

OLAP Reporting for the Enterprise

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EXECUTIVE SUMMARY

A key to success in business today is to understand and effectively manage the factors that drive your enterprise. Having critical information about business drivers lets you make decisions that will significantly improve results. As organizations flatten, these mission-critical decisions are being made at lower levels—which means that almost every employee in your enterprise needs quick, easy access to appropriate information.

In spite of this necessity, corporate information remains inaccessible for many employees—virtually locked away in data warehouses, data marts, enterprise resource planning systems, and a myriad of corporate databases.

Traditionally, the only way to retrieve valuable information from these data stores has been to rely on IT to build SQL-type queries that deliver transaction-level detail. The advent of OLAP (online analytical processing), however, has given organizations more effective and meaningful access to critical corporate data. Increasingly, OLAP is becoming the face of the data warehouse. OLAP consolidates and presents summarized corporate information from a multitude of sources. This technology allows users to view information in a business context: sales per quarter per sales rep, units shipped on time per city per branch by air, and so on. By presenting corporate data in this way, trends and anomalies can be easily spotted and addressed.

In many enterprises, OLAP is used by a relatively small number of people—primarily information analysts—for in-depth analysis. Although these companies are clearly benefiting from OLAP technology, they are searching for ways to deploy its value throughout the organization.

One way to deliver value to the entire organization is through OLAP reports—interactive reports that are highly formatted, easily deployed, and effortless to use. These reports accelerate the Eureka moment by exposing sweet spots of information in a data set directly to decision makers, knowledge workers, and information consumers. Sweet spots are selective chunks of information that provide decision makers with immediate critical insight into business drivers. Because users do not need to expend valuable time uncovering this information themselves, they can devote their time to running the business more effectively.

OLAP reports can be regular status reports, but are especially effective for key performance indicator (KPI) reporting, business performance measurement reporting, and scorecard-style reporting. These types of metrics are becoming increasingly important to decision makers, who require a robust reporting environment in which to perform these tasks.

Cognos PowerPlay® enables organizations to create and deploy highly formatted, interactive OLAP reports. These reports let users easily measure, manage, and improve business performance, then distribute this information across the enterprise. Decision makers throughout the organization now have the information they need to significantly improve business results.

REPORTING ON CRITICAL CORPORATE INFORMATION: THE TRADITIONAL WAY

Conventional query and reporting tools are designed to retrieve detailed information from your corporate database. While these tools are well suited for producing status reports of transactional-level detail, they are not effective for reporting against data that is organized multidimensionally. Because traditional reports are static, users cannot instantly examine other combinations of factors or drill down to get more detail. Instead, if an initial report uncovers information that a decision maker would like to explore further, they must go back to the IT queue for another query.

Besides being difficult to create and update, these SQL-based reports are also resource intensive. Running reports for the time periods companies use—years and quarters or 5-day product weeks, for example—puts a heavy load on the database. According to the Meta Group, “the database can become a black hole for data when performance falls to unusable levels. A multidimensional data store supporting an OLAP application prevents many performance-damaging issues and provides the end user with consistent results.¹”

For companies that want to track performance and trends, or perform scorecard-style management reporting, there is an even more fundamental concern. It can be extremely difficult to understand the big picture when you only have access to reports that focus on transaction-level detail, because data in databases is organized for efficient storage and administration—not for summary-level analysis or exploration. In addition, data storage does not correspond to how the business is organized, so data must be massaged before the average user can extract useful information from it. If, for example, managers want to explore company performance in terms of product sales, a report that details the performance of individual sale reps will not help them spot overall trends. By reviewing summary information first, such as total sales per office or region, decision makers can more easily gain a big picture view of business performance. They can then drill down to lower-level details to uncover what is driving these trends.

REPORTING ON CRITICAL CORPORATE INFORMATION: THE OLAP WAY

OLAP technology has brought significant value to business decision making. OLAP systems store and access data as dimensions that represent business factors like time, products, geographical regions, and sales channels. This information is stored multidimensionally—like a cube that can be viewed, turned, and shifted from any angle. It is also presented in a business context, like number of customer complaints by product line in North America last quarter, rather than a database context—so decision makers have immediate access to the information they need to make the best decisions for the business.

Although many organizations are reaping significant benefits from OLAP tools, research has shown that the heaviest users—analysts and other content producers—represent only 10–15% of those who would benefit from access to OLAP data. The vast majority of decision makers, like managers and lower-level information consumers, would derive significant value from

¹ “Application Delivery Strategies #659”, 9 May 1998, *The Meta Group*

OLAP tools, but prefer to view reports that are provided to them by a core group of content producers². In addition, many of these information consumers want the best of both worlds: prepackaged, dynamic reports to speed the decision-making process and to enable analysis and exploration.

Until recently, organizations have found it difficult to meet some of these user requirements. However, with the advent of OLAP tools, like PowerPlay, enterprise-wide deployment of OLAP reports is now a reality.

OLAP REPORTS: FUNDAMENTAL PRINCIPLES

OLAP reports are the intuitive front end to a detailed set of critical corporate data. Inherently dynamic, highly formatted, effortless to use, and easