DSS System. You can submit a stored query as-is, or you can modify it before you run it. Stored query icons are organized in folders and sub-folders.

Other features of the Queries Tab page include:

- the Look in box displays the name of the current folder whose contents are displayed on the Tab page.
- a toolbar allows you to:
 - go up one level to the next-higher folder.
 - create a new folder.
 - copy the selected query.

The Ad Hoc Tab

This tab is related to specifying your own ad hoc queries. The DSS System hierarchy is displayed in a directory-like format.

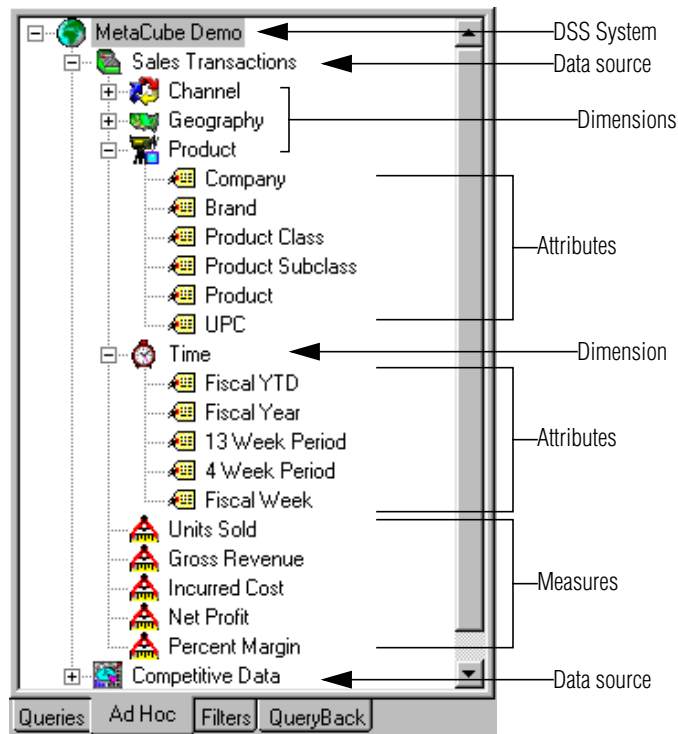


Figure 2-3 The Ad Hoc Tab page

The icons in the Ad Hoc Tab page represent the following components of a DSS System:

- The DSS System itself, at the top
- Data sources
- Dimensions
- Attributes
- Measures

Within each dimension, attribute icons reflect the hierarchy for that dimension. The icon at the top of the hierarchy represents the attribute that summarizes data at the highest level. The icon at the bottom of the hierarchy represents the attribute that summarizes data at the lowest level, that is, provides the most detailed data. Measure icons represent the data stored in the DSS System; measures are the actual data that appear in a report or chart.

The Filters Tab

This tab is related to applying pre-defined filters to queries and specifying your own filters. Icons representing filters currently available to you are displayed in a directory that looks and behaves much like the file directory on your Windows PC.

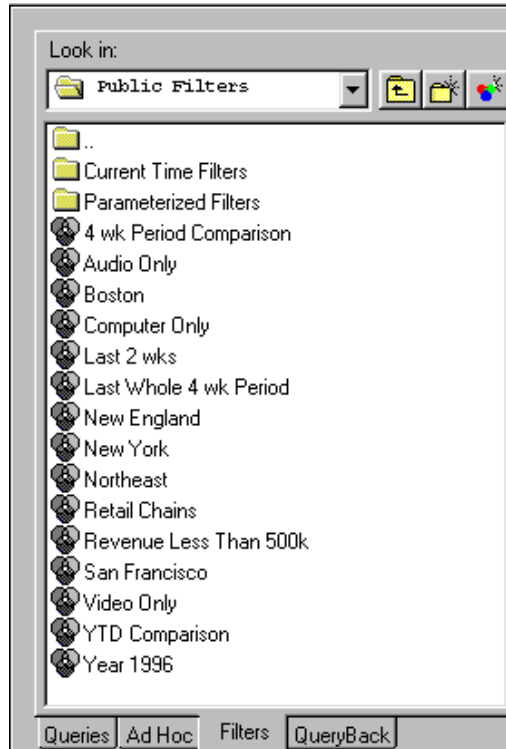


Figure 2-4 *The Filters Tab page*

In the Filters Tab page, the icons represent previously specified filters that you can apply to queries before submitting them.

Other features of the Queries Tab page include:

- the Look in box indicates the name of the current folder whose contents are displayed on the Tab page.
- a toolbar allows you to:
 - Go up one level to the next higher folder.
 - Create a new folder.
 - Create a new filter.

The QueryBack Tab

This tab is related to submitting queries for background (or QueryBack) processing on the server. When you schedule a query to run in background mode, it is queued on the server and then run at a scheduled time. After the query has finished, you can retrieve the results from this tab page.

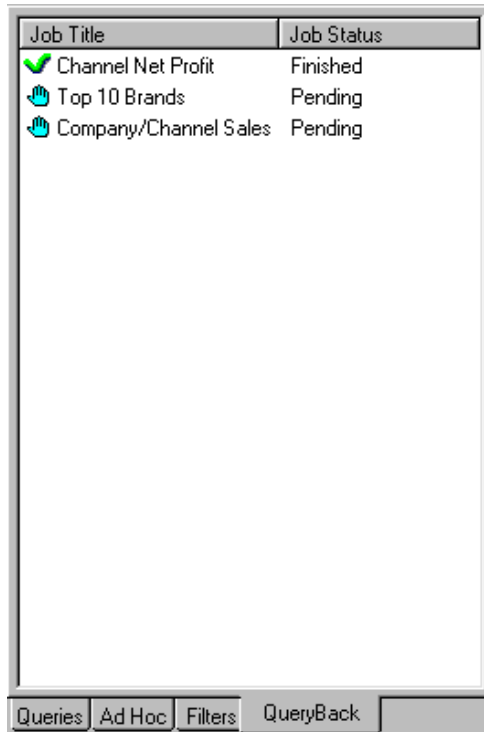


Figure 2-5 QueryBack Tab page

In the QueryBack Tab page, the queue for background (QueryBack) jobs is displayed, showing the name of the query's worksheet and the query's status in the QueryBack job queue. The job's status might be one of the following:

- Pending—the job is waiting in the queue.
- Running—the job is currently running.
- Finished—the job has finished and you can retrieve results.

- Unknown—the exact status of the job cannot be determined.
- Error—an error occurred while the job was running.

In the QueryBack Tab page, you can view the queue in two ways:

- For job(s) scheduled from the current worksheet only.
- For all worksheets from which QueryBack jobs were scheduled.

Query Definition Area

The Query Definition area of the Query Mode screen graphically displays the components of a query.

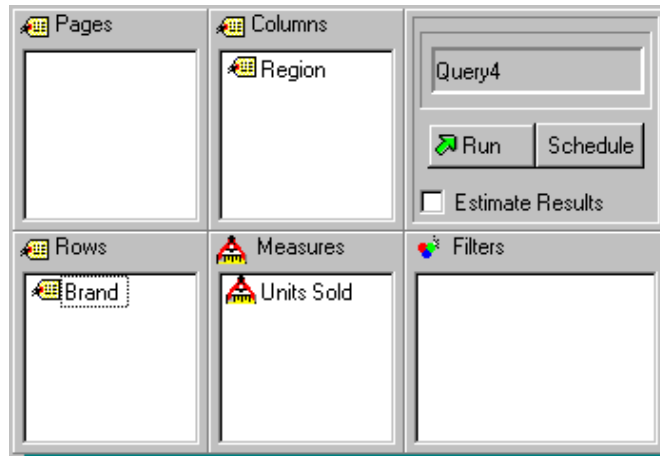


Figure 2-6 Query Definition Area

The drop boxes in the Query Definition area are populated by dragging icons to them or by double-clicking an icon. When double-clicked, icons such as a stored query icon in the Queries Tab, attribute or measure icons in the Ad Hoc Tab, or filter icons in the Filters Tab, are automatically placed into the appropriate drop boxes. Double-clicking an attribute icon always places it in the Rows drop box; you may drag it from there to another drop box, if you wish.

Control Area

The Control Area is where you specify an action for Explorer to perform:

- run a query in foreground mode.
- schedule a query to run as a QueryBack job.
- specify using MetaCube's Sampling feature when a query is run.

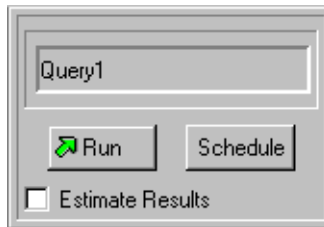


Figure 2-7 Control Area

The Control area displays the name of the current query. Explorer's default query name is Query1, as shown in Figure 2-7. The area where the query name displays is actually the Query Drop Box. In preparation for running a stored query, you can drag and drop a stored query icon into the Query Drop Box, populating other drop boxes in the Query Definition area with the components of the stored query. When you start to drag a stored query icon, the Query Drop Box highlights to indicate that you can drop the icon there. You can run the query, as-is, or modify it before running.

After populating the drop boxes in the Query Definition area, you can run a query in foreground or background mode. After clicking Run, the query runs immediately and Explorer waits for results to be returned.

You can schedule a query to run in background mode at a specified time by clicking the Schedule button. This allows you to specify the exact time the query should run. Explorer does not wait for results, so you can continue to work with other queries and reports.

If you specify the use of MetaCube's Sampling (or Estimate Results) feature, you can improve performance when running a query. The Sampling feature must be enabled in Explorer and your DSS System must be implemented to support it. Before using this feature, verify with your data warehouse administrator that this feature can be used for the DSS System you are accessing.

Example Report

Below the Query Definition area, an Example Report displays a preview of the format of the report Explorer will generate when you run the query.

The screenshot displays the Query Mode interface. At the top, there are six drop boxes for defining the query: Pages, Columns, Rows, Measures, and Filters. The Pages box is empty. The Columns box contains 'Channel' and '4 Week P...'. The Rows box contains 'Brand' and 'Product'. The Measures box contains 'Gross Rev...'. The Filters box is empty. To the right of these boxes are buttons for 'Run' and 'Schedule', and a checkbox for 'Estimate Results'. Below these boxes is the 'Example Report' preview area, which shows a table with the following data:

		Department Stores
		96/01/01 to 96/01/28
		Gross Revenue
Delmore	50" Projection TV	1,000.00
	Entry Level Laser Disc Player	1,000.00
Lasertech	50" Projection TV	1,000.00
	Entry Level Laser Disc Player	1,000.00

Figure 2-8 Example Report

When you specify a query, you define not only the set of data to be retrieved but also the initial format of the resulting Explorer report. The Example Report enables you to see how placing attributes in Rows, Columns, or Pages drop boxes affects the report's appearance. As you drag icons among the drop boxes, the Example Report dynamically reformats.

The Example Report does not display actual data. To display actual data, you must run the query, thereby generating either a report or a chart.

Attribute Formats

If you drop an attribute icon into a Rows drop box, each attribute value generates a row in the report with the actual values in the left-most cells as row headings. If you drop more than one attribute icon into the Rows drop box, Explorer automatically creates a *break report*, with subordinated rows.

	Channel	Department Stores	Retail Chains	Warehouse Stores
District	Company	Units Sold	Units Sold	Units Sold
California	Electrotron Inc.	2,267	3,751	1,825
	Montel Technology	1,294	2,168	1,088
	Soundbyte Inc.	3,128	5,133	2,559
	Total	6,689	11,052	5,472
New England	Electrotron Inc.	989	1,582	764
	Montel Technology	548	892	450
	Soundbyte Inc.	1,369	2,256	1,076
	Total	2,906	4,730	2,290
New York	Electrotron Inc.	618	1,016	508
	Montel Technology	360	590	285
	Soundbyte Inc.	874	1,433	707
	Total	1,852	3,039	1,500

Figure 2-9 Break Report

A break report is a suitable format for applying subtotals, as shown in the example in Figure 2-9.

If you drop an attribute icon into a Columns drop box, each attribute value generates a column in the report with the value, itself, on top as a column heading. You can easily create cross-tabular reports by arranging attributes in both columns and rows. You can create a break report using columnar format, as well.

If you drop an attribute icon into a Pages drop box, Explorer generates a multipage report with data for each attribute value on a separate page.

Measure Format

You can select as many measures as you wish for a query by dropping their icons into the Measures drop box. If a query contains multiple measures, each measure appears as a separate column in the report, with the values for that measure populating the cells in that column.

MetaCube Workbooks

Whenever you use Explorer, you are working in a MetaCube *workbook*. A workbook contains one or more *worksheet*. A worksheet may display one of the following:

- A query that is defined but not yet run.
- A report displaying query results.
- A chart displaying query results in chart form.

Therefore, a workbook is a collection of queries, reports, and charts.

- If you are using Client/Server Explorer, you may open more than one workbook at a time. The Windows menu option displays the names of all open workbooks and you can click a name to display a specific workbook.
- If you are using Web Explorer, you may open only one workbook at a time.

When you save a workbook, which you can do at any time, the data that is the basis for reports and charts is saved with it. When you reopen the workbook, reports and charts are displayed again, using the saved data.

Workbooks are DSS System-specific and contain only queries that run against a single DSS System. If you change DSS Systems, you must use a different workbook.

Explorer saves workbooks using the filename extension *.mcw*; therefore, you can easily identify MetaCube workbooks from your Windows desktop. You can open an existing workbook in one of two ways:

- Double-click the filename of the workbook you wish to open.
- Start Explorer, then open the workbook you wish to use.

Worksheets

Each separate worksheet in a MetaCube workbook contains one and only one underlying query. When you are working with queries and the Query Definition Area drop boxes are displayed, the worksheet is in Query Mode. When you run the query, Explorer changes the worksheet to Results Mode and displays either a report or a chart.

Every individual worksheet has its own tab. In a workbook with multiple worksheets, you display a worksheet by clicking its tab. This causes Explorer to bring the worksheet forward and display its contents.

Printing a Worksheet

You can print reports and charts from Explorer as you do from any standard Windows application. Explorer uses defaults for the format, page numbering, and title of your printed report. You can change the defaults when you print.

Tutorial: Your First Query

Follow the steps below to design an Explorer ad hoc query to run against the MetaCube demonstration database. The report you generate from the query will contain the following information:

- Within each sales district, the gross revenues, by company, for all products sold
- Summarized information according to sales channels—department stores, warehouse stores, and retail chains

For this tutorial, you will use the Sales Transaction data source within the MetaCube Demo DSS System.

Note: To do this tutorial, you must have started Explorer and be accessing the MetaCube Demo DSS System. If necessary, ask your data warehouse administrator to configure your version of Explorer to access the MetaCube Demo DSS System in the MetaCube demonstration database.

Tutorial Steps:

1. Start the version of Explorer that you use on your PC.
 - a. Log into the data warehouse by entering your user ID and password.
 - b. Click the Connect button.
2. To open a new workbook:
 - For Client / Server Explorer, click the New Workbook button on the toolbar.
 - For Web Explorer, a new workbook opens automatically when you start Web Explorer.
3. To specify an ad hoc query, you will work in the Ad Hoc Tab page of Explorer's Query Mode. Click the Ad Hoc Tab.
4. To display the objects in the Sales Transactions data source, click the + expander button or double-click its icon.
5. To find the number of items sold, drag the Units Sold measure icon to the Measures drop box. You can also double click the icon; Explorer automatically places the icon in the Measures drop box.
6. To find out brand sales within each region, you will use the Region and the Brand attributes.
 - a. Expand the *Geography* dimension by clicking the + expander button or double clicking the *Geography* dimension icon.
 - b. Drag the Region icon to the Rows drop box (or double-click the Region icon).
 - c. Expand the *Product* dimension icon.
 - d. Double-click the Brand attribute to place it in the Rows drop box.

Tip: *You can remove icons from the drop boxes by doing the following:*

1. Right-click the icon you wish to remove.
2. Click Remove in the shortcut menu.

Tip: *You can rearrange attribute icons by dragging them from one drop box to another or by dragging one icon on top of or under another.*

7. Notice the example report area that previews the report your query will produce.

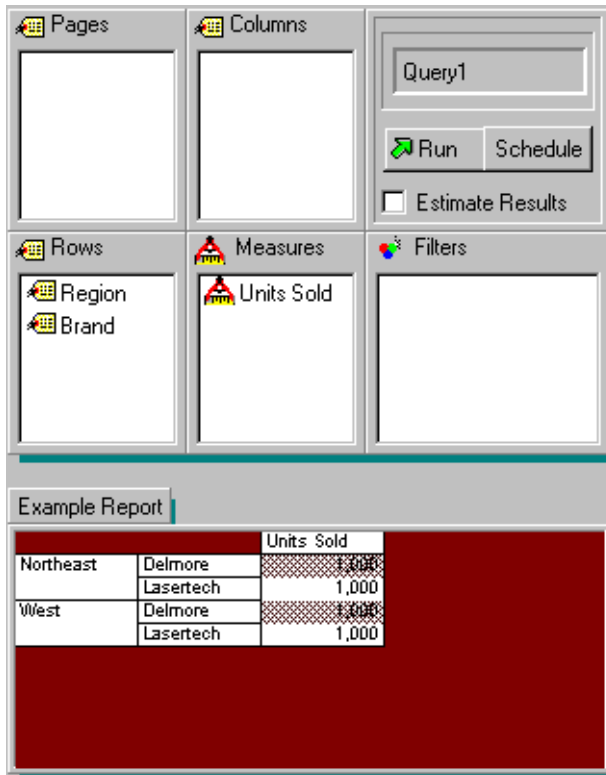


Figure 2-10 My first ad hoc query

The Explorer Query Definition Area should look like Figure 2-10.

8. To run your first ad hoc query, click the Run button in the Control Area.

Tip: Sometimes, when you run a query, you may receive the following warning, called the **Slow Query Warning**.

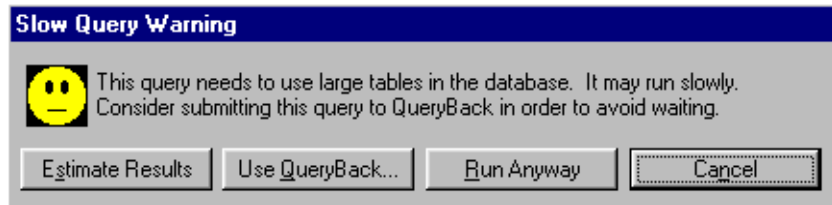


Figure 2-11 Slow Query Warning

The warning is generated by Explorer based on configuration values set for the MetaCube demonstration database. For these tutorial examples, you can ignore the warning. Click the **Run Anyway** button.

9. If necessary, enlarge Explorer's Results Mode screen to view the full report.

Region	Brand	Units Sold
Northeast	Alden	1,811
	Barton	1,314
	Delmore	1,778
	Extreme	433
	Lasertech	1,105
	NVD	2,719
	Onetron	910
	Suresound	2,548
West	Techno Components	3,699
	Alden	2,626
	Barton	1,924
	Delmore	2,557
	Extreme	649
	Lasertech	1,665
	NVD	3,788
	Onetron	1,254
	Suresound	3,464
	Techno Components	5,286

Figure 2-12 Results of running My First ad hoc Query

Figure 2-12 shows how your report should look.

10. To return to Query Mode, do one of the following:

- Right-click the worksheet tab, then click Query Mode on the shortcut menu.
 - Click the Query Mode button on the toolbar.
11. Close Explorer, if you wish; or, leave it open for the next tutorial exercise in this chapter.

What's In Your DSS System?

You can view the organization of the dimensions and the attribute values in a DSS System by specifying a query that contains only the attributes from a single dimension and requests no numeric data (that is, no measures).

For example, using the MetaCube demonstration database, you might view the following attribute values in the *Geography* dimension:

- names of all regions
- names of all districts
- names of all cities

Tutorial: Attribute-only query

For this tutorial, you will use the Sales Transaction data source within the MetaCube Demo DSS System. You will specify and run an attribute-only query on the *Geography* dimension.

Note: To do this tutorial, you must have started Explorer and be accessing the MetaCube Demo DSS System. If necessary, ask your data warehouse administrator to configure your version of Explorer to access the MetaCube Demo DSS System in the MetaCube demonstration database.

1. Start Explorer and, if necessary, open a workbook.
2. If necessary, display a new worksheet by clicking the New Worksheet button on the toolbar.
3. To specify a query to display attribute values for the *Geography* dimension, double-click the *Region*, *District*, and *City* attribute icons so that they automatically appear in the Rows drop box.
4. Run the query.

The resulting report is shown in Figure 2-13 below.

Region	District	City
Northeast	New England	Boston
		Sudbury
	New York	New York
West	California	Oakland
		Palo Alto
		San Francisco

Figure 2-13 Attribute-only query

This report shows the two regions, the three districts, and the six cities in the MetaCube demonstration database. The report reflects the hierarchical nature of the *Geography* dimension as well as showing which districts are in the two regions and which cities are in the three districts.

Explorer Reports

When results of a query are returned, Explorer displays them in its report screen, which looks very different from the Query screen. When displaying a report, Explorer is in Results Mode. In Results Mode, all functions required for modifying reports are available.

Explorer’s Results Mode allows you to:

- apply different formatting to display your report
- view additional data that you did not originally request in your query.

Tutorial: Your First Report

Follow the steps below to specify an Explorer query to run against the MetaCube demonstration database and return a report that contains the following information:

- within each sales district, gross revenues, by company, for all products sold.

- summarized information according to sales channel—department stores, warehouse stores, and retail chains.

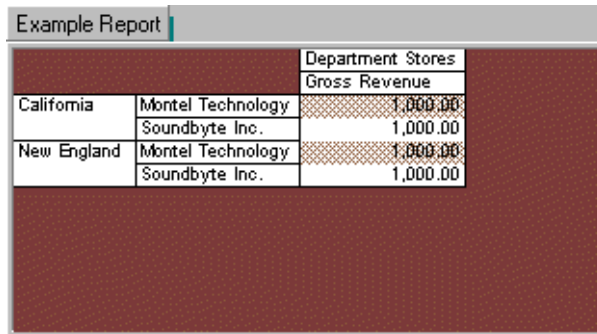
For this tutorial, you will use the Sales Transaction data source within the MetaCube Demo DSS System.

Note: *To do this tutorial, you must have started Explorer and be accessing the MetaCube Demo DSS System. If necessary, ask your data warehouse administrator to configure your version of Explorer to access the MetaCube Demo DSS System in the MetaCube demonstration database.*

Tutorial Steps:

1. In Explorer, open a workbook, if necessary.
2. To display a new worksheet, click the New Worksheet button on the toolbar.
3. To display the Ad Hoc Tab page, click its tab.
4. Expand the Sales Transactions data source icon and its dimension icons, as needed, to complete the steps below.
5. To find out gross revenues for the products sold, double-click the Gross Revenues measure icon to place it in the Measures drop box.
6. To organize data first by district, then by company, use the District and Company attributes. Double-click the District attribute in the *Geography* dimension, then double-click the Company attribute in the *Product* dimension.

7. To subdivide all gross revenue information by sales channel, use the Channel attribute in the *Channel* dimension. Drag the Channel attribute to the Columns drop box. Or, you can double-click the Channel attribute, then drag it from the Rows drop box to the Columns drop box.



		Department Stores
		Gross Revenue
California	Montel Technology	1,000.00
	Soundbyte Inc.	1,000.00
New England	Montel Technology	1,000.00
	Soundbyte Inc.	1,000.00

Figure 2-14 Example report

Notice the example report that shows you a prototype of the report your query will produce.

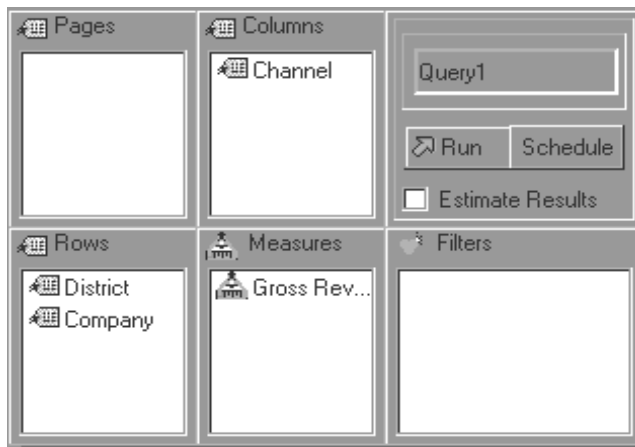


Figure 2-15 Query definition for your first report

The query definition itself is shown in Figure 2-15.

8. To run the query, click the Run button.

Channel

Measures

		Channel	Department Stores	Retail Chains	Warehouse Stores
District	Company		Gross Revenue	Gross Revenue	Gross Revenue
California	Electrotron Inc.		1,034,145.00	1,732,275.00	846,905.00
	Montel Technology		3,064,100.00	5,207,020.00	2,576,040.00
	Soundbyte Inc.		1,133,345.00	1,868,010.00	939,825.00
New England	Electrotron Inc.		461,130.00	728,135.00	359,465.00
	Montel Technology		1,283,020.00	2,080,280.00	1,086,540.00
	Soundbyte Inc.		481,890.00	821,300.00	367,980.00
New York	Electrotron Inc.		287,875.00	475,890.00	233,520.00
	Montel Technology		863,400.00	1,443,260.00	726,880.00
	Soundbyte Inc.		310,490.00	490,680.00	255,445.00

District

Company

My First Report

Worksheet1

Figure 2-16 Your first report

The report should look like Figure 2-16.

The Report Screen

Notice the features of the report screen. In the center of the screen is the report itself. In the upper right and left corners as well as the lower left corner of the screen are “pivot handles” that allow you to reformat the appearance of the report by rearranging information into different columns, rows, or pages.

- The pivot handles in the upper right-hand corner are related to information that is displayed in columns.
- The pivot handles in the lower left-hand corner are related to information that is displayed in rows.
- The pivot handle in the upper left-hand corner is related to information that is displayed by page.

You can reorganize information in a report by dragging attribute and measure names from one pivot handle to another pivot handle.

Tutorial Steps (continued):

9. To display your report by page, drag the Channel attribute name from the column pivot handle in the upper right-hand corner to the page pivot handle in the upper left-hand corner. Position the cursor so that the color of the pivot handle changes to yellow.

Tip: Explorer highlights valid drop areas when you are reformatting a report using the pivot handles. When the pivot handle color is yellow, you may drop the object you were dragging.

Your report should look like Figure 2-17.

District	Company	Gross Revenue
California	Electrotron Inc.	1,034,145.00
	Montel Technology	3,064,100.00
	Soundbyte Inc.	1,133,345.00
New England	Electrotron Inc.	461,130.00
	Montel Technology	1,283,020.00
	Soundbyte Inc.	481,890.00
New York	Electrotron Inc.	287,875.00
	Montel Technology	863,400.00
	Soundbyte Inc.	310,490.00

Figure 2-17 Reformatted report; displayed by page

Notice the page heading and page count boxes. On each page of your report, gross revenues are reported for one of the three outlet channels: Department Stores, Retail Chains, and Warehouse Stores.

10. To display the three pages of your report, click the arrow buttons right and left to display next and previous pages.
11. On the Department Stores page, pivot the rows so that district figures display in separate columns. Drag the District name from the row pivot handle in the lower left-hand corner to the empty column pivot handle in the upper right-hand corner. Position the cursor so that the color of the pivot handle changes to yellow.

Page 1 of your report should look like Figure 2-18.

The screenshot shows a report interface with a table of data. The table is titled 'Department Stores' and is displayed on 'Page 1 of 3'. The table has four columns: 'District', 'California', 'New England', and 'New York'. The rows are grouped by 'Company' and show 'Gross Revenue' for each company across the three districts. The companies listed are Electrotron Inc., Montel Technology, and Soundbyte Inc. The revenue values are: Electrotron Inc. (1,034,145.00, 461,130.00, 287,875.00), Montel Technology (3,064,100.00, 1,283,020.00, 863,400.00), and Soundbyte Inc. (1,133,345.00, 481,890.00, 310,490.00). The interface includes a 'Channel' dropdown set to 'Department Stores', a 'District' dropdown, a 'Measures' dropdown, and a 'Company' dropdown at the bottom. The status bar at the bottom shows 'My First Report' and 'Worksheet1'.

	District	California	New England	New York
Company	Gross Revenue	Gross Revenue	Gross Revenue	
Electrotron Inc.		1,034,145.00	461,130.00	287,875.00
Montel Technology		3,064,100.00	1,283,020.00	863,400.00
Soundbyte Inc.		1,133,345.00	481,890.00	310,490.00

Figure 2-18 Pivoted report on department stores page

12. On the Department Stores page, drill down in the company data to display gross revenues by brands for all companies:

- a. Click the cell containing the company name Electrotron Inc.
- b. Click the Drill Down button on the toolbar.

Your report should look like Figure 2-19. The company names are replaced by the brand names Delmore and Techno Components. These are the two brands of the Electrotron Inc. company. Gross revenues are reported by brand rather than by company. There is more detail in this report.

Notice that Explorer has created a new worksheet. When you perform a drill operation, Explorer automatically generates a new query to retrieve more detailed information. The new query is contained in the new worksheet.

	District	California	New England	New York
Brand		Gross Revenue	Gross Revenue	Gross Revenue
Delmore		168,900.00	69,350.00	47,800.00
Techno Components		865,245.00	391,780.00	240,075.00

Figure 2-19 Report after drilling down for more detailed information

13. On the Department Stores page, drill up to display the company gross revenue figures again:
 - a. Click on one of the brand names, such as Delmore.
 - b. Click the Drill Up button on the toolbar.The resulting report, which displays in a new worksheet, looks as it did before you drilled down.
14. To return to Query Mode, do one of the following:
 - Right-click the bottom of the worksheet, then click Query Mode on the shortcut menu.
 - Click the Query Mode button on the toolbar.
15. Close Explorer or leave it open for the next tutorial exercise in this chapter.

Explorer Charts

You can choose to generate a chart rather than a report to display the results of your query. Explorer's charting option provides the following formats:

- Pie chart and 3D pie chart
- Bar chart and 3D bar chart
- Line chart and 3D line chart
- Area chart and 3D area chart

Explorer displays the data from your query by creating a chart in the style you select. In addition, Explorer's chart feature has extensive editing and formatting capabilities that allow you to modify the appearance of your chart directly in Results Mode.

The chart in Figure 2-20 is a two-dimensional bar chart graphing the data retrieved from Your First Query.

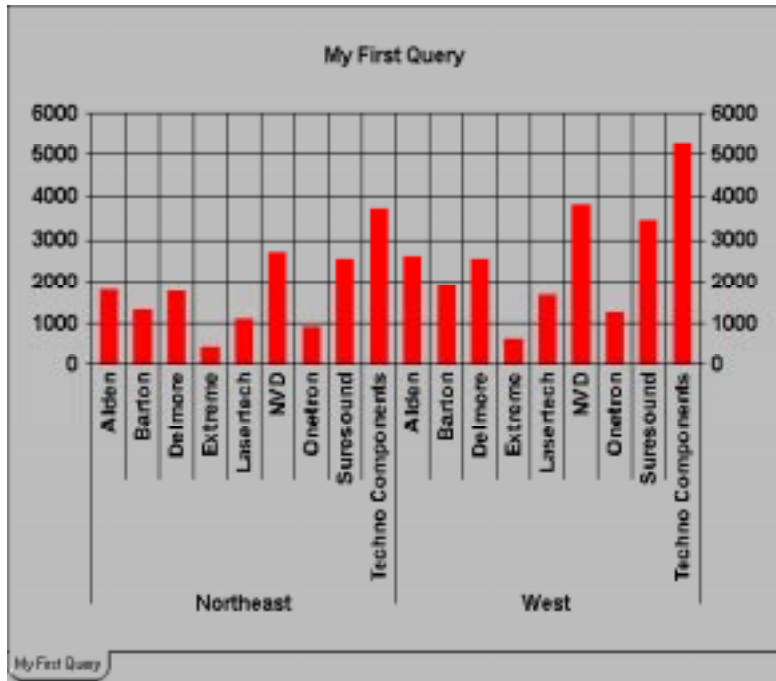


Figure 2-20 Sample Explorer 2D bar chart

Tutorial: Your First Chart

Follow the steps below to specify an Explorer query to run against the demonstration database and display the result set as a 2D bar chart. The chart will display the following information:

- for all districts, unit sales, by company, for company, for all products.
- summarized data by the three sales channels.

For this tutorial, you will use the Sales Transaction data source within the MetaCube Demo DSS System.

Note: To do this tutorial, you must have started Explorer and be accessing the MetaCube Demo DSS System. If necessary, ask your data warehouse administrator to configure your version of Explorer to access the MetaCube Demo DSS System in the MetaCube demonstration database.

Tutorial Steps:

1. If necessary, open a workbook and display a new worksheet.
2. Click the Ad Hoc Tab.
3. Expand the Sales Transactions data source and its dimension icons, as needed, to complete the steps below.
4. To define the query for the chart:
 - a. Double-click the Units Sold measure icon to place it in the Measures drop box.
 - b. Double-click the District attribute icon to place it in the Rows drop box.
 - c. Double-click the Company attribute icon to place it in the Rows drop box.
 - d. Drag the Channel attribute icon to the Columns drop box.
5. To run the query and display the results as a 2D bar chart:
 - a. For Client / Server Explorer, click the 2D Bar Chart button on the toolbar.
 - b. For Web Explorer, click the Choose Report or Chart button on the toolbar, then click Bar on the menu.
6. Enlarge the Explorer window, if needed, for a better view of the display.
7. To change Explorer's default title for the bar chart, double-click the default title. In the Text tab of the Format Title dialog box, highlight the default title in the text box and replace it with the title you would like to use—such as My First Chart.
8. Click **OK**.

9. To display the legend:
 - a. Right-click anywhere within the chart's border and click Legend on the context menu.
 - b. In the Format Legend dialog box, in the Location tab, click the Visible box to enable it.
 - c. To position the Legend text box, click the Top button.
 - d. Click **OK**.

Your chart should look similar to Figure 2-21.

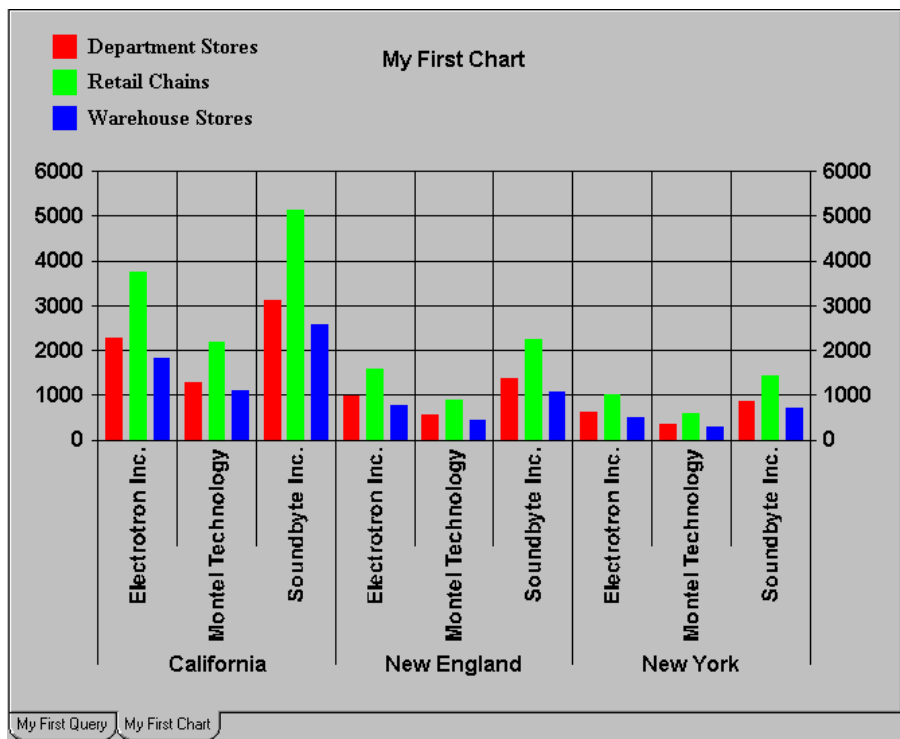


Figure 2-21 My First Chart

Tip: To resize areas of the chart, click the area and drag the handles. Areas you can resize in a chart are the title, the legend, and the chart itself. Move areas by dragging them with the mouse.

- 10.** Rename your chart worksheet:
 - a.** Right-click the worksheet tab, then click Rename Worksheet on the shortcut menu.
 - b.** In the Rename dialog box, type the new name. The new name is reflected immediately in the worksheet tab.
- 11.** To access the Explorer Save feature:
 - a.** For Client / Server Explorer, click the Save Workbook button on the toolbar.
 - b.** For Web Explorer, click the Save Options button on the toolbar, then click Save Workbook.
- 12.** To save the workbook, type the name of the workbook in the text box of the Save Workbook dialog box.

You do not need to type the .mcw filename extension; when Explorer saves the workbook, it adds the filename extension automatically.
- 13.** Close Explorer.



Stored Queries

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T

his chapter provides information about using stored queries to produce standard Explorer reports. This chapter discusses:

- how to use stored queries.
- public and private stored queries.
- modifying and saving stored queries.

In this chapter are some tutorials that provide the opportunity to practice using stored queries.

Stored Queries

A stored query is a query saved in the database. Icons representing stored queries display in the Queries Tab page. A stored query can be run as-is, or it may be modified before running. Running stored queries is the fastest way to produce Explorer reports, since the query is already defined. Queries for generating standard reports that you wish to produce and analyze repeatedly should be saved as stored queries.

Stored queries may be run in foreground, to obtain results immediately, or scheduled as QueryBack jobs to run once or on a recurring basis. See [Chapter 9, “Running Queries in Background,”](#) for information on MetaCube’s background processing capabilities.

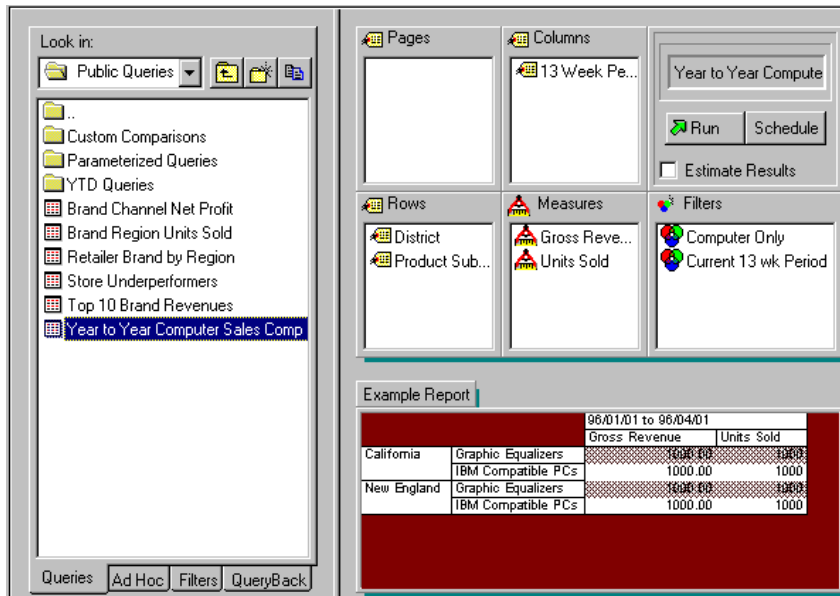


Figure 3-1 Queries Tab page and Query Definition area

A query definition must consist of at least one attribute and one measure. Typically, however, queries contain more than one of these categories, and possibly one or more filter.

In Figure 3-1 shows the Queries Tab page with the Query Definition area populated with the components of a stored query. It contains:

- three attributes; two in the Rows drop box and one in the Columns drop box.
- two measures in the Measures drop box.
- two filters in the Filters drop box.

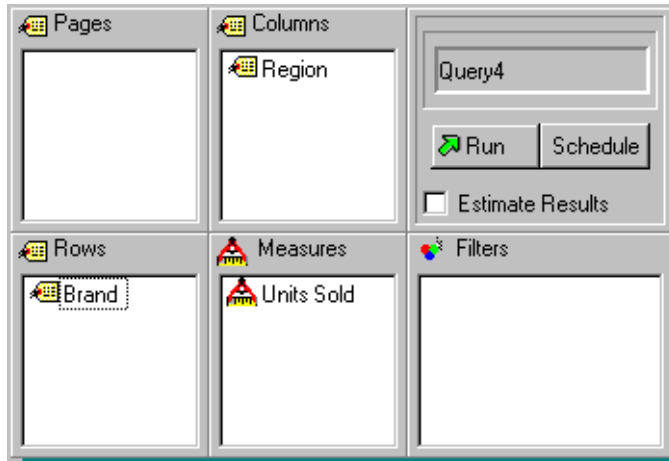


Figure 3-2 Query Definition area in Explorer

Implicit in the definition of a query is information that allows Explorer to format the report generated by the query. The Rows, Columns, and Pages drop boxes for attribute icons become formatting instructions for Explorer that indicate the orientation of that information in the report.

	Region	Northeast	West
Brand	Units Sold	Units Sold	
Alden	1,811	2,626	
Barton	1,314	1,924	
Delmore	1,778	2,557	
Extreme	433	649	
Lasertech	1,105	1,665	
NVD	2,719	3,788	
Onetron	910	1,254	
Suresound	2,548	3,464	
Techno Components	3,699	5,286	

Figure 3-3 Report generated by query in Figure 3-2

Figure 3-3 shows the report that results from running the query shown in Figure 3-2. Each brand name is placed on the left of its row, as a heading; each region name appears as a heading at the top of a column. The measure data is oriented by column.

Multipage reports can be specified in a query, as well. If an attribute icon is placed in the Pages drop box, data in the resulting report contains separate pages for each attribute value.

Tutorial: Running a Stored Query

Follow the steps below to learn about using stored queries in a DSS System. For this tutorial, you will use the Sales Transaction data source with the MetaCube Demo DSS System in the MetaCube demonstration database.

Note: To do this tutorial, you must have started Explorer and be accessing the MetaCube Demo DSS System. If necessary, ask your data warehouse administrator to configure your version of Explorer to access the MetaCube Demo DSS System in the MetaCube demonstration database.

Tutorial Steps:

1. Start the version of Explorer that you use on your PC.
 - a. Log into the data warehouse by entering your user ID and password.
 - b. Click the Connect button.
2. To open a new workbook:
 - For Web Explorer, when you started Web Explorer, a new workbook opened automatically.
 - For Client / Server Explorer, click the New Workbook button on the toolbar.
3. To run a stored query, you will work in the Queries Tab page of Explorer's Query Mode. If the Queries Tab page is not displayed, click the Queries Tab.
4. To display the stored queries available to you, double-click the Public Queries folder.
5. Select the Brand Region Units Sold query by double-clicking its icon.

6. Notice the components of this stored query:
 - Brand attribute icon appears in the Rows drop box.
 - Region attribute icon appears in the Columns drop box.
 - Units Sold measure icon appears in the Measures drop box.
 - Current Week filter icon appears in the Filters drop box. This filter is stored as part of the query and causes Explorer to retrieve data only for the current week. Filters are discussed in depth in [Chapter 4, “Filters.”](#)
7. To run this query, click the Run button.
The results of this query are shown in Figure 3-4.

Region	Northeast	West
Brand	Units Sold	Units Sold
Alden	70	115
Barton	54	76
Delmore	85	107
Extreme	14	29
Lasertech	44	72
NVD	115	159
Onetron	36	47
Suresound	105	140
Techno Components	158	221

Figure 3-4 Stored query results

Notice how the report is formatted, based on where components of the query appeared in Query Mode:

- Brand attribute values appear as headings for rows.
 - Region attribute values appear as headings for columns.
 - Units Sold measure data appears in columns.
8. Close Explorer; or leave it open for the next tutorial in this chapter.

Saving and Using Queries

As part of your company's DSS System, your data warehouse administrator may have provided a set of stored queries that you, and other Explorer users in your company, can run at any time. This set of queries might, for example, produce standard charts and reports used in your company. It is efficient, in this case, to store shared queries in a central location, accessible by all Explorer users.

When queries are saved in the database, only the query specification is saved; data returned by running the query is not saved. Therefore, every time you run a stored query, you retrieve into your workbook the latest data available in your DSS System.

By contrast, when you save a MetaCube workbook, you also save queries — one per worksheet. Saving a MetaCube workbook does not save queries to the database. If you have run the query, each worksheet also saves the data you retrieved. The data remains in the workbook until you rerun the query, when it is replaced by new data. General information about Explorer workbooks is contained in [Chapter 2, “Getting Started with Explorer.”](#)

Public and Private Queries

All Explorer users accessing the same DSS System have access to the public queries stored there. Public queries are created by your data warehouse administrator.

You may save your own queries in the same central location where public ones are saved. Queries you save in the database are private queries, accessible only by you and not by other Explorer users. You may save, delete, and modify your private queries. Private queries are accessible for all workbooks you create while accessing the DSS System where they are saved.

Note: *Your data warehouse administrator may have developed some guidelines for saving queries in the database; be sure you are familiar with these before you save queries in the database.*

The Query Icon

All icons for stored queries display in the Queries Tab page. Query icons that display without color, that is, black and gray, represent public queries. These queries are accessible by all users of the DSS System. You can change a public query before running it, but the changes cannot be saved. You cannot modify a public query directly, although you can make a copy of it and save it, with modifications, as your own private query.

Query icons that display in color represent queries you have saved—that is, your own private queries. Private queries are only accessible by you; they are not available for other Explorer users, even though they are accessing the same DSS System.

Using Folders

When you save queries in the database, they are stored in folders and subfolders organized in a tree structure. The top-level folder is named ROOT; you can create subfolders in which to organize saved queries. Your data warehouse administrator may have created subfolders in which to save your queries.

A DSS System has a single set of folders and subfolders and all users of that DSS System can see all folders. Folders are used to store both queries and filters (see [Chapter 4, “Filters”](#) for information on public and private filters).

Listed below are some important things to understand about MetaCube folders and the objects stored in them:

- In Explorer, there is no such thing as a private folder. All folders are visible to all Explorer users.
- When working in the Queries Tab page, icons that represent filters are not visible. The same is true when working in the Filters Tab page: query icons are not visible.
- Icons for your own private queries are visible only to you. Similarly, icons for other Explorer users' private queries are visible only to them. Because of this, no single user can view the entire contents of the DSS System's folders.

- A folder cannot be deleted unless it is empty. Because you may not be able to see all the objects in a folder, it may appear to be empty when it isn't. That is, you may delete all your private queries from a given folder so that it appears empty to you. However, if another Explorer user has stored objects in that folder or if it contains any filter icons, it is not really empty and cannot be deleted.

Tutorials: Working with Stored Queries

Follow the steps below to learn about using Stored Queries in a DSS System. For this tutorial, you will use the Sales Transaction data source with the MetaCube Demo DSS System in the MetaCube demonstration database.

Note: To do this tutorial, you must have started Explorer and be accessing the MetaCube Demo DSS System. If necessary, ask your data warehouse administrator to configure your version of Explorer to access the MetaCube Demo DSS System in the MetaCube demonstration database.

Tutorial: Saving a Query

In this tutorial, you will specify and save a private query. Then, you will run it.

Tutorial Steps:

1. Start Explorer and open a workbook, if necessary.
2. Open a new worksheet by clicking the New Worksheet button on the toolbar.
3. To specify a query:
 - a. Click the Ad Hoc Tab.
 - b. Expand the Sales Transactions data source directory and the dimensions within it, as needed, to specify an ad hoc query.

4. Specify the following query:
 - a. Double-click the City attribute icon in the *Geography* dimension.
 - b. Drag the Company attribute icon in the *Product* dimension to the Columns drop box. (You can also double-click the icon, then drag it from the Rows drop box to the Columns drop box.)
 - c. Double-click the Units Sold measure icon.
5. Access Explorer's Save function:
 - For Client/Server Explorer, click the Query menu, then click the Save to Database option.
 - For Web Explorer, click the Save Options button on the toolbar, then click Save Query.
6. In the Save Query dialog box, type a name for the query, such as My Stored Query, then click **OK**.
7. Click the Queries Tab.
8. Display the ROOT level of the Queries directory tree and notice the colored icon representing your stored query. A colored query icon represents a private stored query.
9. Open a new worksheet by clicking the New Worksheet button on the toolbar.
10. Double-click the icon for your stored query.
Explorer populates the drop boxes in the Query Definition area with the components of the query and displays its name in the Query Drop Box.
11. Run the query.

Tip: Sometimes, when you run a query, you may receive the following warning, called the **Slow Query Warning**.

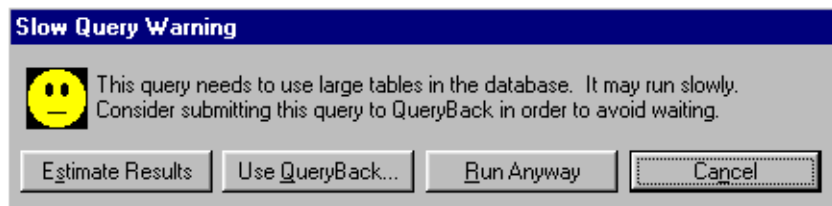


Figure 3-5 Slow Query Warning

The warning is generated by Explorer based on configuration values set for the MetaCube demonstration database. For these tutorial examples, you can ignore the warning. Click the Run Anyway button.

12. Close Explorer, if you wish, or leave it open for the following tutorial.

Tutorial: Modifying a Public Query

In this tutorial, you will access a public query, modify it by removing the filter applied to it, then save it as your private query.

Tutorial Steps:

1. If Explorer is not already open, open it. Open a workbook, if necessary.
2. Open a new worksheet, if necessary, by clicking the New Worksheet button on the toolbar.
3. Click the Queries Tab.
4. To access a public query:
 - a. Double-click the folder named Public Queries.
 - b. Double-click the gray-and-black icon for the Retailer Brand by Region public query icon.
5. To remove the filter from the query:
 - a. Right-click the Current Week filter icon in the Filters drop box.
 - b. Click Remove in the shortcut menu.
6. To access Explorer's save function:
 - For Client / Server Explorer, click the Query menu, then click the Save As to Database option.
 - For Web Explorer, click the Save Options button on the toolbar, then click Save Query As.
7. In the Save Query dialog box, type a name for the query, such as My Private Query, then click Save or **OK**.
8. Display the ROOT level of the Queries directory tree and notice the colored icon for your saved query. A colored query icon represents a private query.
9. Close Explorer.

Filters

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This chapter provides information about filtering Explorer queries. Topics discussed in this chapter include:

- how filters work.
- public and private filters.
- default filters.
- specifying filters.
- parameterized filters.
- filtering on time.

In this chapter are some tutorials that provide the opportunity to practice using filters.

Filtering Result Sets

When a *filter* is applied to a query, it places a constraint on the range of values retrieved by that query. A filter narrows the scope of a query, returning a subset of the total data a query might otherwise return. Explorer's filtering capability provides a high level of control over the contents of a report—your query can retrieve only the data pertinent to the specific analysis you wish to perform.

Filters may be defined for dimensions (using attribute values as the basis for the filter) or for data sources (using measures within that data source as the basis for the filter).

In Query Mode, icons representing filters display in the Filters Tab page. If a filter has been applied to a query, its icon appears in the Filters drop box.

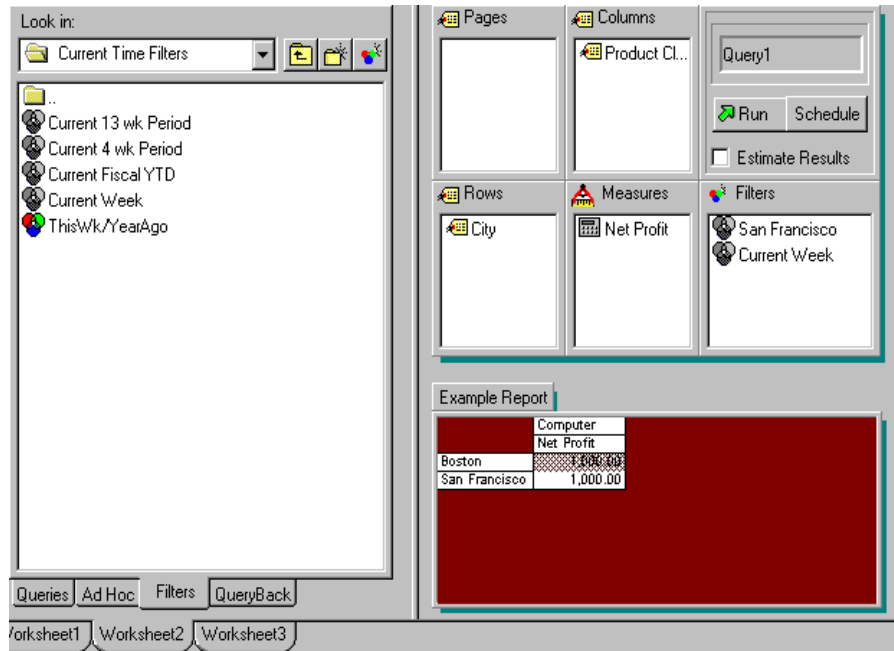


Figure 4-1 Query Definition area with San Francisco and Current Time filter

The query specification shown in Figure 4-1 returns Net Profit information for the city of San Francisco and for the current week. Data for cities other than San Francisco or for weeks other than the current one do not appear in the report.

Attribute filters are defined on a dimension-by-dimension basis. That is, a single filter constrains data for only the attributes contained in one dimension. You can apply multiple filters to a query, however; in fact, every dimension in a query may be filtered, if you wish. Attribute filters are available throughout an entire DSS System.

Measure filters can be defined for any measure in a given data source. Measure filters only apply for a single data source, not the entire DSS System.

Your DSS System may contain some previously defined filters, developed and made available to you by your data warehouse administrator. You can also create your own filters.

Public and Private Filters

All Explorer users accessing the same DSS System have access to the public filters stored there. Public filters are created by your data warehouse administrator.

You may save your own filters in the same central location where the public ones are saved. Filters you save in the database are private filters, accessible only by you and not by other Explorer users. You may save, delete, and modify your private filters. Private filters are accessible for all workbooks you create while accessing the DSS System where they are saved.

If you wish to modify a public filter, you may copy it, modify it, and then save it back to the database as your private filter.

Note: *Your data warehouse administrator may have developed some guidelines for saving filters in the database; be sure you are familiar with these before you save filters in the database.*

The Filter Icon

All icons for filters display in the Filters Tab page. Filter icons that display without color, that is, black and gray, are public filters that were created by your data warehouse administrator and are accessible by all Explorer users. You cannot modify a public filter, although you can make a copy of it and save it, with modifications, as your own private filter.

Filter icons that display in color represent filters you have saved—that is, your own private filters. Private filters are only accessible by you; they are not available for other Explorer users, even though they are accessing the same DSS System as you.

Default Filters

A default filter is an attribute filter that is automatically in effect when you first start Explorer. Default filter icons appear in the Filters drop box in Query Mode. You, or your data warehouse administrator, may designate one or more default filter for the copy of Explorer that runs on your PC.

When you set a filter as your default, it is your default whenever you log in to the DSS System using the same user ID you used when you set the default. You may designate either public or private attribute filters as default filters.

Note: *A measure filter cannot be designated as a default filter.*

If you, or your data warehouse administrator, have designated one or more default filter, the icon for these filters has a different appearance. A check mark appears over the standard filter icon. If a public filter is designated as a default filter, the icon is gray and black; if a private filter is designated as a default filter, the icon is colored.

Tutorial: Filtering a Query

Note: *To do the tutorials in this chapter, you must have started Explorer and be accessing the MetaCube Demo DSS System. If necessary, ask your data warehouse administrator to configure your version of Explorer to access the MetaCube Demo DSS System in the MetaCube demonstration database.*

In this tutorial, you will use a public query and apply an existing filter to it.

Tutorial Steps:

1. Start Explorer and, if necessary, open a new workbook.
2. Click the Queries Tab.
3. To access the stored query Brand Region Units Sold, double-click its icon in the Public Queries folder in the Queries Tab page.

When this query is run, it produces the report shown in Figure 4-2. This report shows unit sales by brand for both sales regions—Northeast and West—for the current week. The query already contains a filter that retrieves only the current week's data.

Region	Northeast	West
Brand	Units Sold	Units Sold
Alden	70	115
Barton	54	76
Delmore	85	107
Extreme	14	29
Lasertech	44	72
NVD	115	159
Onetron	36	47
Suresound	105	140
Techno Components	158	221

Figure 4-2 Brand Region Units Sold report

4. To filter this query to show sales only for the Northeast region:
 - a. Click the Filters Tab.
 - b. Double-click the Northeast filter icon in the Public Filters folder.
5. Run the query.

Notice that the resulting report lists one column of Units Sold data—for the Northeast Region. Because of the filter you applied to the query, all data for the West Region was eliminated from the report.
6. Close Explorer; or leave it open to do the next tutorial.

Filter Definition

A filter definition consists of one or more statements, called *filter elements*; each filter element is based on a single attribute value or measure. The more filter elements in a filter specification, the more tightly data is constrained.

A filter element is a comparison expression made up of:

- the name of an attribute or measure.
- a comparison operator.
- a value used to evaluate retrieved data. In the case of an attribute filter, the value is an attribute value. In the case of a measure filter, the value is a number.

Some examples of filter elements are listed below:

- City = 'San Francisco'
- Fiscal Week In (<<Current Period>>)
- Brand In ('Alden','Barton','Lastertech')
- Units Sold > 100

These examples all apply to the MetaCube demonstration database. The first filter is for the *Geography* dimension, the second for the *Time* dimension, the third for the *Product* dimension. The fourth is a measure filter based on the Units Sold measure.

Channel	Brand	Product Subclass	Units Sold
Department Stores	Alden	Memory Chips	194
	Lasertech	Hardware Boards	99
	NVD	CDROM Drives	181
	Suresound	CDROM Drives	172
		Hardware Boards	100
	Techno Components	CDROM Drives	180
Retail Chains		Hardware Boards	45
	Alden	Memory Chips	345
	Lasertech	Hardware Boards	172
	NVD	CDROM Drives	283
	Suresound	CDROM Drives	289
		Hardware Boards	170
	Techno Components	CDROM Drives	304
		Hardware Boards	71

Figure 4-3 Filtered report

The report in Figure 4-3 shows the brands of memory chips, hardware boards, and CDROM drives sold in department stores and retail chains in the western region. The query that produced this report contained three filters to limit the data in the report.

- The report contains data for department stores and retail chains, but not warehouse stores, requiring a filter on the *Channel* dimension. This filter may be defined in one of the following ways:

Channel In ('Department Stores','Retail Chains'),

or

Channel <> 'Warehouse Stores'

- The report contains unit sales figures for CDROM drives, memory chips, and hardware boards only, eliminating all other product subclasses; this requires a filter on the *Product* dimension. This filter may be defined as follows:

```
Product Subclass In ('CDROM Drives', 'Memory Chips', 'Hardware Boards')
```

- The report contains data for the western region only, requiring a filter on the *Geography* dimension. This filter may be defined as follows:

```
Region = 'West'
```

Note: Your data warehouse administrator may prevent some attributes that appear in *Query Mode* from being available for use in a filter definition.

Comparison Operators for Attribute Filters

Comparison operators designate the test to be applied to eliminate data. The comparison operators you can use in an attribute filter element are listed in the table.

Operator	Meaning
=	equal; the default and most commonly used operator
< >	not equal
>	greater than; most useful for numeric comparisons
>=	greater than or equal to; most useful for numeric comparisons
<	less than; most useful for numeric comparisons
<=	less than or equal to; most useful for numeric comparisons
In	within the specified list; used for both numeric and character string comparisons
Not In	not within the specified list; used for both numeric and character string comparisons
Like	used for pattern matching; the wildcard is % and can be used to replace 0 or more characters in the search pattern

Operator	Meaning
Not Like	used for pattern matching; the wildcard is % and can be used to replace 0 or more characters in the search pattern
Is Null	is empty
Is Not Null	is not empty

The operators >, <, >=, and <= can also apply alphabetical parameters to string values. For example, the “Alden” brand is less than the “Delmore” brand, since “A” precedes “D” in the alphabet.

Comparison Operators for Measure Filters

Measure filters constrain data retrieved by a query according to a comparison expression applied to the actual data values.

The comparison operators that you can use for measure filters are listed in the table.

Operator	Meaning
=	equal; the default and most commonly used operator
< >	not equal
>	greater than; most useful for numeric comparisons
>=	greater than or equal to; most useful for numeric comparisons
<	less than; most useful for numeric comparisons
<=	less than or equal to; most useful for numeric comparisons
In	within the specified list; used for both numeric and character string comparisons
Not In	not within the specified list; used for both numeric and character string comparisons

Using Folders

When you save filters, they are stored in folders and subfolders organized in a tree structure. The top-level folder is named ROOT; you can create subfolders in which to organize filters. Your data warehouse administrator may have created subfolders in which to save your queries.

A DSS System has a single set of folders and subfolders and all users of that DSS System can see all folders. Folders are used to store both queries and filters (see [Chapter 3, “Stored Queries”](#) for information on public and private queries).

Listed below are some important things to understand about MetaCube folders and the objects stored in them:

- In Explorer, there is no such thing as a private folder. All folders are visible to all Explorer users.
- When working in the Filters Tab page, icons that represent queries are not visible. The same is true when working in the Queries Tab page: filter icons are not visible.
- Icons for your own private filters are visible only to you. Similarly, icons for other Explorer users' private filters are visible only to them. Because of this, no single user can view the entire contents of the DSS System's folders.
- A folder cannot be deleted unless it is empty. Because you may not be able to see all the objects in a folder, it may appear to be empty when it isn't. That is, you may delete all your private filters from a given folder so that it appears empty to you. However, if another Explorer user has stored objects in that folder or if it contains any query icons, it is not really empty and cannot be deleted.

Tutorial: Creating and Applying Filters

In this tutorial, you will create and run an ad hoc query; then, you will apply filters to it and run it again, observing the change the filter makes in the results. Your filtered report will be the same as that shown in [Figure 4-3 on page 4-8](#).

Tutorial Steps:

1. Open an Explorer workbook, if necessary and display a new worksheet.
2. Click the Ad Hoc Tab.
3. Expand the Sales Transactions data source and dimension icons, as needed, to perform the steps in this tutorial.
4. To specify the query from the Sales Transaction data source:
 - a. Double-click the Channel attribute icon in the *Channel* dimension.
 - b. Double-click the Brand attribute icon in the *Product* dimension.
 - c. Double-click the Product Subclass attribute icon in the *Product* dimension.
 - d. Drag the Region attribute icon in the *Geography* dimension to the Columns drop box.
 - e. Double-click the Units Sold measure icon.
5. Click the Filters Tab.
6. To select the dimension on which to filter and to name the filter:
 - a. Click the Create New Filter button on the Filters Tab page toolbar.
 - b. In the Choose Filter Group dialog box, click *Channel*, then click **OK**.
 - c. In the Filter Elements dialog box, type the name of the filter in the Filter Name text box:

No Warehouses
 - d. Click the New button.

7. To specify a filter that retrieves data only for Department Stores and Retail Chains, but not Warehouse Stores:
 - a. In the Filter Element Definition dialog box, click the Search button.
 - b. Drag the Warehouse Stores icon to the Operand box.
 - c. In the Operator list box, select the not equal symbol (<>).
 - d. Click **OK**.
 - e. The Filter Elements dialog box displays the filter you just defined. Click **OK**.

Notice that Explorer displays an icon in the Filters Tab page for the filter you just specified.
8. To select the dimension for the second filter and to name the filter:
 - a. Click the Create New Filter button on the Filters Tab page toolbar.
 - b. In the Choose Filter Group dialog box, click *Geography*, then click **OK**.
 - c. In the Filter Elements dialog box, type the name of the filter in the Filter Name text box:

West Only
 - d. Click the New button.
9. To specify a filter that retrieves data only for the West Region:
 - a. In the Filter Element Definition dialog box, click Region in the Attribute list.
 - b. Click the Search button.
 - c. Drag the West icon to the Operand box.
 - d. In the Operator list box, notice the default operator (=). Do not change this operator.
 - e. Click **OK**.
 - f. The Filter Elements dialog box displays the filter you just defined. Click **OK**.

Notice that Explorer displays an icon in the Filters Tab page for the filter you just specified.

10. To select the dimension for the third filter and to name the filter:
 - a. Click the Create New Filter button on the Filters Tab page toolbar.
 - b. In the Choose Filter Group dialog box, click *Product*, then click **OK**.
 - c. In the Filter Elements dialog box, type the name of the filter in the Filter Name text box:

Drives/Chips/Boards
 - d. Click the New button.
11. To specify a filter that retrieves data only for three subclasses of product:
 - a. In the Filter Element Definition dialog box, click Product Subclass in the Attribute list.
 - b. Click the Search button.
 - c. Drag the icons for CDROM Drives, Hardware Boards, and Memory Chips to the Operand box.
 - d. In the Operator list box, notice that the operator has changed (In). Explorer automatically applied the appropriate operator for more than one operand. Do not change the operator. Click **OK**.
 - e. The Filter Elements dialog box displays the filter you just defined. Click **OK**.

Notice that Explorer displays an icon in the Filters Tab page for the filter you just specified.
12. To apply the filters you created to the query, double-click each filter icon, in turn. Notice that Explorer automatically places them in the Filters drop box.
13. Run the query.
14. Close Explorer; or leave it open to do the next tutorial in this chapter.

Parameterized Filters

You can create Explorer filters that take user input (or parameters) at the time the query is executed. When a query that includes a parameterized filter runs, Explorer displays a dialog box prompting for input that completes the comparison expression(s) for one or more filters applied to the query.

You can apply more than one parameterized filter to a single query. In Figure 4-4, two parameterized filters were applied to a query from the demonstration database: one on the City attribute in the *Geography* dimension and one on the Company attribute in the *Product* dimension. Notice that the single dialog box is structured to accept user input for both the parameterized filters.

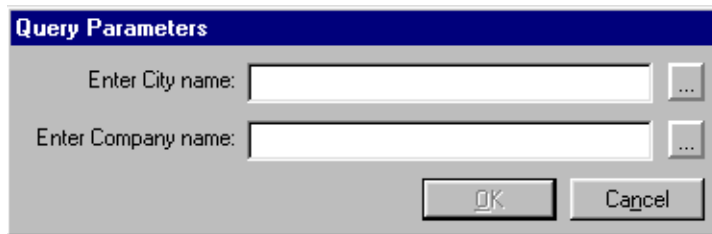


Figure 4-4 Query Parameters input dialog box

The ... button to the right of each input text box allows you to view a list of all possible values for the attribute. You may select the value you wish to use in the query.

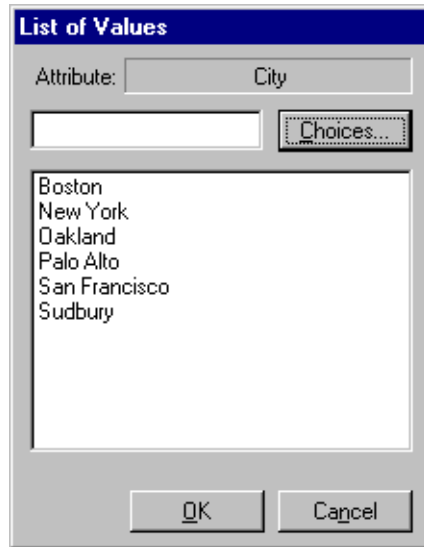


Figure 4-5 *List of Values dialog box*

The list of attribute values is displayed in the **List of Values** dialog box, as shown in Figure 4-5.

The MetaCube demonstration database contains two queries that use parameterized filters. To see how parameterized filters work, you can execute either the Choose Class & Region or the Product by Zip: Choose City query, stored in the Parameterized Filters folder.

Each time a parameterized query is executed, you can specify input for the query and obtain results based on that input.

Tutorial: Parameterized Filter

Note: To do the tutorials in this chapter, you must have started Explorer and be accessing the MetaCube Demo DSS System. If necessary, ask your data warehouse administrator to configure your version of Explorer to access the MetaCube Demo DSS System in the MetaCube demonstration database.

In this tutorial, you will create two parameterized filters and apply them to a query. When you run the query, and apply the filters, the Query Parameters dialog box will look as shown Figure 4-4.

Tutorial Steps:

1. In Explorer, open a workbook, if necessary, and display a new worksheet.
2. Click the Ad Hoc Tab.
3. Specify a query that will report gross revenues from product sales by city, then by company:
 - a. Expand the Sales Transactions data source, if necessary, and the dimensions, as needed.
 - b. Double-click the City attribute icon in the *Geography* dimension.
 - c. Double-click the Company attribute icon in the *Product* dimension.
 - d. Double-click the Gross Revenue measure icon.
4. To display the Filters Tab page, click the Filters Tab.
5. To specify a parameterized filter based on the City attribute:
 - a. Click the Create New Filter button in the Filters Tab page toolbar.
 - b. In the Choose Filter Group dialog box, click *Geography*, then click **OK**.
 - c. In the Filter Elements dialog box, type the name for the filter in the Filter Name box:

What City
 - d. Click the New button.
 - e. In the Filter Element Definition dialog box, click City in the Attribute list. The word City displays in the Attribute box.
 - f. Position the cursor in the Operand box and type:

<<Enter City name>>

 then click **OK**.
6. The Filter Elements dialog box displays the filter you specified. Click **OK**.

7. To specify a parameterized filter based on the Company attribute:
 - a. Click the Create New Filter button in the Filters Tab page toolbar.
 - b. In the Choose Filter Group dialog box, click *Product*, then click **OK**.
 - c. In the Filter Elements dialog box, type the name for the filter in the Filter Name box:

What Company

- d. Click the New button.
 - e. To specify a filter on the Company attribute, in the Filter Element Definition dialog box, verify that the word Company displays in the Attribute box.
 - f. Position the cursor in the Operand box and type:

<<Enter Company name>>

then click **OK**.

8. The Filter Elements dialog box displays the filter you specified. Click **OK**.
9. Apply the two filters you specified to the query. Double-click each filter icon, in turn. Explorer places each filter in the Filters drop box.
10. Run the query.
11. To complete the information in the Query Parameters dialog box:
 - a. Position the cursor in each text box and type the name of the city and the name of the company for which you wish to see data in the report.
 - b. If necessary, click the ... button next to each field to see attribute values for each field. In the List of Values dialog box, click the Choices button. Click the attribute value to use for the query, then click **OK**.
12. Click **OK** in the Query Parameters dialog box to finish running the query.
13. Close Explorer.

Filtering on Time

Filtering on time is different from filtering on, for example, city, where city has absolute values in the data warehouse. Because MetaCube understands the idea of relative time as well as absolute time, you indicate one or the other when creating a time filter.

Absolute Time Filter

In a data warehouse, a time dimension table contains absolute values that Explorer uses when retrieving result sets. For example, you can retrieve sales data for the first half of 1997 by filtering data using the dates January 1, 1997, and June 30, 1997, inclusive, to limit the information returned in your query. This is filtering on absolute time.

Relative Time Filter

A relative time filter allows you to retrieve results for time periods such as the current week or the last four weeks, regardless of the actual date, or to compare results for the current time period and the same time period last year, again regardless of the actual dates. Using MetaCube, you can design queries that can be executed over time to retrieve data and comparisons for the most recent data in your data warehouse, without changing the query itself.

For example, you can run weekly reports that always retrieve the most recent week's data. Without the ability to specify relative time, producing a weekly sales report, for example, would require continuous redefinition of the query for each report, using absolute dates such as February 13-19 or October 20-26. A relative time filter remains undefined until the query executes, at which time MetaCube defines the filter in terms of absolute dates.

To allow you to create relative time filters, MetaCube provides the following relative time parameters:

- Current Period
- Last 2 Periods
- Last 3 Periods

- Last 4 Periods
- Current Period and Same Period Last Year

The word “period” has no absolute meaning. Its meaning is derived from the time attribute included in the query. If you included an attribute for fiscal week in the query, for example, current period means the current week.

The periods provided by Explorer and listed above are commonly used for standard reports. However, Explorer understands any quantity of time periods, such as Last 5 Periods or Last 14 Periods. You can use any number of time periods in your time filter definition. For example, to report data in one-week chunks for the last 10 weeks, the relative time filter definition is:

```
Fiscal Week In <<Last 10 Periods>>
```

When using the Current Period and Same Period Last Year relative time parameter, The query itself is specified with the Fiscal Week time attribute.

Comparing Changes in Data Over Time

As an example, in an analysis of fourth-quarter sales, the absolute numbers may be less important than how those numbers compare with fourth-quarter sales a year ago. Explorer can calculate data changes over time in absolute terms or in percentages; see [Chapter 5, “Explorer Analysis Features.”](#)

When specifying reports that calculate changes over time, it is helpful to organize the time attribute by column and the other attributes in the query by row. This provides a readable format in which Explorer can display its comparison calculation in an additional column of the report.

A report to compare changes in data over time can specify:

- a relative time filter that compares a current period with the same period last year and produces two columns of data, one for each time period being compared.
- a measure calculation to calculate the absolute or percent change between the two columns of data.

Fiscal Week	96/03/26 - 96/04/01	97/03/25 - 97/03/31	
Brand	Units Sold	Units Sold	Increase/Decrease
Alden	219	185	-34
Barton	159	130	-29
Delmore	161	192	31
Extreme	55	43	-12
Lasertech	118	116	-2
NVD	262	274	12
Onetron	93	83	-10
Suresound	266	245	-21
Techno Components	347	379	32

Figure 4-6 Report showing absolute change

The report in Figure 4-6 contains, in the first two columns, data for the current fiscal week and the same week a year ago. The time filter applied to the query is:

Fiscal Week In (<<Current Period and Same Period Last Year>>)

The third column of the report contains the results of the Absolute Change measure calculation, showing the difference between the first two columns. Information on Explorer Measure Calculations is contained in [Chapter 5, “Explorer Analysis Features.”](#)

By applying the relative time filter that compares this week’s data with the same period last year, MetaCube returns two columns of data. The measure calculation, Absolute Change, generates an additional column of data containing the results of that calculation.

Important: When using a relative time filter that compares a current period with the same period a year ago, the query must contain the corresponding time attribute to view the actual data.

When returning the measure calculation data for a two-column report, MetaCube executes the comparison calculation and places the column containing the results in a third column. When more than two columns are contained in the report, Explorer interpolates a comparison column after each successive column. For example, if there are three columns of data, Explorer inserts a column after column 2 to display the comparison between columns 1 and 2, and another column after column 3 to display the comparison between columns 2 and 3.

Note: Typically, comparative calculations are performed on columns, not rows, of data. However, there is no requirement to do this. Once you have run the original query, you can pivot the columns to display data in rows if this makes your report more readable. The discussions in this guide, however, refer to columns containing data and comparison values.

Predefined Parameters

Your data warehouse administrator may have defined some parameters that you can incorporate into filters. When you incorporate a predefined parameter into a filter definition, you type the parameter's name, enclosed in double angle brackets. Associated with a predefined parameter is one or more SQL statement that retrieves the data for that parameter.

For example, suppose your data warehouse administrator had defined a parameter named Top Product that, when applied to a query, constrains the query to retrieve only data about the top-selling product. To use this parameter, you would specify the following *Product* dimension filter:

```
Product = <<Top Product>>
```

where Top Product is the name of the pre-defined parameter.

When you execute the query, MetaCube automatically executes the SQL commands associated with the Top Product pre-defined parameter to identify the top-selling product and return data about it.

Use of a predefined parameter does not cause the **Query Parameters** dialog box to display, since no user input is required.

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This chapter describes MetaCube Explorer’s analysis features. These include:

- sorting reports.
- reporting highest and lowest values.
- computing summary values—grand totals and subtotals.
- querying more than one data source.
- incorporating data analysis calculations into reports.
- using MetaCube’s Sampling feature.

At the end of this chapter, a tutorial provides an opportunity to practice using some of these features.

Sorting Reports

MetaCube’s sorting capability allows you to specify sort orders for attribute and measure values in reports. MetaCube’s default sort method for reports is to sort attribute values in ascending order.

- In Query or Results Mode, you can sort all rows and columns of attributes, affecting alphabetical, numerical, and chronological sorting.
- In Results Mode, you can also sort columns and rows of data (measures) in the report.

Sorting Attributes

The sort orders available for attributes are:

- ascending (the default).

- descending.
- none.

The None option means that retrieved attribute values appear in the report as they were returned from the database.

MetaCube applies sort orders independently to every attribute in a query. In a break report where two or more attributes occur in subordinated rows or columns, the first attribute in the query is sorted first. The sort order applied to any given attribute does not affect the sort order of any other attribute. Explorer sorts the rows first, then the columns, thereby giving precedence to the columns.

Sorting Measures

The sort orders available for measures are:

- ascending.
- descending.

Measure sorting is done after running a query. You may sort measures by column or by row (if measure data has been pivoted or if there is more than one column of measure data). In a break report, you can designate that breaks points in the report should be preserved or you can reformat a break report so that an entire column or row of measure data is sorted in order, thereby ignoring breaks.

Sorting does not change the underlying query; it changes only formatting specifications for the resulting report. Therefore, Explorer does not create a new worksheet in your MetaCube workbook when you specify changes in sort order.

Note: MetaCube arranges dates so that the earliest comes first, and the most recent comes last. If you wish to view the most recent date first, use the sort feature to set the sort order for dates to descending.

Company	Brand	Units Sold
Electrotron Inc.	Techno Components	8,985
	Delmore	4,335
Montel Technology	Barton	3,238
	Alden	4,437
Soundbyte Inc.	Suresound	6,012
	Onetron	2,164
	NVD	6,507
	Lasertech	2,770
	Extreme	1,082

Figure 5-1 Attribute sort example

In Figure 5-1, company names are sorted in ascending order. The brand names are sorted in descending order by company.

Company	Brand	Units Sold
Electrotron Inc.	Techno Components	8,985
Soundbyte Inc.	NVD	6,507
	Suresound	6,012
Montel Technology	Alden	4,437
Electrotron Inc.	Delmore	4,335
Montel Technology	Barton	3,238
Soundbyte Inc.	Lasertech	2,770
	Onetron	2,164
	Extreme	1,082

Figure 5-2 Break report sorted by column

Figure 5-2 shows the same report, sorted by measure in Results Mode. Explorer has sorted the entire report, starting with the rows. The entire data column was then sorted in descending order, irrespective of the row breaks.

Reporting Highest and Lowest Values

Explorer's Top / Bottom N feature allows you to generate a report that contains information for a set of measure values ("N" values) meeting one of the following criteria:

- The highest measures in the result set.

- The lowest measures in the result set.
- The top of the result set by percent.
- The bottom of the result set by percent.

City	Units Sold
Boston	2,347
New York	2,279
Oakland	2,381
Palo Alto	2,377
San Francisco	3,530
Sudbury	1,178

Figure 5-3 Audio sales by city

For example, the report in Figure 5-3, generated from the MetaCube demonstration database, shows sales of audio equipment by city.

City	Units Sold
Oakland	2,381
Palo Alto	2,377
San Francisco	3,530

Figure 5-4 Top selling products cities for audio products: using Top/Bottom N

By comparison, the query that produced the report in Figure 5-4 used the Top /Bottom N feature to retrieve information on the three top-selling cities for audio equipment sales.

The Top /Bottom N feature does not automatically sort the measures. You can sort them using Explorer’s report sorting feature described in the section [“Sorting Reports” on page 5-3](#).

The report shown in Figure 5-5 retrieved net profit for sales of audio, computer, and video products for the last four weeks, by city. Applying the Top /Bottom N feature resulted in a report showing the top three cities.

Product Class	Audio	Computer	Video
City	Net Profit	Net Profit	Net Profit
Boston	61,190.00	260,484.00	132,676.00
Palo Alto	60,960.00	265,943.00	137,143.00
San Francisco	89,225.00	420,605.00	201,143.00

Figure 5-5 Three most profitable cities by product class: Top/Bottom N feature applied

In this report, the first column, showing net profit for audio products, shows the top three cities to be Boston, Palo Alto, and San Francisco. However, the second and third columns do not display the top three cities for computer and video products; rather, they simply display data associated with the top three cities for audio sales.

Page 1: Audio		Page 2: Computer		Page 3: Video	
City	Net Profit	City	Net Profit	City	Net Profit
Boston	61,190.00	Boston	260,484.00	Oakland	135,736.00
Palo Alto	60,960.00	Palo Alto	265,943.00	Palo Alto	137,143.00
San Francisco	89,225.00	San Francisco	420,605.00	San Francisco	201,143.00

Figure 5-6 Pages of product class report

If you organize this report by page for product class, as shown in Figure 5-6, Explorer now processes each page separately and the resulting three-page report shows the top three cities for each class of product—audio, computer, and video. Notice that although Boston was one the top three most profitable cities for sales of audio and computer equipment, Oakland replaces Boston in the list of top three most profitable cities for video sales.

Computing Summary Values

MetaCube can compute summary values for attributes at any level in a report. Summary calculations you can request include:

- Sum.
- Average.
- Count.

- Minimum.
- Maximum.

MetaCube can calculate grand totals for all rows and columns in a report. You can also obtain subtotal calculations by attribute at the break points in a report.

Grand Total Calculations

You can specify grand total calculations in either Query or Results Mode. Because the MetaCube analysis engine computes the grand totals, if you add them to an existing report; Explorer displays them in the same worksheet.

District	California	New England	New York	Grand Total
Brand	Units Sold	Units Sold	Units Sold	Units Sold
Alden	2,626	1,094	717	4,437
Barton	1,924	796	518	3,238
Delmore	2,557	1,060	718	4,335
Extreme	649	275	158	1,082
Lasertech	1,665	669	436	2,770
NVD	3,788	1,699	1,020	6,507
Onetron	1,254	550	360	2,164
Suresound	3,464	1,508	1,040	6,012
Techno Components	5,286	2,275	1,424	8,985
Grand Total	23,213	9,926	6,391	39,530

Figure 5-7 Grand total report

The sales report in Figure 5-7 shows grand totals by both row and column. In this report, Explorer has added a footer row in which total sales for each district are shown and a column containing cross-totals for sales for each brand.

Subtotal Calculations

Explorer can calculate subtotal values for a report organized into subordinated rows or columns—a break report. When you subdivide attributes in a report, MetaCube can insert subtotal calculations at each break point.

Example Subtotal Report

The format of the break report in Figure 5-8 allows MetaCube to calculate subtotals for each region in the report.

Tip: Not all measures are appropriate for totaling. For example, in the demonstration database, totaling the Percent Margin measure does not produce meaningful results.

Region	Company	Units Sold
Northeast	Electrotron Inc.	5,477
	Montel Technology	3,125
	Soundbyte Inc.	7,715
	Total	16,317
	Average	5,439
	Count	3
	Minimum	3,125
West	Maximum	7,715
	Electrotron Inc.	7,843
	Montel Technology	4,550
	Soundbyte Inc.	10,820
	Total	23,213
	Average	7,738
	Count	3
	Minimum	4,550
	Maximum	10,820

Figure 5-8 Break report showing all possible Explorer subtotal calculations

The sample break report in Figure 5-8 illustrates all the summary calculations provided by Explorer—total, average, count, minimum, and maximum. You can request as many summary calculations as you want in any given report.

Reports from More Than One Data Source

You can specify an Explorer query to retrieve and display, in a single report, data from any data sources in the DSS System you are accessing. This feature allows you to generate an Explorer report that analyzes similar information stored in separate data sources. The single requirement is that the data sources used for such a report must have dimensions in common.

In the DSS System for the demonstration database, three dimensions—*Product*, *Geography*, and *Time*—are exactly matching dimensions in both the Sales Transactions and Competitive Data data sources. Therefore, these three dimensions can be used to combine data from the two data sources.

Region	Northeast	West
Brand	Units Sold	Units Sold
Alden	1,811	2,626
Barton	1,314	1,924
Delmore	1,778	2,557
Extreme	433	649
Lasertech	1,105	1,665
NVD	2,719	3,788
Onetron	910	1,254
Suresound	2,548	3,464
Techno Components	3,699	5,286

Figure 5-9 Sales report from the Sales Transactions data source

The sales report shown in Figure 5-9 was retrieved from the Sales Transactions data source and contains sales information by region for all brands in the *Product* dimension.

The Competitive Data data source in the demonstration database also contains a *Product* dimension, which contains sales information for competitors. The attribute names in the *Product* dimensions for these two data sources match exactly.

Region	Northeast		West	
Brand	Units Sold	Competitive Sales	Units Sold	Competitive Sales
Alden	1,811	276	2,626	320
Barton	1,314	200	1,924	250
Delmore	1,778	214	2,557	312
Extreme	433	61	649	85
Lasertech	1,105	152	1,665	225
NVD	2,719	338	3,788	542
Onetron	910	118	1,254	176
Suresound	2,548	361	3,464	436
Techno Components	3,699	555	5,286	693

Figure 5-10 Competitive sales added to the basic sales report

In Figure 5-10, competitive sales information has been added to the basic report, producing, in a single report, information that can be easily read and analyzed.

Analyzing Data Values with Measure Calculations

Often, data becomes more meaningful when it is compared with other data. You can design queries and format Explorer reports to compare measure data to:

- rank values
- show differences between two values
- calculate running totals
- calculate percentage of totals.

Explorer's measure calculation feature provides many report options to calculate comparison information to enable more in-depth analysis of report data.

This table lists Explorer's measure calculation options.

Measure Comparison	What It Displays
Normal	measure as its actual number; used to remove an existing calculation for the measure
Absolute Change	difference between the current value and the previous value, displayed as a number (negative numbers display with a minus sign)
% Change	result of dividing the numeric difference by the previous value; expressed as a percent
% Of Previous	result of dividing the current value by the previous value, expressed as a percent
Rank	sequential numbers indicating ranked order of measure values; 1 indicates highest rank (largest number)
Bottom Rank	sequential numbers indicating ranked order of measure values; 1 indicates lowest rank (largest negative number, or, for all positive numbers, smallest positive number)

Measure Comparison	What It Displays
Running Total	sum of the current measure value and all previous values in the same column (or row if report has been pivoted)
% Of Row / Column Total	comparison between the current measure value and the sum of all values in the column (or row, if the report has been pivoted), expressed as a percent
% Of Page Total	comparison between the current measure value and the sum of all values on the page, expressed as a percent
% Of Report Total	comparison between the current measure value and the grand total of all values in the report (across all pages)
% Of Orthogonal Row / Column	comparison between the current measure value and the sum of the entire row that contains it (or column if the report has been pivoted)
% Of Subtotal	comparison between the current measure and the subtotal of which it is a part, expressed as a percent
Quantiles	similar to rank; comparison among all measures in a column (or row, if the report has been pivoted) according to some number of user-defined groupings (quantiles); 1 indicates the highest quantile ranking. For example, setting the Quantiles to 3 divides returned data into 3 groups (tertiles); a setting of 4 divides data into quartiles; a setting of 100 divides data into percentiles.
Moving Average	average of a set of measures that includes the current measure and some user-defined number of previous measures in the column (or row, if the report has been pivoted); if the number of measures to be averaged is less than the user-defined number (for example, at the beginning of the report), the actual number of measures available is used for the calculation.
Moving Sum	sum of a user-defined set of measures that includes the current measure and some number of previous measures in the column (or row, if the report has been pivoted); if the number of measures to be summed is less than the user-defined number (for example, at the beginning of the report), the actual number of measures available is used for the calculation

Note: If measures have been pivoted in Results Mode, Explorer displays comparisons in rows rather than columns.

Absolute and Percent Change

Explorer's change calculations compare data values that appear in two separate columns.

Absolute Change Calculation

The Absolute Change calculation shows the numeric difference between two values. By default, positive numbers are unsigned; negative numbers are signed.

Percent Change Calculations

The % Change calculation reports the percent of change between two values. This calculation is the result of dividing the numeric difference between the current value and the previous value by the previous value and expressing it as a percent.

Fiscal Week	96/03/26 - 96/04/01	97/03/25 - 97/03/31		
Brand	Gross Revenue	Gross Revenue	Rev Difference	% Chg in Rev
Alden	\$793,240.00	\$607,700.00	-\$185,540.00	-23.39%
Barton	\$188,320.00	\$137,820.00	-\$50,500.00	-26.82%
Delmore	\$36,350.00	\$43,250.00	\$6,900.00	18.98%
Extreme	\$96,250.00	\$75,250.00	-\$21,000.00	-21.82%
Lasertech	\$91,850.00	\$80,150.00	-\$11,700.00	-12.74%
NVD	\$42,650.00	\$45,440.00	\$2,790.00	6.54%
Onetron	\$13,600.00	\$14,450.00	\$850.00	6.25%
Suresound	\$61,040.00	\$55,410.00	-\$5,630.00	-9.22%
Techno Components	\$199,450.00	\$211,475.00	\$12,025.00	6.03%

Figure 5-11 Report illustrating measure calculations that compare measure data

The report in Figure 5-11 illustrates the two measure calculations that compare data values.

The report shows revenues for all brands for the current week and the same week a year ago. The Rev Difference column (that uses the Absolute Change measure calculation) shows the difference in revenues for the two time periods. The % Chg in Rev column shows the difference in revenues, stated as a percent.

Percent of Previous

A slightly different percentage calculation, % of Previous, is the result of dividing the current value by the previous value, expressed as a percent.

Ranking Data Values

Explorer’s ranking features compare data values within a single column of data.

Explorer’s ranking features include:

- Rank.
- Bottom Rank.
- Quantiles.

The Rank calculation assigns 1 to the largest value within the column, 2 to the second largest value, and so forth. Conversely, Bottom Rank assigns 1 to the smallest number in a column.

Note: The Rank measure calculation ranks all data returned by the query. If you wish to eliminate some data, one way to achieve this is to apply the Top/Bottom N feature to the query. The Top/Bottom N feature is discussed in detail in the section [“Reporting Highest and Lowest Values” on page 5-5](#).

Region	Northeast		West	
Brand	Units Sold	Ranking	Units Sold	Ranking
Alden	1,811	4	2,626	4
Barton	1,314	6	1,924	6
Delmore	1,778	5	2,557	5
Extreme	433	9	649	9
Lasertech	1,105	7	1,665	7
NVD	2,719	2	3,788	2
Onetron	910	8	1,254	8
Suresound	2,548	3	3,464	3
Techno Components	3,699	1	5,286	1

Figure 5-12 Sales report showing rankings by brand for two regions

As illustrated in Figure 5-12, for each column of data in a report, Explorer displays the results of the ranking calculation in an adjoining column.

Unlike comparison calculations, which require at least two columns of data in order to be computed, ranking calculations can be applied to a single column of returned data.

Quantiles

The Quantile feature allows you to rank data into a number of user-defined ranking groups, called *quantiles*. For example, you might generate a report showing sales figures divided into three ranked groups. Explorer evaluates the sales data returned from the query and gives each value a ranking of 1 (for the highest rank), 2, or 3 (for the lowest rank).

Region	Northeast		
Product Subclass	Units Sold	Quantile	Ranking
CDROM Drives	1,410	1	4
Compact Disc Players	1,892	1	1
Graphic Equalizers	1,330	2	6
Hardware Boards	636	3	12
IBM Compatible PCs	1,299	2	7
Laser Disc Players	1,370	2	5
Mac Compatible PCs	888	3	11
Memory Chips	488	3	13
Speakers	1,286	3	9
Tape Decks	1,296	2	8
Television Sets	1,767	1	2
VHS Recorders	1,726	1	3
Video Rewinders	929	3	10

Figure 5-13 Report showing ranking and quantiles of unit sales for the Northwest region

To illustrate how Explorer determines quantile rankings, the report in Figure 5-13 shows product subclass sales for a single region.

- The first column shows the actual sales data (number of units sold, by brand for the Northeast region).
- The second column shows sales ranked into tertiles (three quantiles).
- The third column shows sales ranked from highest (1) to lowest (13).

To assign quantile rankings in this report, Explorer first ranked the unit sales values (as shown in the Ranking column), then divided the highest rank number for this report (13) by the number of quantiles for this report (3). The result determined the number of values assigned to each quantile group. Therefore, sales ranked from 1 to 4 were placed in the first quantile, sales ranked from 5 to 8 were placed in the second quantile, and sales ranked from 9 to 13 were placed in the third quantile.

Setting a Quantile value of 3 divides data into three groups, or tertiles; setting a Quantile value of 4 divides data into quartiles. Setting a Quantile value of 100 divides data into percentiles. As with rank and bottom rank, a report needs to contain only a single column of data in order to be ranked by quantiles.

The default number of quantiles in which to group returned data is specified in Explorer’s Preferences. However, you can specify any value at the time you apply the Quantile measure calculation in a query. Explorer Preferences are discussed in [Appendix B](#).

Running Totals

The Running Total calculation sums, for each row in a column, the current value and all values in previous rows within that column.

Region	Northeast	
Product Subclass	Units Sold	Running Total
CDROM Drives	1,410	1,410
Compact Disc Players	1,892	3,302
Graphic Equalizers	1,330	4,632
Hardware Boards	636	5,268
IBM Compatible PCs	1,299	6,567
Laser Disc Players	1,370	7,937
Mac Compatible PCs	888	8,825
Memory Chips	488	9,313
Speakers	1,286	10,599
Tape Decks	1,296	11,895
Television Sets	1,767	13,662
VHS Recorders	1,726	15,388
Video Rewinders	929	16,317

Figure 5-14 Running total report

For the report in Figure 5-14, Explorer calculated running total values for the Units Sold column and displayed the result in the adjacent Running Total column.

Other Percentage Comparisons

Explorer provides a number of percentage calculations that allow you to compare individual values in a column of data with:

- the total of the column that contains the value
- the total of the page (in a multi-page report) that contains the value
- the total of the entire report
- the total of the row of which the current value is a member
- subtotals in a break report

and display the comparisons as percentages.

Comparing Data with Report Subtotals and Totals

Using the % Of Row / Column Total measure calculation, Explorer compares individual values in a column with the total of the column itself (or row, if the report has been pivoted).

Using the % Of Subtotal measure calculation, Explorer compares individual values in a column to the subtotals in a break report. The report itself does not need to display the subtotals for the percentage calculation to be run.

Company	Brand	Gross Revenue	Pct of Subtotal	Pct of Column Total
Electrotron Inc.	Delmore	\$975,600.00	15.84%	3.13%
	Techno Components	\$5,183,740.00	84.16%	16.64%
	Total	\$6,159,340.00	100.00%	19.77%
Montel Technology	Alden	\$14,840,600.00	80.96%	47.63%
	Barton	\$3,489,940.00	19.04%	11.20%
	Total	\$18,330,540.00	100.00%	58.83%
Soundbyte Inc.	Extreme	\$1,893,500.00	28.39%	6.08%
	Lasertech	\$1,933,350.00	28.99%	6.20%
	NVD	\$1,047,475.00	15.71%	3.36%
	Onetron	\$352,200.00	5.28%	1.13%
	Suresound	\$1,442,440.00	21.63%	4.63%
	Total	\$6,668,965.00	100.00%	21.40%
Grand Total		\$31,158,845.00	300.00%	100.00%

Figure 5-15 Percent of totals report

The sample report in Figure 5-15 illustrates the use of % of Subtotal and % of Row / Column Total calculations.

- The Gross Revenue column shows gross revenues by brand, subtotaled by company.
- The Pct of Subtotal column shows, for each row, the percentage of the subtotal for each company.
- The Pct of Column Total column shows, for each row, the percentage of the entire column total.

When specifying the % of Subtotal measure calculation, you must specify the attribute to be used as a basis for the subtotal percentage calculation.

Explorer lists all the attributes contained in the query so that you can select the one you wish to use.

The % Of Page Total and % Of Report Total measure calculations function similarly, calculating, respectively, percentages based on an entire page of a multipage report and percentages based on values contained in an entire report.

Percent of Orthogonal Row/Column

The % Of Orthogonal Row / Column calculation compares the value within a single cell of a column of data with the values contained in the row of which that cell is a member. If the report has been pivoted, this measure calculation does the opposite: it compares a single value in a row with values contained in the column of which it is a member.

Region	Northeast		West		Grand Total
Brand	Gross Revenue	Pct of Cur Row	Gross Revenue	Pct of Cur Row	Gross Revenue
Alden	\$224,280.00	36.91%	\$383,420.00	63.09%	\$607,700.00
Barton	\$51,800.00	37.59%	\$86,020.00	62.41%	\$137,820.00
Delmore	\$19,300.00	44.62%	\$23,950.00	55.38%	\$43,250.00
Extreme	\$24,500.00	32.56%	\$50,750.00	67.44%	\$75,250.00
Lasertech	\$30,150.00	37.62%	\$50,000.00	62.38%	\$80,150.00
NVD	\$18,610.00	40.96%	\$26,830.00	59.04%	\$45,440.00
Onetron	\$6,675.00	46.19%	\$7,775.00	53.81%	\$14,450.00
Suresound	\$23,250.00	41.96%	\$32,160.00	58.04%	\$55,410.00
Techno Components	\$87,305.00	41.28%	\$124,170.00	58.72%	\$211,475.00

Figure 5-16 Percent of orthogonal row report

The example report in Figure 5-16 shows revenue data for the two regions in the demonstration database—Northeast and West—with grand totals for each brand.

In each row of this report, the Gross Revenue columns show sales revenues for a single brand—one column for each region. The Grand Total column displays total revenues for each brand. This is the orthogonal row total.

For each individual revenue figure shown at the intersection of a region column and a brand name row, an adjacent column, labeled Pct of Cur Row, shows a percentage value that is the result of dividing the individual revenue figure in that cell by the grand total of revenues for that brand.

Moving Comparisons

Moving sums and averages are calculated on a user-defined set of data points. This set of data points always includes the current value plus some number of previous values. For example, a set of four data points for a moving calculation includes the current value and the three previous values.

Fiscal Week	Units Sold	Avg Units Sold
96/12/31 - 97/01/06	1,770	
97/01/07 - 97/01/13	1,649	1,710
97/01/14 - 97/01/20	1,480	1,565
97/01/21 - 97/01/27	1,357	1,419
97/01/28 - 97/02/03	1,311	1,334
97/02/04 - 97/02/10	1,286	1,299
97/02/11 - 97/02/17	1,317	1,302
97/02/18 - 97/02/24	1,280	1,299
97/02/25 - 97/03/03	1,533	1,407
97/03/04 - 97/03/10	1,884	1,709
97/03/11 - 97/03/17	2,029	1,957
97/03/18 - 97/03/24	1,845	1,937
97/03/25 - 97/03/31	1,647	1,746

Figure 5-17 Moving average report

The report in Figure 5-17 calculates a moving average based on two data points. That is, the value used for each moving average calculation is the average of the current value and the previous value. The report displays:

- actual weekly sales in the Units Sold column.
- the moving average calculation in the Avg Units Sold column.

The Avg Units Sold column displays the average of this week's and last week's sales, thereby smoothing out, somewhat, the peaks and valleys of the sales figures.

The moving sum calculation works in a similar way to total the current value and some number of previous values.

The default number of data points to use in the calculation is specified in Explorer's Preferences. However, you can specify any value at the time you apply the Moving Sum or Moving Average measure calculation to a query. Explorer Preferences are discussed in [Appendix B](#).

Formatting a Query for Measure Calculations

When you incorporate measure calculations into a report, you format your query to provide a place to display the results of the calculation.

Typically, you want your report to display the actual data returned for a given measure as well as the results of the measure calculation (ranking, change, percentage, and so on) that is based on the same measure. So, you must specify:

- one or more column to display actual data.
- one column to display the results of a measure calculation.

Each measure calculation you wish to include in a report must be entered as a separate query item.

Brand	Units Sold	Ranking
Techno Components	8,985	1
NVD	6,507	2
Suresound	6,012	3
Alden	4,437	4
Delmore	4,335	5
Barton	3,238	6
Lasertech	2,770	7
Onetron	2,164	8
Extreme	1,082	9

Figure 5-18 Report ranking sales of products by brand

Figure 5-18 shows an example report that displays:

- actual weekly unit sales by brand in the Units Sold column.
- the ranking (from 1 to 9) of unit sales for each brand in the Ranking column.

The report has been sorted by column so that rankings and sales figures are listed from highest to lowest.

Estimating Results

Explorer's Sampling feature allows you to attain improvements in retrieval time for queries to very large DSS Systems. Running against large database tables can cause queries to run slowly. The MetaCube Sampling feature provides a solution to improve query performance against large data tables. Your data warehouse administrator can create smaller tables, called *sample tables*, and incorporate these tables into a DSS System. Sample tables are statistically accurate, randomly generated data tables. By running queries against sample tables, you can query small subsets of very large data tables and obtain results that are statistically accurate to your pre-defined level of confidence.

Using a MetaCube software component called the Sampler, your data warehouse administrator can create sample tables for a DSS System. For example, a sample table containing 10,000 records could be randomly created from an original table containing 100,000,000 records. For you and other Explorer users, querying against the 10,000-row sample table results in noticeable performance improvement as you run queries against a much smaller table.

Getting Accurate Results Faster

In order to use Explorer's Sampling feature, you need to:

- Configure Explorer for Sampling Confidence and Sampling Accuracy by setting the Explorer Preferences related to Sampling.
- Enable the Sampling feature with Explorer.

Even if Sampling is disabled, the Slow Query Warning provides the opportunity to execute the query against sample tables if you have previously set the Sampling Confidence and Sampling Accuracy Preference values. Information on Explorer's Preferences is contained in [Appendix B](#)

Sampling Options

When you configure Explorer for Sampling, you assign a numeric value that defines for the MetaCube analysis engine the sampling confidence and accuracy you wish for the query you are running.

- **Sampling Confidence:** This setting is related to the level of confidence to expect in the report data when you estimate results. The higher the Sampling Confidence level you request, the wider the range of possible error in the data in your report. Conversely, as you set Sampling Confidence to a lower value, the range of error gets smaller. Typical settings for percent of confidence are in the 90s—somewhere between 90 and 99. Many samples (such as political polls, for example) indicate a 95% confidence level.

Other possible settings might include 75% and 50%. Below 50%, results tend to become meaningless. At 50% confidence level, the ranges of error for the values in your report will generally be quite small.

Since the range of error is different for every data value in a given report, Explorer allows you to view the margin of error for each value displayed in your report. After running an Explorer report using the Estimate Results feature, you can display, in Results Mode, the margin of error for each data value. The margin of error is stated in terms of some number.

As an example, suppose you set Sampling Confidence at 95%. After running a report, one of the data elements in the report is 155 and Explorer indicates a margin of error of 12. This means that you can be 95% confident that the real value of that data element falls within a range of 143 to 167.

- **Sampling Accuracy:** This setting is related to the relative accuracy of the results of your queries against the sample tables. Your data warehouse administrator may have created more than one sample table. In this case, your accuracy selection tells the MetaCube analysis engine which sample table to query. If you set the accuracy level low, at, say, 1, the MetaCube analysis engine will run the query against the smallest sample table available. The benefit to you is that query performance is very good; results will be returned fast.

On the other hand, if you set the Sampling Accuracy to 99, the MetaCube analysis engine will run the query against the largest sample table available (not the original table, however).

The exact effect of a given Sampling Accuracy setting depends upon the number of sample tables available against which MetaCube can choose to run the query. By setting Sample Accuracy somewhere within the range of 1 to 99, you are giving guidelines to MetaCube about the tradeoff between performance and accuracy that you want for your reports.

Note: *The MetaCube demonstration database contains sample tables and you can set up Explorer to run queries that estimate results. In the resulting reports, you can view the margin of error for the data elements. However, because the demonstration database is so small, you cannot really observe noticeable improvements in performance since even complex queries run very quickly.*

Tutorial: Explorer's Analysis Features

The tutorial in this section gives you practice using some of Explorer's analysis features.

For this tutorial, you will use the Sales Transaction data source within the MetaCube Demo DSS System and you will apply the following analysis features to a query:

- Sorting attribute values.
- Subtotals and grand totals.
- Querying two data sources.

Note: To do this tutorial, you must have started Explorer and be accessing the MetaCube Demo DSS System. If necessary, ask your data warehouse administrator to configure your version of Explorer to access the MetaCube Demo DSS System in the MetaCube demonstration database.

Tutorial Steps:

1. Open Explorer and, if necessary, open a workbook and display a new worksheet.
2. Click the Ad Hoc Tab.
3. Expand the Sales Transactions data source and its dimensions, as needed, to perform the steps of this tutorial.
4. To specify the basic query:
 - a. Double-click the Region attribute icon in the *Geography* dimension.
 - b. Double-click the Brand attribute icon in the *Product* dimension.
 - c. Double-click the Units Sold measure icon.
5. To retrieve data from another data source (Competitive Data):
 - a. Expand the Competitive Data data source icon.
 - b. Double-click the Units Sold measure icon.
 - c. To provide a more meaningful name for the second Units Sold measure column, right-click the Units Sold_1 icon, then click Rename.
 - d. Rename the measure icon using the same methods you use when renaming Windows operating system files. Type the name:

Competitor Units Sold
6. To apply a filter to the query:
 - a. Click the Filters Tab.
 - b. Double-click the Public Filters folder.
 - c. Double-click the Current Time Filters folder.
 - d. Double-click the Current 4 wk Period filter to place it in the Filters drop box.
7. Click the Ad Hoc Tab.

- 8.** To sort the brands in descending alphabetical order:
 - a.** Right-click the Brand attribute icon in the Rows drop box.
 - b.** Point to Sort on the shortcut menu, then click Descending. The descending order sorts from z to a.
- 9.** To subtotal region sales for all brands:
 - a.** Right-click the Region attribute icon in the Rows drop box.
 - b.** Click Subtotals in the shortcut menu.
 - c.** In the Subtotals dialog box, click Sum, then click **OK**.
- 10.** To display the Grand Totals dialog box:
 - For Client / Server Explorer, click Grand Totals on the Query menu.
 - For Web Explorer, click the Grand Totals button on the toolbar.
- 11.** To obtain grand totals for the report, in the Grand Totals dialog box, click Sum in the Grand Total Rows by list. Click **OK**.
- 12.** Run the query; save the workbook, if you wish.
- 13.** Close Explorer.

Explorer Reports

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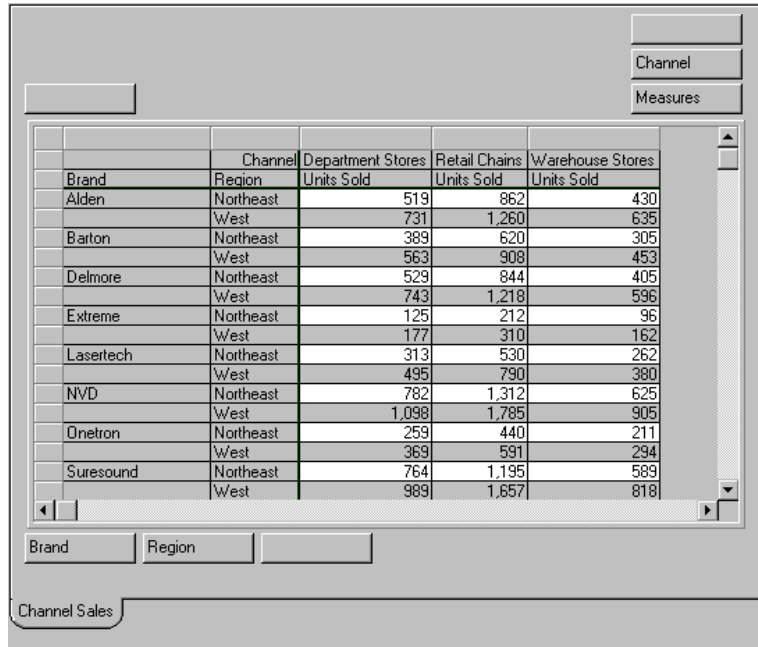
his chapter provides information about Explorer reporting features. This chapter discusses:

- the report screen.
- pivoting, or reformatting, reports.
- analysis features available in reports.
- report properties and information.
- printing reports.
- exporting report results.
- working with reports offline.

At the end of this chapter, a tutorial provides an opportunity to practice using some of these features.

About Explorer Reports

By default, when you run a query, Explorer displays the results in a report. When viewing an Explorer report, you are using Results Mode.



The screenshot shows the Explorer's Report screen. At the top right, there are buttons for 'Channel' and 'Measures'. Below these is a table with columns: Brand, Region, Department Stores, Retail Chains, and Warehouse Stores. The table contains data for various brands (Alden, Barton, Delmore, Extreme, Lasertech, NVD, Onetron, Suresound) across Northeast and West regions, with units sold for each sales channel. At the bottom, there are buttons for 'Brand' and 'Region', and a tab labeled 'Channel Sales'.

Brand	Region	Department Stores	Retail Chains	Warehouse Stores
Alden	Northeast	519	862	430
	West	731	1,260	635
Barton	Northeast	389	620	305
	West	563	908	453
Delmore	Northeast	529	844	405
	West	743	1,218	596
Extreme	Northeast	125	212	96
	West	177	310	162
Lasertech	Northeast	313	530	262
	West	495	790	380
NVD	Northeast	782	1,312	625
	West	1,098	1,785	905
Onetron	Northeast	259	440	211
	West	369	591	294
Suresound	Northeast	764	1,195	589
	West	989	1,657	818

Figure 6-1 Explorer's Report screen

Figure 6-1 shows Explorer's report screen. It consists of:

- the report itself.
- pivot handles that allow reformatting of the report.
- the worksheet tab that identifies the worksheet containing both the underlying query and the report generated by the query.

In Figure 6-1, the report shows unit sales by brand for the Northeast and West regions, broken out into columns by sales channel.

A detailed description of the report screen is contained in the section ["Explorer Reports,"](#) in [Chapter 2, "Getting Started with Explorer."](#)

Pivoting Reports

You can reformat a report so that it presents data in different orientations. For example, you can move rows of attributes so that they display in columns; or, move measure data to display in rows. You can move rows or columns of attributes so that they display a page at a time. This is called *pivoting* the report. When you pivot a report, you do not actually change the data in the report, you reformat the report to display the results differently.

	Region	Northeast	West
Channel	Brand	Units Sold	Units Sold
Department Stores	Alden	519	731
	Barton	389	563
	Delmore	529	743
	Extreme	125	177
	Lasertech	313	495
	NVD	782	1,098
	Onetron	259	369
	Suresound	764	989
	Techno Components	1,078	1,524
Retail Chains	Alden	862	1,260
	Barton	620	908
	Delmore	844	1,218
	Extreme	212	310
	Lasertech	530	790
	NVD	1,312	1,785
	Onetron	440	591
	Suresound	1,195	1,657
	Techno Components	1,754	2,533
Warehouse Stores	Alden	430	635
	Barton	305	453
	Delmore	405	596
	Extreme	96	162
	Lasertech	262	380
	NVD	625	905
	Onetron	211	294
	Suresound	589	818
	Techno Components	867	1,229

Figure 6-2 Pivoted Report: compare with Figure 6-1

Figure 6-2 shows the same data as contained in the report in Figure 6-1, but the format is different. The report has been pivoted. The new format displays sales data in two columns by region rather than three columns by channel.

Analysis Features in Reports

In Results Mode, you can add more data to a report by accessing some of the analysis features available in reports.

Totals and Subtotals in Results Mode

In Results Mode, you can add both grand totals and subtotals to a report. A complete description of MetaCube's grand totals and subtotals feature is contained in [Chapter 5, "Explorer Analysis Features."](#)

Drill Up/Drill Down

MetaCube's drill up / drill down functionality allows you to view different levels of summarized data for the attributes in a report. Drilling down or up on an attribute value in Results Mode:

- creates a new worksheet containing a new query definition.
- displays new summarized data in a new report.
- retains the original query and its report in the old worksheet.

Region	Brand	Units Sold
Northeast	Alden	1,811
	Barton	1,314
	Delmore	1,778
	Extreme	433
	Lasertech	1,105
	NVD	2,719
	Onetron	910
	Suresound	2,548
	Techno Components	3,699
West	Alden	2,626
	Barton	1,924
	Delmore	2,557
	Extreme	649
	Lasertech	1,665
	NVD	3,788
	Onetron	1,254
	Suresound	3,464
	Techno Components	5,286

Figure 6-3 Sales report, by region, for all brands

In Figure 6-3, a query returns a report by region of brands sold.

Region	Brand	Product	Units Sold
Northeast	Alden	4 Megabyte SIMMS	244
		8 Megabyte SIMMS	244
		Network Server PC	457
		Pentium 100 MHz	435
		Pentium 590 Server	431
West	Alden	4 Megabyte SIMMS	357
		8 Megabyte SIMMS	358
		Network Server PC	623
		Pentium 100 MHz	643
		Pentium 590 Server	645

Figure 6-4 Drill-down sales report: product-level detail for Alden brand

Drilling down on the Alden brand produces a similar report, but summarized at the next level down, as shown in Figure 6-4.

When you drill down, you filter out some of the information in the original report, since you are asking for more detailed information on a single attribute only. However, if you configure Explorer to do so, it will retain a reference, in the new report, to the attribute from which you drilled. This is illustrated in Figure 6-4.

The drill up operation produces a more summarized report; that is, it contains less detail. MetaCube, in this case, retrieves data at the next higher level in the dimension hierarchy. Unlike drilling down, which filters out some of the data in the original report, the drill up operation produces a report that encompasses, at a minimum, all the values contained in the original report. Therefore, the particular attribute value selected does not matter, the summarized report includes all the data at the next higher level.

Region	Company	Units Sold
Northeast	Electrotron Inc.	5,477
	Montel Technology	3,125
	Soundbyte Inc.	7,715
West	Electrotron Inc.	7,843
	Montel Technology	4,550
	Soundbyte Inc.	10,820

Figure 6-5 Drill up sales report: company-level summarization includes all brands

For example, in the original brand sales report by region, shown in Figure 6-3, drilling up on any brand name produces the report shown in Figure 6-5.

You can drill up or down on an attribute organized either by column or by row.

Multiple Drill Paths

A hierarchy can branch, thereby having more than one path along which to drill.

The demonstration database illustrates this in its *Time* dimension. The Fiscal Week attribute, the base attribute in the hierarchy, is the point where the hierarchy branches into three separate paths, moving upward through the dimension.

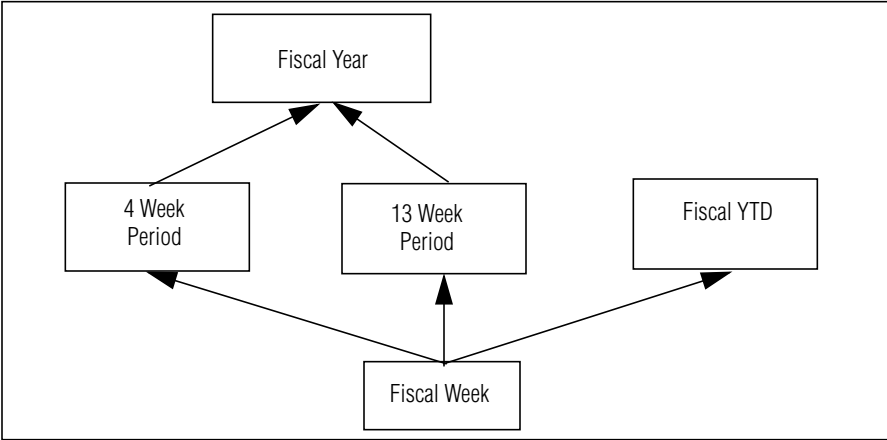


Figure 6-6 Time branching hierarchy in demonstration database

When you drill up on an attribute where a hierarchy branches, you need to tell Explorer which branch to follow.

Fiscal Week	Units Sold
96/01/01 - 96/01/07	1,558
96/01/08 - 96/01/14	1,398
96/01/15 - 96/01/21	1,270
96/01/22 - 96/01/28	1,216
96/01/29 - 96/02/04	1,193
96/02/05 - 96/02/11	1,226
96/02/12 - 96/02/18	1,169
96/02/19 - 96/02/25	1,418
96/02/26 - 96/03/04	1,758
96/03/05 - 96/03/11	1,935
96/03/12 - 96/03/18	1,771
96/03/19 - 96/03/25	1,550
96/03/26 - 96/04/01	1,680
Grand Total	19,142

Figure 6-7 Report of unit sales by fiscal week for 1996

The report in Figure 6-7 contains unit sales information for the year 1996, including a grand total. If you were to drill up on this report, Explorer would prompt you for the consolidation path to follow; you could follow one of three paths:

- 4 Week Period.
- 13 Week Period.
- Fiscal YTD.

If you were to select 4 Week Period, the resulting report would show units sales figures summarized in groups of 4-week periods.

4 Week Period	Units Sold
96/01/01 to 96/01/28	5,442
96/01/29 to 96/02/25	5,006
96/02/26 to 96/03/25	7,014
96/03/26 to 96/04/22	1,680
Grand Total	19,142

Figure 6-8 Report showing unit sales by 4-week periods for 1996

Notice that the grand total amount of sales is the same as in the previous report. However, sales are summarized at a level higher because of drilling up in the *Time* dimension from the Fiscal Week level to the 4-Week Period level.

If you had selected either the 13-Week Period or Fiscal YTD path, however, the resulting report would be summarized for one of those time periods.

When you drill in Explorer reports, you move along the path one level at a time; it is not possible to skip levels.

Drilling Down to Multiple Attributes at the Same Level

Dimensions may be designed to include multiple attributes at the same hierarchical level. In the *Product* dimension of the demonstration database, for example, the Product and UPC attributes both describe individual products at the lowest level of the hierarchy.

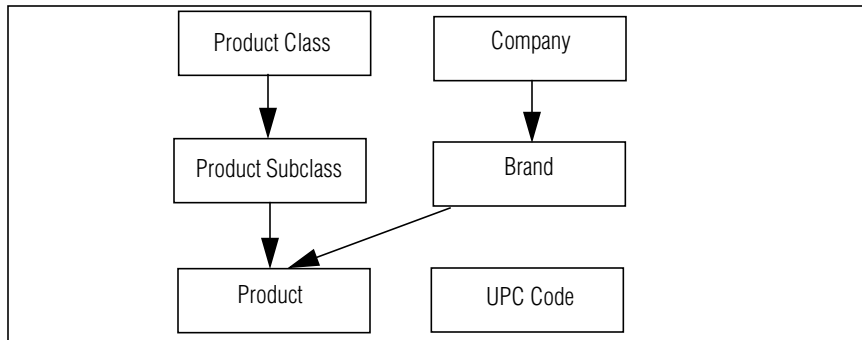


Figure 6-9 Product dimension in the MetaCube demonstration database

For any level in a dimension's hierarchy where there are multiple attributes, your data warehouse administrator has identified one as the default attribute. Therefore, if you drill to a level where there are two or more attributes, Explorer automatically drills to the default attribute and displays values for it in the resulting report.

In the demonstration database, the default attribute for the product level of in the *Product* dimension hierarchy is the Product attribute. Therefore, if you drill down in the *Product* dimension, Explorer automatically selects Product attribute values to display in the report, not UPC values.

Drill Across

In Results Mode, Explorer's drill across functionality allows you to:

- Add attributes from other dimensions to a report, thereby adding new rows or columns of attribute values at subordinated levels.
- Add measures to your report, thereby increasing the amount of data shown in the report.

Drilling across:

- Creates a new worksheet containing a new query definition.
- Generates a report with additional data or further levels of detail for the existing data.
- Retains the original query and report in the old worksheet.

Product Class	Units Sold
Audio	14,092
Computer	11,374
Video	14,064

Figure 6-10 Basic report: Unit sales by Product Class

A basic query for unit sales by product class produces the report shown above in Figure 6-10.

Product Class	Channel	Units Sold
Audio	Department Stores	4,099
	Retail Chains	6,737
	Warehouse Stores	3,256
Computer	Department Stores	3,243
	Retail Chains	5,410
	Warehouse Stores	2,721
Video	Department Stores	4,105
	Retail Chains	6,674
	Warehouse Stores	3,285

Figure 6-11 First Drill Across report adding channel subdivisions

The report shown in Figure 6-11 is the result of drilling across to add another attribute to the report. The addition of the Channel attribute causes the sales data to be subdivided to produce the break report containing more detail for the existing data. This is shown above in Figure 6-11.

Product Class	Channel	Channel	Geography	Region	Units Sold
Audio	Department Stores		Northeast		1,699
			West		2,400
	Retail Chains		Northeast		2,777
			West		3,960
	Warehouse Stores		Northeast		1,328
			West		1,928
	Total			14,092	
Computer	Department Stores		Northeast		1,363
			West		1,880
	Retail Chains		Northeast		2,243
			West		3,167
	Warehouse Stores		Northeast		1,115
			West		1,606
	Total			11,374	
Video	Department Stores		Northeast		1,696
			West		2,409
	Retail Chains		Northeast		2,749
			West		3,925
	Warehouse Stores		Northeast		1,347
			West		1,938
	Total			14,064	

Figure 6-12 Second Drill-Across report adding region subdivisions

Drilling across again to add another attribute, Region, produces the report shown in Figure 6-12. Subtotals by product class can be compared with the data in the original basic report, shown in Figure 6-10. Subdividing the basic report with two drill across operations adds two levels of detail to the report and creates a break report on which to calculate subtotals.

You can also drill across to add more measure data to a report. When you add measure data, it may be from any data source in your DSS System. Since the dimensions used for drilling across must exactly match, Explorer prevents your using an incorrect dimension for drilling across.

Product Class	Units Sold
Audio	14,092
Computer	11,374
Video	14,064

Figure 6-13 Units sold by product class

A basic report, shown in Figure 6-13 above, can be expanded to incorporate additional measure data by drilling across.

Product Class	Units Sold	Gross Revenue	Net Profit
Audio	14,092	\$3,395,925.00	\$358,065.00
Computer	11,374	\$20,491,290.00	\$1,595,043.00
Video	14,064	\$7,271,630.00	\$804,589.00

Figure 6-14 Drill-across report with gross revenue and net profit shown

In Figure 6-14, gross revenue and net profit data have been added by drilling across to measures.

Report Information

In Results Mode, Explorer makes available, on the screen, some information about the current report that may be useful to you.

- Report creation date.
- Sampling Accuracy setting.
- Sampling Confidence setting.
- Filter(s) applied.

The report information about the current report provides a quick summary of some key parameters about the report. This information displays on the screen, but cannot be printed.

Report Properties

You may specify report properties or characteristics that affect how a report displays on the screen as well as how it prints. Default report properties are set using Explorer's Preferences. However, you can change report properties on a report-by-report basis.

You can individually customize the appearance of reports and the report screen, itself, for each worksheet. Properties for an individual worksheet override the Explorer-wide defaults.

The features that you can customize on a report-by-report basis are described below.

Pivoting Features

You can specify pivoting capabilities for a report as follows:

- **Pivoting:** You can enable / disable the ability to pivot a report. By default, pivoting is enabled. In addition, you can display / remove row, column, or page pivot handles from the report screen. Pivot handles are used to pivot reports. If the handles do not display on the screen, pivoting cannot be performed. By default, pivot handles are displayed and enabled.
- **Pivot handles:** You can specify the size of the pivot handles. This is useful to accommodate a long attribute or measure name.

Fonts/Colors Features

The features of the Explorer screen for which you can define fonts are listed in the table below.

Feature	What It Is
Pivots	Handles that enable pivoting of reports
Results	Measure data in the report
Headers	Areas of the report that contain column headings (attribute values and measure names)
Summaries	Areas of the report that contain subtotals
GrandTotals	Areas of the report that contain grand totals

Explorer's default font settings are:

- Font—MS Sans Serif.
- Font style—regular.
- Size—eight point.
- Script—Western.

The features of the Explorer screen for which you can define colors are listed in the table below.

Feature	What It Is
PivotsBackColor	Background color for pivot handles
PivotsForeColor	Color of font on pivot handles
Band1Color	You may define up to four background colors for the rows in a report. Each color alternates with as many others as you specify. For example, if you define two band colors—white and green—alternate rows of the report will be white and green.
Band2Color	
Band3Color	
Band4Color	
ResultsBackColor	Unused; band colors override this setting
ResultsForeColor	Color of font that prints measure data
HeadersBackColor	Background color for all areas that contain attribute values or measure names
HeadersForeColor	Color of font that prints attribute values and measure names
SummariesBackColor	Background color for sub-total calculations
SummariesForeColor	Color of font that prints sub-total calculations
GrandTotalsBackColor	Background color for grand total calculations
GrandTotalsForeColor	Color of font that prints grand total calculations

Information on setting Explorer-wide default report properties is contained in [Appendix B](#).

Printing Results

Explorer provides several options that you can apply as you print a report. For example, you can individualize reports by creating a header and footer for each page of the report. Also, you can adjust margins for a printed report so that it appears exactly where you want it on the page. Another way to control the positioning of the report is to center it vertically or horizontally, or both.

In the Header and Footer fields of a report, you can include, in addition to text, many formatting codes that allow you to produce customized reports. The table below lists the codes that can be used to specify Headers and Footers for reports.

	Code	Usage
Font Codes:		
	&B	Use a bold font
	&I	Use an italic font
	&U	Underline the header/footer text
	&S	Strikes through the header/footer text with continuous hyphen line
	&"fontname"	Use the specified font; double quotes are required
	&nn	Use the specified font size. Must be a 2-digit number
Format Codes:		
	&L	Left-aligns the text that follows.
	&C	Centers the text that follows. By default, headers and footers for Explorer reports are centered.
	&R	Right-aligns the text that follows.
	&D	Prints the current date.
	&N	Prints the total number of pages in the report.

	Code	Usage
	&T	Prints the current time.
	&F	Prints the name of the worksheet.
	&A	Prints the name of the worksheet. Used as default for Explorer report's page heading.
	&P	Prints the current page number. Used with the word "Page" as the default for Explorer report footers.
	&P+n	Prints the page number plus n.
	&P-n	Prints the page number minus n.
	&&	Prints an ampersand.
	&N	Prints the total number of pages in the report.

Font codes must precede any other code or text, or they are ignored. Unless otherwise specified (using &L or &R), headers and footers are centered on each page of the report. Codes may be typed in uppercase or lowercase letters.

You can combine alignment codes and font codes to print a header or footer with separate elements. For example, the print specification:

```
&L&"Helvetica"&D&C&&"Palatino"&A&R&"Helvetica"Page &P of &N
```

prints the following three-part header or footer.

5/7/97

Worksheet1

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You may change font style immediately after each alignment code.

You can also set the standard Windows print setup options when printing Explorer reports.

The procedures for printing a chart differ from those for reports. For information on printing charts, refer to [Chapter 7, "Explorer Charts."](#)

Exporting Report Results

In Results Mode, Explorer provides features for copying reports or report data to other Windows tools and applications. The copy and export options are available in Results Mode.

Export to Microsoft Excel

If Microsoft Excel software is installed on your PC, you can copy query results from Explorer directly to an Excel spreadsheet. If Excel is not already open, copying to Excel opens the application and places data from your report in a new Excel workbook.

A setting in Explorer's Preferences determines whether data is copied into a standard spreadsheet or into an Excel PivotTable. Excel PivotTables provide analysis and reporting features for multi-dimensional data sets.

Note: *If any attributes in your report are organized by column, Excel PivotTable cannot accept the Explorer data.*

Export to Microsoft Access

If Microsoft Access software is installed on your PC, you can export reports to an existing Microsoft Access database. In the Access database, Explorer creates a new table. The table is named after your query and contains the data in the report. Explorer automatically creates Access database fields of the appropriate data types and names them based on the definition of the query that created the report.

Export to a Text File

You can export your report to a text file. The text file contains your data in comma-delimited form, with double quotes around strings.

Copy to the Clipboard

You can copy a selected portion or all of a report to the Windows clipboard. You can paste into other Windows applications using standard Windows paste methods.

Working Offline

Explorer provides features that allow you and other users to work with reports and charts offline. This section discusses:

- mailing workbooks.
- using a workbook offline.

Mailing a Workbook

MetaCube Explorer is integrated with mail systems so that you can mail a workbook as an attachment to a mail message, just as you do any other document, spreadsheet, or graphic file. MetaCube uses the standard MAPI mail interface; any mail system that supports the MAPI interface can be used to send and receive MetaCube workbooks.

You can attach a MetaCube workbook to a mail message in any mailing system that allows attachments.

The recipient of your MetaCube workbook can view and print your reports and charts. Thus, you can easily share the results of your queries with other Explorer users.

The recipient of your MetaCube workbook can also run queries contained in your workbook if they are also connected to the same DSS System against which the queries were originally created. However, if you have used any filters in your queries, they must be public filters. Other users do not have access to your private filters and, therefore, they might not get the same results when running a filtered query.

Using a Workbook Offline

You can perform the following tasks when working offline from the data warehouse:

- customize report properties for individual reports.
- pivot the data in a report.
- sort a report or chart.
- rename, delete, copy a query, or rearrange worksheets in the workbook.
- create a chart from any report.
- reformat a chart.

Note: *Although you can perform these operations offline, you cannot save any changes you make to a workbook offline. To change a workbook, you must be connected to a DSS System.*

If connected to a printer, you can print reports and charts, as well. If connected to your network, you can mail the workbook to other Explorer users.

When you are working offline, you cannot perform tasks, such as drilling up or down, that require access to the DSS System or require refreshing of data.

Tutorial: Analysis Features in Reports

The tutorial in this section gives you practice using some of Explorer's report features. For this tutorial, you will use the Sales Transaction data source within the MetaCube Demo DSS System.

Note: *To do this tutorial, you must have started Explorer and be accessing the MetaCube Demo DSS System. If necessary, ask your data warehouse administrator to configure your version of Explorer to access the MetaCube Demo DSS System in the MetaCube demonstration database.*

In this tutorial, you will perform the following operations in Results Mode:

- Pivot a report.
- Drill up and drill across in a report.

- Sort a report.
- Add subtotals and grand totals to the report.
- View report properties.

Tutorial Steps:

1. If necessary, open a new workbook in Explorer or display a new worksheet.
2. Click the Ad Hoc Tab.
3. Expand the Sales Transactions data source and its dimensions, as needed, to perform the steps in this tutorial.
4. To specify the basic query:
 - a. Double-click the Product attribute icon in the *Product* dimension.
 - b. Drag the Region attribute icon to the Columns drop box.
 - c. Double-click the Units Sold measure icon.
5. Run the query.
6. In Results Mode, pivot the report:
 - Drag the Region name from the upper right-hand corner pivot handle and drop it on top of the Product pivot handle.

When you start to drag, the cursor appears as a special “pivot” cursor and valid drop areas are highlighted. When the pivot cursor is over a valid drop area, the background for the pivot handle becomes yellow. Release the mouse button to drop the attribute name you are pivoting.

Notice that, as a result of pivoting, you have created a break report with Region at the outer level and Product subordinated at the inner level.
7. Drill up to in the report to view more summarized data by brand.
 - a. Click in one of the cells in the Product column.
 - b. Click the Drill Up button on the toolbar.

Because you are using attributes in a branching dimension, you must indicate to Explorer which path to use when drilling up.
 - c. In the Choose Drill Direction, click Brand, then click **OK**.

Explorer reruns the query and displays the results in a new worksheet.

8. In the report, drill across to the Competitive Data data source to add a Competitive Data Units Sold column to the report.
 - a. Click one of the data cells in the Units Sold column.
 - b. Click the Drill Across button on the toolbar.
 - c. In the Drill Across Measures dialog box, click the Units Sold measure icon in the Competitive Data data source, then click **OK**.
9. To sort measure data in the report in descending order (from largest number to smallest number):
 - a. Click a cell in the Units Sold column of the report.
 - b. Click the Sort button on the toolbar.
 - c. In the Sort Measures dialog box, click the Sort Column check box, then click the Descending button. Click **OK**.
10. To sort the Brand column in descending alphabetical order:
 - a. Click a cell in the Brand column of the report.
 - b. Click the Sort button on the toolbar.
 - c. In the Sort dialog box, click Brand in the Sort Report On list, then click Descending. Click **OK**.
11. To add subtotals to the report for each region:
 - a. Right-click the Region pivot handle in the lower left-hand corner of the worksheet.
 - b. Click Subtotals on the shortcut menu.
 - c. In the Subtotals dialog box, click Sum, then click **OK**.
12. To access the Grand Totals feature:
 - For Client / Server Explorer, click Grand Totals on the Query menu.
 - For Web Explorer, click the Grand Totals button on the toolbar.
13. To add grand totals to the report:
 - a. In the Grand Totals dialog box, click Sum in the Grand Total Rows by list.
 - b. Click **OK**.
14. Print the report, if you wish, using Explorer's default print settings.
15. Close Explorer.



Explorer Charts

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This chapter describes Explorer charts and presents an overview of the capabilities of Explorer's charting feature. This chapter discusses:

- chart options and how to format queries to obtain the desired charting result.
- creating readable charts.
- chart formats.
- charting options.
- analysis functions available in charts.

A detailed online help system for Explorer's chart feature provides specific information on the use of the various charting features.

At the end of this chapter a tutorial provides an opportunity to practice using some of these features.

About Explorer Charts

Explorer chart types include the following:

- Two-dimensional or three-dimensional pie chart
- Two-dimensional or three-dimensional bar chart
- Two-dimensional or three-dimensional line chart
- Two-dimensional or three-dimensional area chart

Explorer automatically sizes, labels, and orients the chart. It also titles the chart with the name of the worksheet from which the chart was generated. Explorer charts the attributes organized by rows along the horizontal x-axis of the chart, the measures along the vertical y-axis of the report, and the attributes organized by columns as different colors, and, where possible, on the z-axis in three-dimensional charts.

Pie Charts

The two-dimensional pie chart displays data as a fraction of a whole, with each fraction shown as a segment of the pie. While not suited to tracking change over time, the two-dimensional pie chart offers a comparative view of a measure divided into different components.

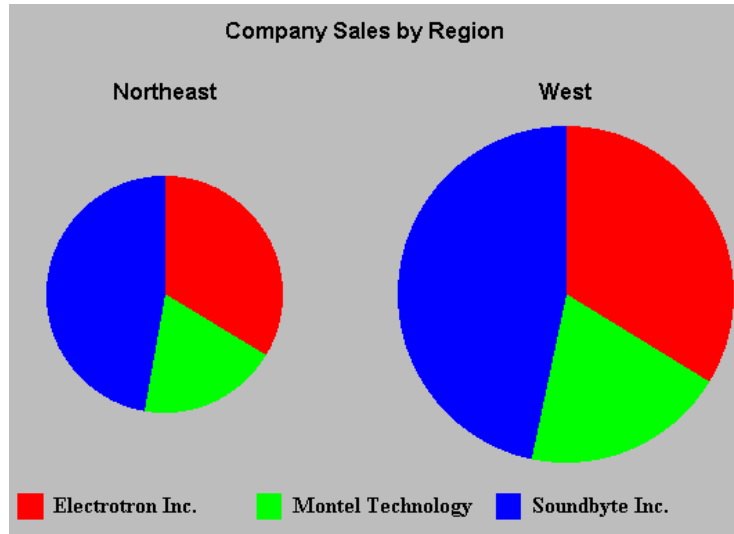


Figure 7-1 Company sales by Region

The format of the chart is determined by the position (row or column) of the attributes in the query. For example, in the demonstration database, a query requesting unit sales by company (with the Company attribute in the Columns drop box) produces a single pie chart in which each different segment represents total sales for one of the three companies. Adding Region information to the report (in the Rows drop box) causes the chart to display two pies, each corresponding to a region. Figure 7-1 shows the resulting two-dimensional pie chart.

You can chart data in a variety of formats, either in Results Mode, after executing a query, or directly from Query Mode. After charting retrieved data, you can change the report back to a spreadsheet format, if you wish.

For a break report, Explorer charts each subordinated row separately. For example, Figure 7-2 shows the chart for a query that retrieves unit sales by channel and region (in rows) and brand (in columns). Each combination of channel and region is a separate pie. The size of the pies reflect the total unit sales for each channel/region combination: retail chains in the West of the highest sales, warehouse stores in the northwest have the lowest sales.

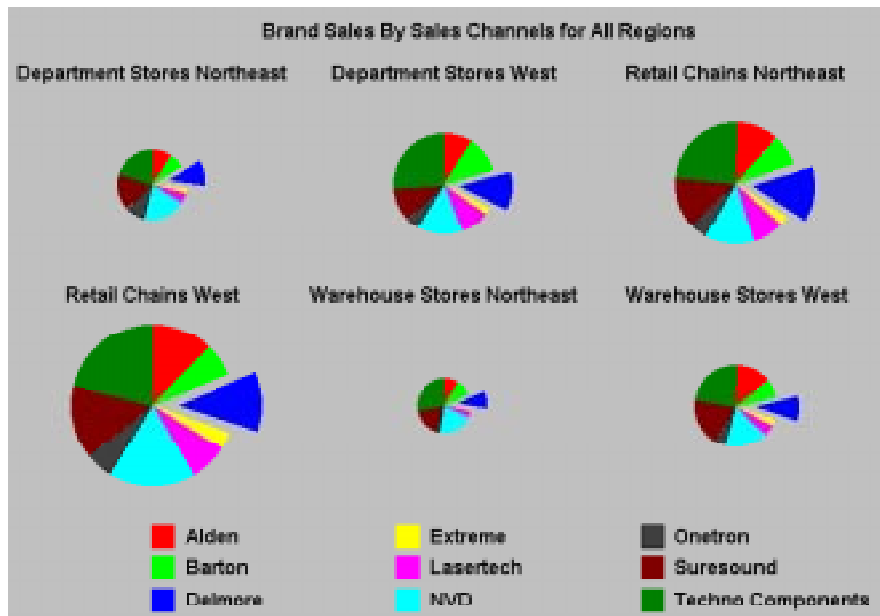


Figure 7-2 Pie chart of break report

Figure 7-2 shows some of Explorer's chart formatting capabilities used to create a readable and printable chart:

- The title has been customized.
- The legend is displayed.
- Sales of the Delmore brands are highlighted by dragging its pie segment away from the pie.

Graphing a query that tracks sales over time in a pie chart format is useful only when attempting to understand what fraction of some typical measure, such as sales, occurs in different periods of time. For example, Figure 7-3 shows a set of pies that tracks sales of product classes over a given time period.

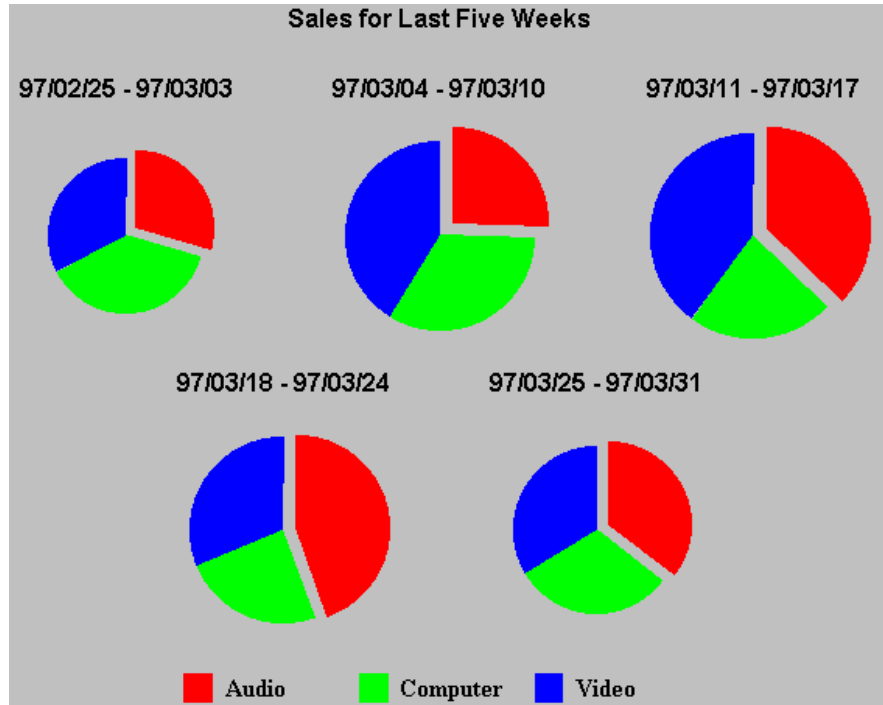


Figure 7-3 Pie chart

The chart in Figure 7-3 results from a query that retrieves unit sales for product classes (organized by column) over the past five fiscal weeks (organized by row and filtered to retrieve only five weeks of data). The pies have been formatted to highlight sales of audio equipment.

Three-dimensional pie charts present data in the same format as two-dimensional pie charts, but the charts themselves are raised at an angle to the page, adding a depth perspective to the chart view. This perspective conveys no additional information, however.

Bar Charts

A two-dimensional bar chart emphasizes the difference between two values in a given range or period of time. Measures are represented along the vertical y-axis and attributes organized by rows are represented along the horizontal x-axis. Attributes organized by columns are represented by different-colored bars that also run along the x-axis. To simplify a bar chart, limit or eliminate values organized by columns, so that only a few bars appear in the chart.

For example, Figure 7-4 shows a two-dimensional bar chart of sales for the last four fiscal weeks (organized by row) for the Soundbyte Company's brands (brand, organized by column and filtered to include only the company named Soundbyte) in which the colored bars represent sales for each brand.

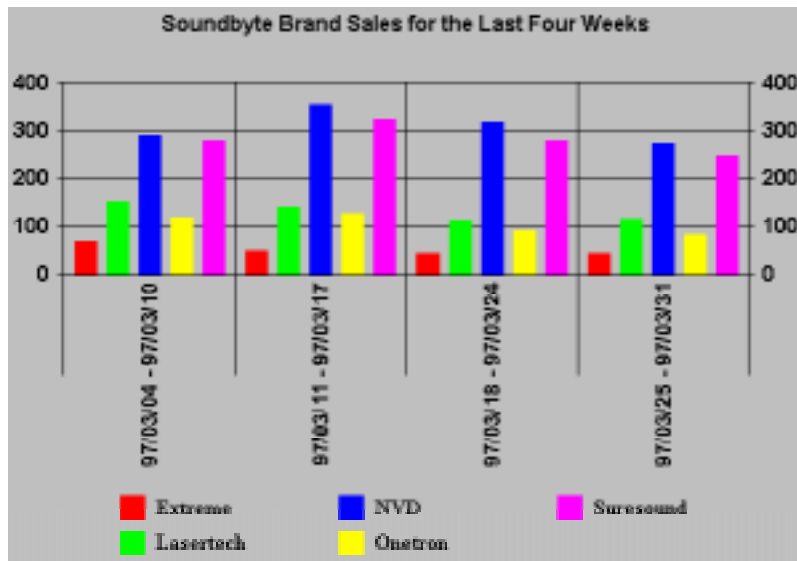


Figure 7-4 Bar chart

A three-dimensional bar chart tracks the different-colored bars of a two-dimensional bar chart in a third dimension, facilitating comparison across rows in one direction and across columns in the other. In three-dimensional bar charts, Explorer tracks the different-colored bars of a two-dimensional bar chart in different slots along the z-axis, with each slot charting bars of a particular color. The measure defines the y-axis, each column of data defines a different slot across the z-axis, and each row is charted along the x-axis.

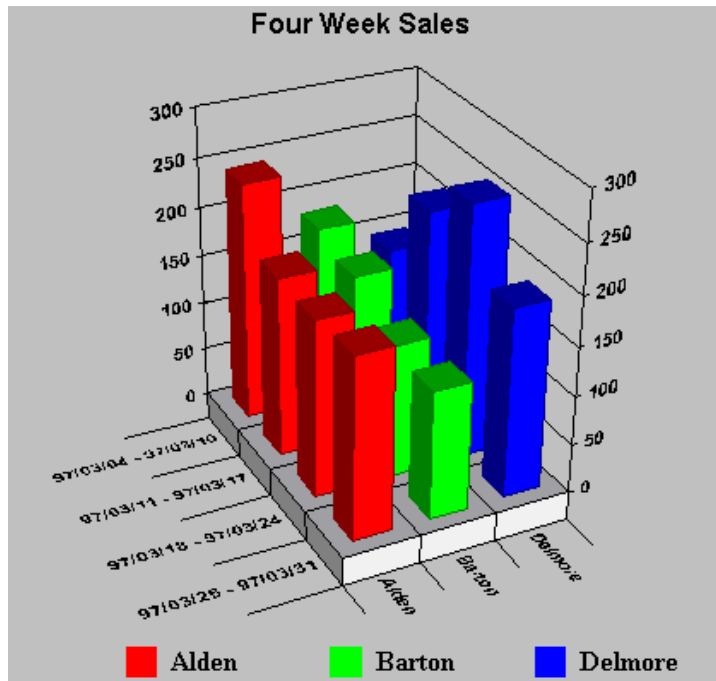


Figure 7-5 Three-dimensional bar chart

The chart in Figure 7-5 shows results of a query similar to that for Figure 7-4, except that only three brands—Alden, Barton, and Delmore—are shown.

Line Charts

A two-dimensional line chart typically graphs a variable over time, although this chart can also be useful to track the relationship between any two variables. Separate lines represent each column from the report and the rows display along the horizontal x-axis. The measure displays along the y-axis. If you select more than one measure, the chart contains two sets of lines on the same-scale y-axis. To generate a two-dimensional chart for a query requesting information as it changes over time, track time in rows.

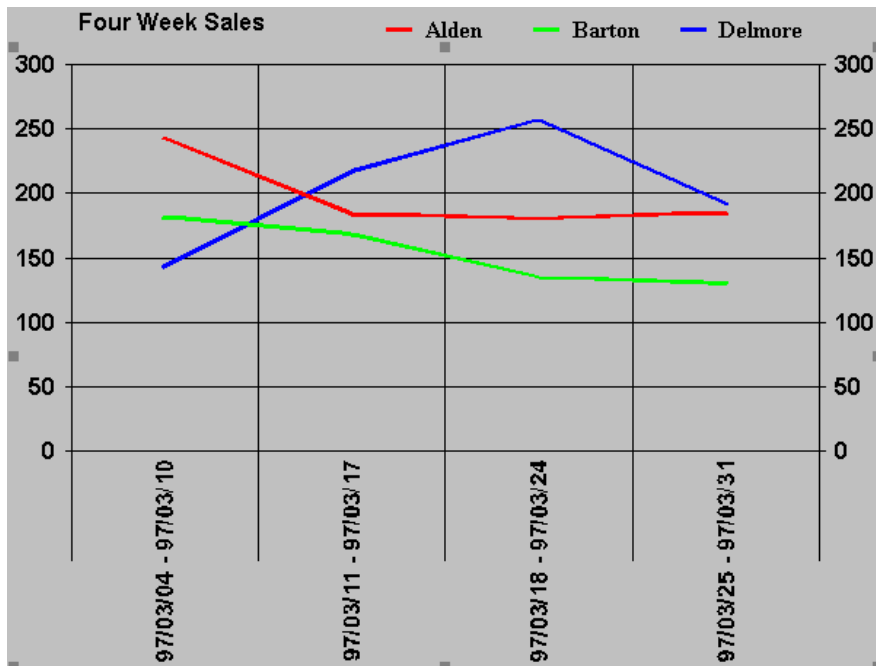


Figure 7-6 Line chart

This line chart was produced from the same query as the one used to produce the three-dimensional bar chart in Figure 7-5.

A three-dimensional line chart plots lines from a standard line chart as uniform-width bands. As with three-dimensional bar charts, each different-colored band in a three-dimensional line chart tracks in a separate slot along the z-axis, corresponding to a separate attribute (located in the Columns drop box) in the query.

Area Charts

Figure 7-7 illustrate how an area chart reports information. The query that produced the chart below retrieves, for a four-week period (in rows), unit sales by product class (in columns).

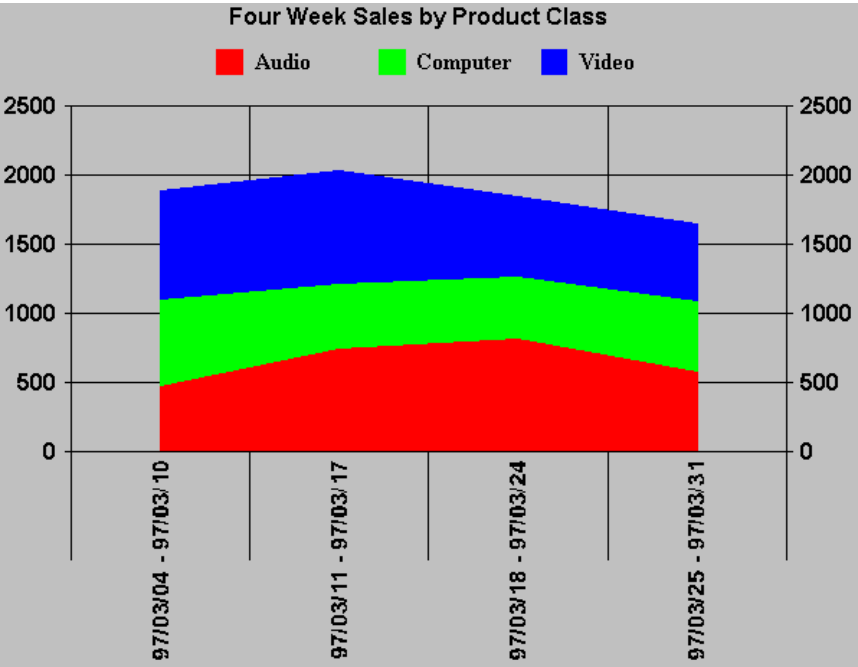


Figure 7-7 Area chart

For the first reporting week (97/03/04 to 97/03/10), sales of audio equipment—the lowest area in the chart—are something under 500 units. When computer sales—the next area of the chart—are added for the same week, total sales total over 1000 units. Adding video sales—the top area—total sales of all classes of product are close to 2000 units.

For the week of 97/03/11 to 97/03/17, audio sales are up somewhat. Adding computer sales, total sales are over 1000, and, adding video sales, total sales for the week are above 2000 units.

The third and fourth columns can be read in a similar way. For the third column, although audio and computer sales are higher, decreases in both video sales bring total sales for all product classes down. Likewise, in the fourth reporting week, sales for all product classes decrease, causing total sales to fall below total sales for the first week.

In the stacked format, three-dimensional area charts render two-dimensional area charts at an angle, to show depth. This perspective conveys no additional information. If the area chart is unstacked, the area chart then represents only a filled-in line chart and a three-dimensional view arranges each line in a separate track on the z-axis. In this instance, a three-dimensional area chart affords a view of areas that may be obscured in a two-dimensional chart.

Creating Readable Charts

To generate meaningful charts, keep the following in mind:

- **Consistent Units:** As a general rule, include only one measure in your query, since different measures are not directly comparable. For example, attempting to chart revenues and units sold on the same scale produces two different lines or sets of bars that differ widely in magnitude, preventing Explorer from appropriately scaling the charts to the data.

For similar reasons, you should avoid charting measure calculations, such as % Change and Rank, or summaries. The numbers returned by these functions are not always directly comparable to the raw data in your report and tend to distort the resulting charts.

- **Number of Attributes:** Use only a single attribute in the Columns drop box in the query. When possible, filter data returned for that attribute. Every value organized by columns is included in the legend. To prevent the chart from becoming too complicated, it is a good idea to limit the values appearing in the legend. For example, to chart sales over time for a particular brand, format the query so that Brand is in column orientation and filter on Brand to select only the data in which you are interested. If you do not filter on Brand, the graph will show every brand and the chart may be difficult to read.

Charting Options

Right-clicking a chart displays a shortcut menu of charting options. This menu allows you to format existing charts and to generate new types of charts not accessible from the toolbar.

In the dialog box for each chart option is a Help button. You can access online help for complete instructions on formatting your chart using the chart program's extensive library of chart types and formatting features.

You can open the formatting dialog boxes for a particular component of a chart by double-clicking a chart component, such as the title of the chart, one of the chart's axes, or a series being tracked on the chart.

The various options on the chart shortcut menu allow you to work with Explorer charts.

Chart Wizard

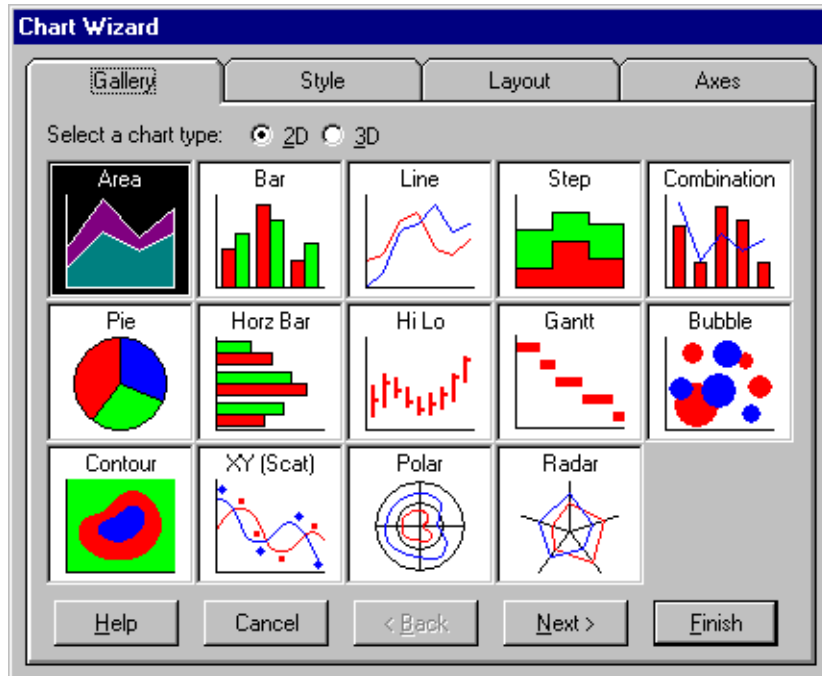


Figure 7-8 Chart Wizard dialog box

Using the Chart Wizard, you can edit your existing chart to:

- reformat it into another chart style (in the Gallery tab).
- select from one of many formatting styles for the chart style you currently have (in the Style tab).
- add or edit a title, footnote, or legend for your existing chart (in the Layout tab).
- add or edit axis labels for your chart (in the Axes tab).

The Chart Wizard allows you to step through the chart formatting process a tab at a time, using the **Next>** and **<Back** buttons.

Edit Chart Data

You can locally change the data charted by Explorer. However, if you do this, the underlying data for your chart will not match data stored in the DSS System. Changing data values in the chart program has no effect on data values in the database tables.

General

You can frame and provide a background for your chart as well as display or hide the chart title, legend, footnotes, and, in three-dimensional charts, the numbering along the second y-axis. You can also choose to format charts for printing or for display on your computer monitor.

You to use your own bitmap file or Windows metafile as a custom background fill.

Plot

There are many options that affect the format of the chart itself. Depending on the type of chart, some tabs may be unavailable.

Series

You can set format characteristics for a series of data or a data point within a series of data separately, so that you can change the color of a particular line, or the shape of a particular bar, without changing the entire chart.

Axis, Legend, Title, Footnote

You can format the grid, the axis labels, and the scaling on the x, y, and z axes.

In addition, you can set the appearance, font, location, color, and framing of a chart's legend, title, and footnote. You can also re-title a report, or add a footnote if one does not already exist.

Copy, Paste, Print, Save As, Load

These features work as you would expect for your Windows environment. Page Setup and Print Setup Tabs available from a chart are different from the Print dialog box opened from Explorer's toolbar.

Finally, in the chart screen, you can save and load charts, but not the queries that generated the charts. To save or load a query, use Explorer's Query Mode.

Analysis Features in Charts

When working with charts, you are in Explorer's Results Mode; some Explorer features are available to use.

Explorer features you can use to manipulate charts include:

- **Top/Bottom N filter:** you can filter your chart data to display either top or bottom ranking data. Explorer's Top N filter is described in the section [“Reporting Highest and Lowest Values” on page 5-5](#).
- **Drill Up/Down/Across:** you can drill up, down, or across in charts just as you do in a report. To activate Explorer's Drill feature, select a data point (or handle) in the chart:
 - In a pie chart, click a pie segment. Explorer displays the handle for that segment.
 - In a bar chart, click a bar. Explorer displays the handle for that bar.
 - In a line chart, click a point where the line changes direction. Explorer displays a handle for that point.
 - In an area chart, click a point at which the area forms an angle. Explorer displays a handle for the angle.

Tip: *If you have created a chart based on a query with multiple attributes in rows or columns, you may need to click twice to isolate a single data point.*

Once a single data point is selected, you can drill up, down, or across. Explorer's Drill Up / Drill Down and Drill Across features are described in [Chapter 6, “Explorer Reports.”](#)

Tutorial: Using Charts

The tutorial in this section gives you practice using some of Explorer's chart features. For this tutorial, you will use the Sales Transaction data source within the MetaCube Demo DSS System.

In this tutorial, you will perform the following operations:

- Create a pie chart.
- Highlight data in the pies.
- Change the format to display a three-dimensional chart.
- Title the chart and change the font style for the title.
- Display and position the chart legend.

Note: To do this tutorial, you must have started Explorer and be accessing the MetaCube Demo DSS System. If necessary, ask your data warehouse administrator to configure your version of Explorer to access the MetaCube Demo DSS System in the MetaCube demonstration database.

Tutorial Steps:

1. If necessary, open a new workbook in Explorer and display a new worksheet.
2. Click the Ad Hoc Tab.
3. Expand the Sales Transactions data source and its dimensions, as needed, to perform the steps in this tutorial.
4. To specify the basic query:
 - a. Double-click the City attribute icon in the *Geography* dimension.
 - b. Drag the Brand attribute icon to the Columns drop box.
 - c. Double-click the Units Sold measure icon.
5. Create a pie chart:
 - For Client / Server Explorer, click the 2D Pie Chart button on the toolbar.
 - For Web Explorer, click the Choose Report or Chart button on the toolbar, then click Pie.

6. Drag the Techno Components segment slightly away from each pie to highlight this data. To drag a pie segment:
 - a. Click the pie segment you wish to move.
 - b. Click and drag the pie segment.
7. Reformat the chart into a three-dimensional bar chart:
 - For Client / Server Explorer, click the 3D Bar Chart button on the toolbar.
 - For Web Explorer, click the Choose Report or Chart button on the toolbar, then click Pie.
8. Pivot the bar chart to the left to make the chart more readable. To pivot a bar chart:
 - a. Press down the CTRL key. Notice that the form of the cursor changes.
 - b. Grab the bar chart and swing it to the left, slightly, so that bars and the label for the Extreme brand become more visible.
9. Create a new title for the chart and change the title's font:
 - a. Right-click anywhere in the chart.
 - b. Click Title in the shortcut menu.
 - c. Click the Text Tab.
 - d. In the Text box, select the current title text and type a new title:

Chart Tutorial
 - e. Click the Font Tab.
 - f. Select a different font for the title. Change the Font Style and / or Size, if you wish. Click **OK**.
10. Display and position the chart's legend:
 - a. Right-click anywhere in the chart.
 - b. Click Legend on the shortcut menu.
 - c. In the Location Tab:
 1. Click the Visible check box.
 2. Click the Bottom button.
 - d. Change the font, font style, and size for the legend text.

- 11.** Reposition the components of the chart—title, bar chart, and legend—to fit well in the screen. To move chart components, click in or near a component so that its handles display. Do one or both of the following
 - Drag the handles to resize the component.
 - Click and drag the entire component to reposition it.
- 12.** Print the chart, if you wish; then close Explorer.

Customizing Explorer Reports

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This chapter describes the features of MetaCube Explorer that allow you to produce customized reports. These include:

- custom summarization of data using buckets.
- highlighting important groups of data using color or symbols.
- custom comparison queries.
- user-defined measures.
- renaming attributes and measures.
- snap-ins for customized measure calculations for Explorer.

Also included in this chapter is information on:

- viewing system messages from your data warehouse administrator.
- viewing the SQL statements sent to the database by Explorer.

In this chapter a tutorial provides an opportunity to practice using some of these features.

Custom Summarization of Data: Buckets

Explorer provides a feature that allows you to customize reports by defining groups of attributes to use as the basis for summarizing data. As part of your query definition, you can organize attribute values into a set of user-defined groups, called *buckets*, thereby summarizing data to meet your own specific reporting requirements.

Grouping Attribute Values into Buckets

Buckets are based upon existing attribute values and are defined by grouping attribute values according to one of the following mechanisms:

- Ranges of alphabetic or numeric values.
- Sets of specific items (attribute values).
- A combination of ranges and selected items.

The ability to define a set of buckets allows you to create query categories that are different from those originally defined in your DSS System.

Product Subclass	Units Sold
CDROM Drives	3,277
Compact Disc Players	4,348
Graphic Equalizers	3,241
Hardware Boards	1,502
IBM Compatible PCs	3,236
Laser Disc Players	3,250
Mac Compatible PCs	2,156
Memory Chips	1,203
Speakers	3,253
Tape Decks	3,250
Television Sets	4,327
VHS Recorders	4,327
Video Rewinders	2,160
Grand Total	39,530

Figure 8-1 Report of sales summarized by product subclass

In the demonstration database, you can define a query that returns sales totals for all subclasses of product. If the basic query includes a grand total calculation, it produces the report shown in Figure 8-1.

Equipment Categories	Units Sold
Home Entertainment Equipment	28,156
PC Equipment	11,374
Grand Total	39,530

Figure 8-2 Report of sales by user-defined buckets

In the report shown in Figure 8-2, product subclass sales information is organized into a set of two buckets:

- PC equipment.
- Home entertainment equipment.

All product subclasses have been grouped into one or the other of these two user-defined buckets which determine how data is summarized in the report.

Bucket Definitions

Bucket definitions are specified on a query-by-query basis and are saved with that query in a workbook or in the database.

Buckets by Alphabetic or Numeric Range

One method of defining a set of buckets is by alphabetic or numeric range of attribute values. Each bucket is defined by a range of values. The entire set of bucket values starts with the lowest value stored in the data warehouse and runs up to the highest value stored in the data warehouse for the given attribute.

In Explorer, each individual range is specified using a threshold value that is the top of the range. For the first bucket, Explorer automatically begins the range with the lowest value stored. For each succeeding bucket, Explorer defines the range starting with the next value higher than the threshold for the previous range and ending at the next threshold value you specify. The last range is automatically defined by Explorer; it extends from the next value higher than the last threshold you specified up to the highest stored value.

Note: For alphabetic ranges, values are case sensitive in the data warehouse. Be sure that character values are entered exactly as they appear in the database.

Each set of buckets has a name. The name appears as the query category for the bucket set and replaces the attribute name. Within the set, each bucket is labeled. This label takes the place of individual attribute values and is displayed in the results, along with its summarized data.

When specifying alphabetic ranges, you may use a single character or character strings to delimit the ranges.

Buckets by Selected Attribute Values

Another method of defining a set of buckets is by specifying the exact attribute values to be included in each bucket. The entire set of buckets has a name. The name appears as the query category and replaces the attribute name. Within the set, each bucket is labeled. This label takes the place of individual attribute values and is displayed in the results, along with its summarized data. When defining the contents of buckets by selecting values, you may include the same attribute value(s) in more than one bucket. You may also eliminate some attribute values from inclusion in any bucket.

To assist you in selecting items to be included in buckets, Explorer displays all the available attribute values in a list. You may select the values you wish to include in each bucket.

Tip: When selecting alphabetic values, using the list provided by Explorer assures that the value contained in your query will match exactly the value stored in the database.

Custom Buckets

The custom buckets feature allows you to mix and match the way you define buckets. In a single custom bucket specification, you may:

- define one or more buckets using a range of values.
- define one or more buckets by selecting specific values from a list of values.
- lump together “unbucketed” values into a single “Other” bucket.
- eliminate values by not including them in any bucket.

The custom buckets feature allows you to include the same attribute value or values in more than one bucket.

The entire set of buckets has a name. The name appears as the query category and replaces the attribute name. Within the set, each bucket is labeled. This label takes the place of individual attribute values and is displayed in the results, along with its summarized data.

When defining a custom bucket by range, you can specify a range to begin and end with any arbitrary value. Custom ranges do not need to begin with the smallest value or end with the highest value stored in the database. Also, ranges for custom buckets may overlap.

A feature of the custom bucket definition process allows you to define a range that includes all values below or above a given threshold. You can use the word ALL in the range specification. For example, a specification of:

<ALL> To 50

defines a range that includes all numeric values less than or exactly equal to 50 (including negative values). A specification of:

100 To <ALL>

defines a range that includes all values exactly equal to or greater than 100.

The ALL option allows you to define ranges that include values at the low and high ends of the entire set of values for the attribute you are custom bucketing. You do not need to know (or specify) the actual lowest or highest value.

As an example, the following range specifications include every possible value for an attribute whose values are alphabetic characters.

Definition	Range
<ALL> To Dz	A (beginning of the alphabet) through D, including all uppercase as well as mixed-case alphabetic values
E To Lz	E through L, including all uppercase as well as mixed-case values
M To Rz	M through R, including all uppercase as well as mixed-case values
S To <ALL>	S through the end of the alphabet

Tutorial: Specifying Buckets

Follow the steps below produce a report with the following information:

- For the east and west coast cities, product sales by class
- A comparison between east and west coast sales, showing the difference between sales for those two areas
- Grand totals of unit sales for the east and west coast cities

Note: To do this tutorial, you must have started Explorer and be accessing the MetaCube Demo DSS System. If necessary, ask your data warehouse administrator to configure your version of Explorer to access the MetaCube Demo DSS System in the MetaCube demonstration database.

Tutorial Steps:

1. Start Explorer and, if necessary, open a new workbook.
2. Click the Ad Hoc Tab.
3. Expand the Sales Transactions data source and its dimensions, as needed, to perform the steps in this tutorial.
4. Specify the basic query:
 - a. Double-click the Product Class attribute icon.
 - b. Drag the City attribute icon to the Columns drop box.
 - c. Double-click the Units Sold measure icon.
5. Right-click the City icon in the Columns drop box.
6. Click Buckets in the shortcut menu. In the Buckets dialog box:
 - a. In the Name box, type a name for the set of buckets:

East/West Coast Sales

- b. Click the Selecting Items only button.
7. To specify the bucket for east coast cities:
 - a. Click the ... button at the right of the top box in the Items list.
 - b. In the List of Values dialog box, click the Choices button.
 - c. From the list of city names, click Boston and New York, using standard Windows techniques for selecting multiple items in a list.
 - d. Click **OK**.
 - e. To position the cursor in the Bucket Label box, press Tab. Type the Bucket Label for the bucket:

East Coast Cities

The name you provide here is used as a heading for the report.

8. To specify the bucket for west coast cities:
 - a. Click the next ... button.
 - b. In the List of Values dialog box, click the Choices button.
 - c. From the list of city names, click Oakland, Palo Alto, and San Francisco.
 - d. Click **OK**.
 - e. To position the cursor in the Bucket Label box, press Tab. Type the Bucket Label for the bucket:

West Coast Cities

The name you provide here is used as a heading for the report.

- f. Click **OK**.
 - g. Notice the icon Explorer uses to represent the set of buckets you defined. You have specified your own query category; the Bucket Labels you typed will appear as column headings in the report.
9. Specify a calculation that compares sales for the east and west coasts:
 - a. In the DSS System hierarchy on the Ad Hoc Tab page, double-click the Units Sold measure icon to place another Units Sold icon in the Measures drop box. Its name is Units Sold_1.
 - b. Right-click the Units Sold_1 icon.
 - c. Click Calculation on the shortcut menu.
 - d. In the Name box of the Measure Calculation dialog box, type a name for the measure calculation:

Difference in Sales

This name appears in the report as the column heading for the measure calculation.

- e. Click Absolute Change in the Display As list, then click **OK**.
10. Run the query.
11. In Results Mode, add grand totals to the report for product classes and for east and west coast cities. To access the Grand Totals feature:
 - For Client / Server Explorer, click Grand Totals on the Query menu.
 - For Web Explorer, click the Grand Totals button on the toolbar.

12. In the Grand Totals dialog box, click Sum in the Grand Total Rows by list, then click **OK**.

East/West Coast Sales	East Coast Cities	West Coast Cities	
Product Class	Units Sold	Units Sold	Difference in Sales
Audio	4,626	8,288	3,662
Computer	3,758	6,653	2,895
Video	4,628	8,272	3,644
Grand Total	13,012	23,213	10,201

Figure 8-3 Tutorial report: Buckets

The final report for this tutorial is shown in Figure 8-3.

13. Close Explorer, if you wish, or leave it open for the next tutorial.

Highlighting Important Data: Stoplighting

Explorer's Stoplighting feature allows you to apply colors to ranges of measure values to highlight them in a report. Alternatively, you can apply special symbols that display in place of the actual data. Using either technique, you can visually highlight key information in a report.

Stoplight colors and symbols are applied to measure data by defining ranges of data values. For example, you could stoplight a report to highlight, in red, sales and revenue figures that fall below a certain threshold.

A stoplight definition is associated with a single query and is saved with that query in a workbook or in the database.

When defining ranges of data to stoplight, you start with the lowest range first. In Explorer, each individual range is specified using a threshold value that is the top of the range. For the first range, Explorer automatically begins the range with the lowest value in the retrieved data. For each succeeding range, Explorer starts with the next value higher than the threshold value for the previous range and ends at the next threshold value you specify. The last range extends from the value higher than the last threshold you specify up to the highest value in the report.

For each range, you can select a color or a symbol to use to display the data for that range. Explorer supplies a default color or symbol, which you can change, if you wish.

Tip: To print symbols correctly in your reports, your PC must have the WingDings font installed.

Custom Comparison Queries

Explorer provides a custom comparison feature that allows you to define a single query that generates two or more SQL statements to retrieve data. The retrieved data is displayed side-by-side or as a single integrated list of values. This feature is useful for retrieving data for several attributes into a single report without creating a break report. Data retrieved is displayed side-by-side in several columns or in a single sorted column.

US/SF Sales	USA	San Francisco	
Brand	Units Sold	Units Sold	% of Country Sales
Alden	4,437	1,166	26.28%
Barton	3,238	828	25.57%
Delmore	4,335	1,027	23.69%
Extreme	1,082	274	25.32%
Lasertech	2,770	715	25.81%
NVD	6,507	1,610	24.74%
Onetron	2,164	549	25.37%
Suresound	6,012	1,505	25.03%
Techno Components	8,985	2,257	25.12%

Figure 8-4 Custom comparison report

The report in Figure 8-4 compares unit sales for the city of San Francisco with unit sales for the entire country. The report also includes a measure calculation to show what percent of the total sales are made in San Francisco.

The data for country-wide sales is accomplished when the first SQL query is run. To obtain data specifically for San Francisco, a filter, embedded in the custom comparison definition itself, filters the second SQL query to obtain only data for San Francisco. The % of Country Sales column shows the difference, for each brand, between unit sales for San Francisco and unit sales country-wide.

Note: Any filters applied within a custom comparison become part of that custom comparison definition. They have the effect of filtering individually for each SQL statement issued to retrieve the attribute values you specified in the custom comparison. This has a different effect from a filter applied outside the custom comparison definition, which limits data for the entire report.

Tutorial: Custom Comparison

Follow these steps below to specify a query that uses a custom comparison. For this tutorial, you will use the Sales Transaction data source with the MetaCube Demo DSS System in the MetaCube demonstration database.

The query you specify will produce a report with unit sales information for products, by subclass, for the three retail outlets and the two sales regions.

Note: To do this tutorial, you must have started Explorer and be accessing the MetaCube Demo DSS System. If necessary, ask your data warehouse administrator to configure your version of Explorer to access the MetaCube Demo DSS System in the MetaCube demonstration database.

Tutorial Steps:

1. Start Explorer and, if necessary, open a new workbook and worksheet.
2. Click the Ad Hoc Tab.
3. To specify the custom comparison, right-click the Columns drop box, then click New Custom Comparison in the shortcut menu.
 - a. In the Custom Comparison dialog box, type the name for the custom comparison in the Name box:

Channel/Region Compare
 - b. Double-click the *Channel* dimension icon to expand it, then double-click the Channel attribute icon.
 - c. Double-click the *Geography* dimension icon, then double-click the Region attribute icon.
 - d. Click the Sort Separately button, then click **OK**.

4. Complete the query:
 - a. Expand the Sales Transactions data source icon, then expand the *Product* dimension in the DSS System hierarchy.
 - b. Double-click the Product Subclass attribute icon.
 - c. Double-click the Units Sold measure icon.
5. Run the query.

Channel/Region Compare	Department Stores	Retail Chains	Warehouse Stores	Northeast	West
Product Subclass	Units Sold	Units Sold	Units Sold	Units Sold	Units Sold
CDROM Drives	949	1,539	789	1,410	1,867
Compact Disc Players	1,279	2,061	1,008	1,892	2,456
Graphic Equalizers	925	1,558	758	1,330	1,911
Hardware Boards	424	721	357	636	866
IBM Compatible PCs	913	1,555	768	1,299	1,937
Laser Disc Players	946	1,552	752	1,370	1,880
Mac Compatible PCs	623	1,015	518	888	1,268
Memory Chips	334	580	289	488	715
Speakers	953	1,561	739	1,286	1,967
Tape Decks	942	1,557	751	1,296	1,954
Television Sets	1,268	2,041	1,018	1,767	2,560
VHS Recorders	1,265	2,051	1,011	1,726	2,601
Video Rewinders	626	1,030	504	929	1,231

Figure 8-5 Results of custom comparison query

The results of the tutorial query are shown in Figure 8-5. The format of the report that results from using a custom comparison allows you to show data values in separate columns.

User-Defined Measures

Explorer allows you to define a custom measure that you can incorporate into your queries. A custom, or user-defined, measure is based on measures that already exist in the data warehouse.

About Measures

Measures are the numeric data items tracked in a DSS System and can be one of two kinds:

- Stored: actual numeric values contained in data warehouse tables.
- Calculated: derived by a formula based on other measure values.

Stored measures track business transactions at your company. Your data warehouse administrator has probably specified several stored measures in your DSS System so that you can view this information using Explorer. Each item of data tracked in your data warehouse is represented in Explorer by a measure icon.

A calculated measure, on the other hand, is one that is defined by a formula, based on one or more previously defined measure, either stored or calculated, to produce additional data items. Values for calculated measures are computed at the time a query is executed, and, therefore, are always calculated on the most current data stored in your DSS System.

The MetaCube demonstration database contains:

- three stored measures: *Units Sold*, *Incurred Cost*, and *Gross Revenue*.
- two calculated measures: *Percent Margin* and *Net Profit*.

As a calculated measure, *Percent Margin* is not stored as a number in the demonstration database tables. By storing a formula for calculating percent margin instead, the MetaCube analysis engine can calculate this value when a query executes. The formula used to return a value for *Percent Margin* is based on *Gross Revenue* and *Incurred Cost*, two stored measures.

Your DSS System may include some calculated measures that were specified by your data warehouse administrator.

Measure Constraints

You can apply a measure constraint (or filter) to your custom measure. Similar to attribute filters, measure constraints limit the measure values returned in a report or chart. Although rarely used, constraints are useful to prevent custom measures from incorporating undesirable values during calculation. For example, you might define a calculated measure to return the average price of a product sold; the formula would divide the sum of the price of all products sold by the sum of products sold. To ensure that the average price calculation does not attempt to divide by 0 when no products have been sold, you could apply a constraint to filter out product sums equal to 0.

A filter definition consists of three components:

- An *Operand*, a previously-defined measure.
- An *Operator*, a comparison operator, such as = or <>.
- A *Value*, a constant to which the operand is compared.

Tutorial: User-Defined Measure

Follow the steps below to learn about specifying a query that uses a custom comparison. For this tutorial, you will use the Sales Transaction data source with the MetaCube Demo DSS System in the MetaCube demonstration database.

- The user-defined measure you specify will calculate the average revenue per unit sold.
- The query you specify will produce a report with the following information for the current week: units sold, gross revenues, and average revenue for all video products.

Note: *To do this tutorial, you must have started Explorer and be accessing the MetaCube Demo DSS System. If necessary, ask your data warehouse administrator to configure your version of Explorer to access the MetaCube Demo DSS System in the MetaCube demonstration database.*

Tutorial Steps:

1. Start Explorer and, if necessary, open a new workbook and worksheet.
2. Click the Ad Hoc Tab.
3. Access the measure definition feature:
 - For Client / Server Explorer, click Define Measures on the Tools menu.
 - For Web Explorer, click the Define Measures button on the toolbar.
4. In the Define User Measures dialog box, click Add.

5. In the Measure Definition dialog box, define a user measure that calculates average revenue per unit sold:
 - a. In the Name box, type the name for the measure:

Avg Rev/Unit Sold
 - a. In the Measures Tab, double-click the FACT('Gross Revenue') icon.
 - b. Click the Operators Tab, then double-click the division (/) operator.
 - c. Click the Measures Tab, then double-click the FACT('Units Sold') icon.
6. To format the data for this measure to match the format of other Explorer measures:
 - a. Click the ... button in the Format group box at the bottom of the Measure Definition dialog box.
 - b. In the Format dialog box, click Currency in the Category list. You have applied the Currency numeric format to the user-defined measure. Click **OK**.
 - c. Click **OK** again. Notice that the new user-defined measure is listed in the dialog box. Click Done.
 - d. Click Explorer's Ad Hoc Tab.
 - e. Expand the Sales Transactions data source. Notice that the user-defined measure is listed in the DSS System hierarchy.
7. Specify the query using the user-defined measure:
 - a. Expand the icons in the Sales Transaction data source to complete the steps in this tutorial.
 - b. In the *Product* dimension, double-click the Product attribute icon.
 - c. Double-click the Units Sold, Gross Revenue, and Avg Rev / Unit Sold measure icons.
8. Run the query.

MetaCube calculates the value for the user-defined measure and places the results in a column labeled with the name you provided for the measure.
9. Close Explorer.

Renaming Attributes and Measures

You may change the names of any of the attributes or measures in an individual worksheet. Default attribute and measure names are provided by your data warehouse administrator. If you wish to display names in your report that are more meaningful to you, you can do so. In the MetaCube demonstration database, for example, you might like to change the *Units Sold* measure name to read *Product Sales*.

When you change the name of an attribute or measure, it is changed only for the current worksheet.

You can also redefine the internal specification for an attribute or measure.

Warning: *The ability to redefine internal specifications for MetaCube objects is for special use only and you should not do this unless you are a programmer who is customizing the Explorer application.*

Snap-Ins for Custom Measure Calculations

MetaCube extensions, called *snap-ins*, provide additional measure calculations for Explorer. MetaCube snap-in modules are similar to Excel Add-Ins in that they extend the capabilities of the software to meet specific decision support needs.

A MetaCube snap-in is written to MetaCube's C++ application programming interface (API) and the file itself is identified by the filename extension .mcx. A single .mcx file may contain one or more MetaCube measure calculations. After adding a MetaCube Snap-In, its measure calculations are available immediately.

For Client / Server Explorer, MetaCube snap-ins can be added at any time. When you snap in a MetaCube extension, you add that module to the copy of the MetaCube analysis engine running on your PC. The extension is then available for your use.

For Web Explorer, your data warehouse administrator snaps in extensions for the MetaCube analysis engine you access on the MetaCube middle-tier server. The measure calculations are available, then, for all users who access that particular copy of the MetaCube analysis engine.

Viewing System Messages

A system message is posted by your data warehouse administrator to communicate with you and other Explorer users the current status of the DSS System. For example, the administrator can write system messages informing users about such things as:

- when the latest data has been loaded.
- when the DSS System will be unavailable.

Each message is dated, so you can recognize the most recent information.

Showing SQL

The SQL commands that the MetaCube analysis engine sends to the data warehouse for any given query can be viewed in Explorer.

Usually it is not necessary to view SQL commands when using Explorer. In fact, Explorer is designed to hide the technical aspects of querying databases from users. As an Explorer user, you are probably not interested in learning about SQL syntax; therefore, you will not view SQL statements frequently, if at all.

However, your data warehouse administrator may find the ability to view the SQL commands useful for purposes of troubleshooting. Therefore, Explorer makes it possible for administrators to have easy access to this information.

In addition to displaying SQL commands, the Show SQL dialog box displays:

- the cost of running the query.

- the number of actual SQL commands sent for the current query. Sometimes, for more complex Explorer queries, the MetaCube analysis engine actually sends multiple SQL queries to the server, combining the result sets returned into a single report.

Showing SQL

Running Queries in Background

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T

his chapter provides information on running Explorer queries in background. This feature is known as QueryBack.

This chapter discusses:

- Background processing of Explorer queries.
- Submitting queries to QueryBack.
- Status of QueryBack jobs.
- Retrieving results of QueryBack jobs.

Background Processing of Queries

Once you have defined a query, the MetaCube analysis engine generates database commands in SQL to retrieve the results. Explorer allows you to run the query directly from your computer or to submit the query for background processing. Background processing (called QueryBack) allows you to submit queries to the server thereby freeing your computer to perform other tasks. You may also use QueryBack to schedule query jobs to run at pre-determined times so that results will be available when you need them.

To submit a query to QueryBack, MetaCube's server-side processing agent, your data warehouse administrator must have granted you background processing privileges. You may be granted full permission to use QueryBack at any time, or you may be limited to certain days and hours.

Conversely, your data warehouse administrator may have set your privileges such that you are precluded from submitting foreground queries at all and must use QueryBack for all queries you submit.

In either case, after submitting a QueryBack job, you retrieve results in a separate step, after your QueryBack job has finished running.

QueryBack is not available in all systems. Check with your data warehouse administrator to find out if this feature is available and, if it is, what your own QueryBack permissions are.

Using QueryBack

When executing a query, the MetaCube analysis engine issues SQL commands to the server for immediate execution. While these commands process on the server, your computer waits for the results to be returned. Explorer displays the results as either a report or a chart.

The Slow Query Warning

For any query, MetaCube analyzes the database to identify the optimal tables from which to retrieve the result. However, queries requesting the most detailed data in the DSS System may require the MetaCube analysis engine to access very large tables. The MetaCube analysis engine anticipates possible slow performance and displays the slow query warning.

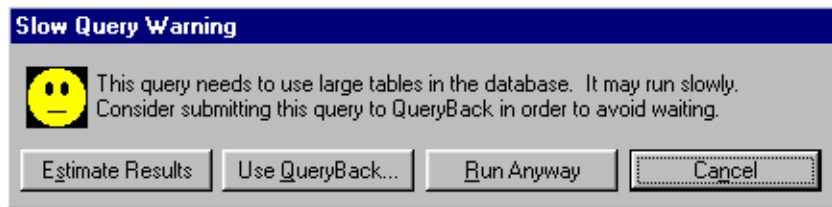


Figure 9-6 *Slow Query Warning*

If you receive a Slow Query Warning, you have several options for continuing. One of the options is to submit the query to QueryBack for background processing. When the query has completed, you may retrieve the results.

Explorer is configured to display the Slow Query Warning when the cost of running the query exceeds a given threshold. See [Appendix B](#) for information on configuring Explorer. Your data warehouse administrator can help you determine what number to set as a threshold for the Slow Query Warning.

Scheduling Queries

Using QueryBack after receiving a Slow Query Warning is one way to submit a query to QueryBack. You may also schedule a query for background processing when you first run it.

Note: *If you are configured as a user who can only use background processing for queries, Explorer will not allow you to submit foreground queries. You must schedule all queries using the QueryBack feature.*

If you submit a query to the server using QueryBack, MetaCube's server-side agents perform the following tasks:

- Schedule the query for execution.
- Store the SQL commands on the server until they are scheduled to execute.
- Execute the commands on the server as a background process.
- Store the results on the server.

When you schedule a QueryBack job, you can run the query as soon as possible on the server, or you can specify a time at which to run the query. This allows you to schedule running of a query during off hours, for example.

In addition, you can also specify recurring times to run a query. You can specify to run queries daily, weekly, monthly, and annually. If you know, for example, that new data is loaded into your data warehouse every weekend, you might schedule a weekly query to process every Sunday night.

At the time you specify a query to run, QueryBack places it in a queue of queries on the server, to be run as soon as possible. Since the query queue can include queries from other Explorer users, some delay may occur between the time you submit a query background job and the time the server actually executes it.

The actual time a query runs depends on the length of the queue, the job's priority, when your data warehouse administrator has granted you privileges to run queries, and the number of processors available on the server. Be sure the clock on your PC is synchronized with the clock on the server, since a significant difference between the two can delay the running of a QueryBack job.

A query's priority determines the precedence your query takes over other queries in the queue issued by users with similar assigned privileges. Your data warehouse administrator manages QueryBack privileges, granting users permissions which in turn affect the order in which queries run. As a user, you can set a priority for your query. The highest priority you can assign your QueryBack job is 5. The higher a job's priority, the sooner it runs.

Status of QueryBack Jobs

After submitting a query to QueryBack, you can monitor the job's status Explorer's QueryBack Tab page.

Explorer allows you to view the details of a QueryBack job, including the number it is assigned on the server. Also, if an error occurred during processing, you can view the error message in Explorer.

You can view the following information about a QueryBack job:

- **Job Number:** the unique identification number generated for each job. Your data warehouse administrator tracks pending, running, and completed jobs on the server using the job ID number.
- **Name:** the name of the worksheet from which the job was submitted.
- **Status:** the current status of a query.
- **Priority:** the priority you assigned to the job when you submitted it to QueryBack.
- **Submit Time:** the time you submitted the job from Explorer.
- **Target Start:** the time you requested that the job begin processing.
- **Start Time:** the time the job actually executed on the server. Jobs may not run as soon as they are submitted because of other jobs waiting in the queue ahead of it, possible downtime of the scheduler process on the server, or other reasons.

- **End Time:** the time the job completed on the server. When the job has completed successfully, you can access the results.

Retrieving Results from QueryBack

When your query has completed, you can retrieve the results into a worksheet in your MetaCube workbook. By default, Explorer returns the results into the current worksheet. You can change this default, if you wish, so that Explorer opens a new worksheet in which to display the results; see [Appendix B](#).



Formats for Numeric Data

This appendix describes Explorer's numeric data format options.

Your data warehouse administrator has defined default formats for the display of numeric data in Explorer reports and for the example report display in Query Mode. However, Explorer offers many options for formatting numeric data. The formats you designate in Explorer affect the display of data; it is not related to the internal format of information stored in the data warehouse.

You can designate formats for:

- numeric data retrieved by queries.
- measure calculations you specify in a query.
- user-defined measures you create.

Format Options

You can format the following categories of numeric data:

- Number
- Currency
- Accounting
- Percentage
- Custom

When you select a numeric format category, you provide information about how you wish to see numbers displayed. Explorer’s numeric formatting options include the following:

- **Number of digits:** Used to specify the number of digits to the right of the decimal point for all numeric format categories.
- **1000 Separator:** Used to specify the comma separator for all numeric data.
- **Negative Numbers:** Used to specify how negative values display; you can select from one of four options.
- **Dollar sign (\$):** Used to specify a dollar sign (\$) in the display of currency values.
- **Custom formats:** Used to specify one of Explorer’s existing format specifications, or to specify your own customized format.

Note: *Formats for numbers automatically display correctly for the regional setting configured on the PC. When using custom formats, specify the following characters using universal symbols, as shown in the table:*

Universal Symbol	Meaning
, (comma)	1000 separator
. (period or dot)	decimal point
- (minus sign)	negative

These universal symbols are translated into the correct symbols for the regional setting in effect.

Custom Format Specifications

Custom format options for Explorer are very similar to those used in Microsoft Excel. Custom format specifications are structured in two sections, separated by a semi-colon (;). The two sections specify the display for positive and negative numeric data. The general structure is shown in Figure A-1.

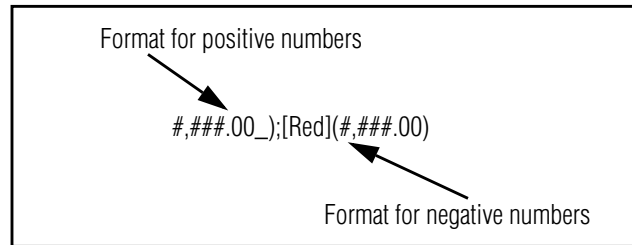


Figure A-1 Custom format specification syntax

The table lists all the formatting options for custom format specifications and provides examples of the display of numeric data.

Format Specification	Example
0	1
0.00	1.23
#,##0	1,234
#,###0.00	1,234.56
#,##0_);(#,##0)	1,234; negative numbers as (1,234)
#,##0_);[Red](#,##0)	1,234; negative numbers in red as (1,234)
#,##0.00_);(#,##0.00)	1,234.56; negative numbers as (1,234.56)
#,##0.00_);[Red](#,##0.00)	1,234.56; negative numbers in red as (1,234.56)
\$\$,###0_);(\$\$,##0)	\$12,346; negative numbers as (\$12,346)
\$\$,##0_);[Red](\$\$,##0)	\$12,346; negative numbers in red as (\$12,346)
\$\$,###0.00_);(\$\$,##0.00)	\$12,345.68; negative numbers as (\$12,345.68)
\$\$,##0.00_);[Red](\$\$,##0.00)	\$12,345.68; negative numbers in red as (\$12,345.68)
0%	1%
0.00%	1.23%
0.00E+00	1.23E+13
##0.0E+0	1.2E+13

The meanings of the symbols used in the format definitions are shown in this table.

Symbol	Meaning
#	Digit placeholder; displays a number.
0 (zero)	Digit placeholder; displays a number. Displays 0 if no digit fills the place help by the 0. For example, the format #.00 plays the number 8.9 as 8.90.
\$ - + / () : space	Printing characters.
, (comma)	Thousands separator; prints when surrounded by # or 0.
. (period)	Decimal point. Used to display fractions as decimal values. Also used in time formats to display fractions of a second.
%	Percentage. The % symbol prints.
_ (underscore)	Skips the width of the next character. For example, _) skips the width of the parenthesis character.
E- E+	Scientific notation format. Number of 0s to the right of the sign determines the exponent's number of digits. Plus sign (+) displays positive exponents with a + and negative exponents with a -.
[Red]	Displays characters in the cell in red.

Configuring Explorer

This appendix explains the options available for configuring Explorer.

Configuration Options

You can specify configuration options in Explorer for the following characteristics:

- General characteristics related to queries.
- Screen fonts and colors.
- Default values for measure calculations.
- Formatting defaults for Explorer reports.
- Type of table to copy to Excel.
- Confidence and accuracy levels for Sampling.

For Client/Server Explorer, you can also set:

- Connection information.

Many or all of the options may have been set for you by your data warehouse administrator. You may decide to change some of these options after using Explorer for awhile. If you wish to change a configuration option, consult with your data warehouse administrator before making these changes.

Fonts/Colors Tab

This tab allows you to configure the fonts and colors of various features of Explorer screens.

The features for which you can define fonts are listed in the table.

Feature	What It Is
General	In Query Mode, dimension, attribute, and measure names; labels for text boxes; lists in text boxes of dialog boxes; text of balloon help boxes; text entered in some dialog boxes.
Pivots	In Results Mode, handles that enable pivoting of reports.
Results	In Results Mode, measure data in the report.
Headers	In Results Mode, areas of the report that contain attribute and measure names.
Summaries	In Results Mode, areas of the report that contain subtotals.
GrandTotals	In Results Mode, areas of the report that contain grand totals.

Explorer’s default font settings are:

- Font—MS Sans Serif.
- Font style—regular.
- Size—eight point.
- Script—Western.

The features for which you can define colors are listed in the table below.

Feature	What It Is
PivotsBackColor	Background color for pivot handles.
PivotsForeColor	Color of font on pivot handles.
Band1Color	You may define four background band colors to be used for the rows of a report. Each color alternates with as many others as you specify. For example, if you define two band colors—white and green—alternate rows of the report will be white and green.
Band2Color	
Band3Color	
Band4Color	
ResultsBackColor	Unused; band colors override this setting.
ResultsForeColor	Color of font that prints measure data.
HeadersBackColor	Background color for all cells that contain attribute values or measure names.
HeadersForeColor	Color of font that prints attribute values and measure names.
SummariesBackColor	Background color for subtotal calculations.
SummariesForeColor	Color of font that prints subtotal calculations.
GrandTotalsBackColor	Background color for grand total calculations.
GrandTotalsForeColor	Color of font that prints grand total calculations.

General Tab

This tab allows you to configure some general features of Explorer. The

General tab contains the following configuration options:

Configuration Option	Default	What It Does
Slow Query Warning	10000	Compared with the Cost field for the fact or aggregate table to be used for the query. If the Cost exceeds this number, Explorer displays the Slow Query Warning.
Maximum Database Rows to Retrieve	32767	0 means retrieve all rows; any other number limits the number of rows retrieved for a report to no more than that number.
Mandatory Time Filter	disabled	When checked, Explorer requires that a time filter be applied to every query. This restriction helps to prevent very long running queries that retrieve data for all time.
Open QueryBack jobs In	New Worksheet	When you ask for the results of a QueryBack job, Explorer writes data into either: ■ the current worksheet ■ a new worksheet in a MetaCube workbook. You may specify where you wish to have the results written. If no workbook is open, Explorer opens a new workbook first.

Slow Query Warning

Before executing a query, MetaCube evaluates the performance cost of accessing the various tables needed to retrieve results. If a query accesses a large table, MetaCube may issue a **Slow Query Warning**, prompting you to:

- use sample tables when running the query.
- submit the query to QueryBack.
- run the query anyway.
- cancel the query.

You can set a threshold for the Slow Query Warning. This value corresponds to the cost values your data warehouse administrator has assigned to tables in the data warehouse. The threshold specifies when Explorer should issue the warning. Before adjusting the Slow Query Warning value, you should consult your data warehouse administrator.

Maximum Rows to Retrieve

This option allows you to place a practical limit on the size of reports by limiting the number of rows Explorer returns for all queries. In some cases, queries can result in reports that take a long time to process and may be too long to be useful.

Setting this option to 0 causes queries to retrieve all possible rows.

Mandatory Time Filter

This check box allows you to specify whether time filters should always be applied in queries. If you check this box, your queries must always be filtered on time; this has the effect of disallowing queries that will retrieve data from the data warehouse for all time. Activate the Mandatory Time Filter option if reports for all time will not be meaningful or helpful to you. Then, you will not inadvertently submit a query for all time that may, possibly, take a long time to run.

Leave this option disabled if you want the flexibility of choosing whether to filter on time on a query-by-query basis.

Open QueryBack Job

These buttons allow you to choose the worksheet in which to retrieve reports submitted to QueryBack. By default, Explorer retrieves results of QueryBack jobs into the current worksheet. You can configure Explorer to open a new worksheet when you retrieve the results of a QueryBack job. For Client/Server Explorer, if a workbook is not currently open, Explorer opens a new workbook into which to write QueryBack results.

If you configure Explorer to retrieve QueryBack results to the current worksheet, it is recommended that, when you view the QueryBack queue status, you select the **Jobs for this Worksheet...** option. That way, if the current worksheet does not match the worksheet in the QueryBack queue, you will not risk overwriting another worksheet when you retrieve results.

Report Tab

This tab contains the following format options for reports.

Option	Default	What It Is/What It Does
Freeze Report Titles	disabled	Enables you to retain column and row headings on the screen as you scroll a report.
Resize Report Columns	enabled	Enables you to resize the width of the columns of a report using the mouse.
Resize Report Rows	enabled	Enables you to resize the height of the columns of a report using the mouse.
Keep Summary in Report after DrillDown	disabled	Causes Explorer to retain the name of the higher level attribute in a report after drilling down to more detail.
Copy to Excel:	As Spreadsheet	Explorer copies data to Excel as either: ■ a spreadsheet ■ a PivotTable You may specify which format to use.

Freeze Report Titles

This option controls the ability to view report headings as you scroll a long and/or wide report in Results Mode. Report Titles are cells that contain the names of the attributes in the query that generated the report. When Freeze Report Titles is enabled, cells containing report heading text remain in view as you scroll the report to display all attribute values. Conversely, when Freeze Report Titles is disabled, report headings scroll out of view as you scroll down or across a report.

Resize Report Columns/Rows

The Resize Report Columns and Resize Report Rows options control the ability to adjust the width of columns and the height of rows in Results Mode. When Resize Report Columns is enabled, you can resize a column by positioning the cursor directly on a column boundary at the top of the report. Then, you can drag the boundary of the column to the right or left to resize the column.

Similarly, when Resize Report Rows is enabled, you can resize a row by positioning the cursor directly on a row boundary at the left side of the report. Then, you can drag the boundary up or down to resize the row.

Keep Summary in Report after DrillDown

When drilling down in Results Mode, Explorer displays only data at the level to which you have drilled. However, if you activate the Keep Summary in Report after DrillDown option, the report will retain the name of the attribute you highlighted before drilling down. This provides a frame of reference for you in the resulting report. For example, if you drill down on a company name to get more detailed information, the company name displays in the resulting report with the drill down attributes as subordinated levels in the report.

If the Keep Summary in Report after DrillDown option is not enabled, the drill down operation simply creates a new report without retaining the name of the attribute from which you drilled.

Copy to Excel

You can designate the format in which Explorer exports data to Excel. Explorer writes data into Excel as either a spreadsheet or a PivotTable. To export MetaCube data to Excel, you must have a copy of that software on your PC; Explorer automatically opens Excel and creates a new spreadsheet or PivotTable.

Calculation Tab

This tab contains the following calculation options.

Option	Default	What It Is/What It Does
Default Number of Quantiles	3	For measure calculations, the number of groups into which to divide report data for ranking. The number 3 divides data into three groups, or tertiles; the number 4 divides the data into quartiles; the number 100 divides data into percentiles.
Default Number of Items for Moving Avg./Sum	3	For measure calculations, the total number of measures on which to calculate moving averages or sums.
Sampling Confidence	100	Used by the MetaCube analysis engine for its Sampling feature. When enabled, allows you to determine the level of confidence for a report retrieved from sample tables.
Sampling Accuracy	100	Used by the MetaCube analysis engine for its Sampling feature. When enabled, allows you to indicate which sample table is used for retrieving results.

Default Number of Quantiles

The number set here determines how many groups (called quantiles) will be used when ranking data in a report. Used when you apply the Quantile measure calculation to your report. The number may be changed on a report-by-report basis.

Default Number of Items for Moving Avg./Sum

This number determines how many values are used when Explorer calculates a Moving Average or a Moving Sum measure calculation on data in a report. The default you set with Explorer options may be changed on a report-by-report basis.

Sampling Confidence

If Sampling Confidence is set to 100, this effectively disables the Sampling (or Estimate Results) feature. When Sampling Confidence is set to 100, the MetaCube analysis engine does not use sample tables when retrieving results. When Sampling Confidence is set to some number less than 100, this affects the level of confidence for reports. The higher the Sampling Confidence setting, the wider the margin of error for returned results.

Sampling Accuracy

If Sampling Accuracy is set to 100, this effectively disables the Sampling (or Estimate Results) feature. When Sampling Accuracy is set to 100, the MetaCube analysis engine does not use sample tables when retrieving results. When Sampling Accuracy is set to some number less than 100, the MetaCube analysis engine determines which of several sample tables to use for retrieving results from the DSS System.

Configuration Tab

This tab is available only for Client / Server Explorer.

Under this tab, you specify information used for connecting from Explorer to a DSS System. Your data warehouse administrator may have entered one or more configurations for the copy of Explorer that runs on your PC.

If you need to specify a configuration for connecting to your DSS System, your data warehouse administrator can provide the information required. To specify an Explorer configuration, you must complete the following information:

Configuration Name: The name of the current set of configuration parameters. It can be any name, although matching this name with the name of the ODBC data source to which you are connecting may provide a logical, meaningful name for a configuration.

Metamodel Schema: The schema / owner of the metadata tables in the database. For Informix databases, which support table owners, this value indicates the name of the user who owns the metadata tables, followed by a dot (.). In ANSI-standard SQL, the dot separates the name of the table owner from the table name.

For the Microsoft Access database, this value is a prefix common to all the MetaCube metadata table names. The prefix is not followed by a dot. Depending on your company's naming conventions, this value may end with an underscore character.

DSS System Name: the name of the DSS System to access upon connecting to the database. To connect to the MetaCube demonstration database, enter "MetaCube Demo" in this field.

Database Type: the two database types supported by MetaCube are Informix Dynamic Server or Microsoft Access.

Data Source: the name of the ODBC User Data Source defined with ODBC Administrator. If the name here and the ODBC User Data Source name do not match exactly, no connection can be made. The ODBC User Data Source name is not case sensitive.

DSS Cache File: this option is obsolete. Do not use.

Informix Parameters:

Defaults for Informix Parameters are set by your data warehouse administrator. You may change options for the copy of Explorer you are using, depending on how you have been configured by your data warehouse administrator.

PDQ Priority: The default value for this parameter is set by your data warehouse administrator and, if you have been given permission, you may change the setting. This parameter sets queries submitted by Explorer as PDQ queries. The Informix PDQ (Parallel Database Query) feature allows the database to manage

resources when processing both OLTP and decision support transactions. The default value for PDQ Priority is -1; this specifies to use the database server default for processing Explorer queries. If you enable PDQ processing, you can set the priority value to a value between 1 (LOW) and 100 (HIGH). (If the number is zero (0), PDQ processing is OFF.) For information on PDQ query processing, refer to the Informix database server documentation.

Data Skip: The default value for this parameter is set by your data warehouse administrator and you may change it, if you wish. This parameter sets the Informix Data Skip feature that allows a query to complete even when data stored on unavailable fragments cannot be retrieved. The effect of turning on Data Skip is to allow all SELECT statements to complete; all unavailable fragments are skipped when a query is processed. However, operations that write to the database do not complete.

For information on data skipping, refer to the Informix database server documentation.

Configuration Tab



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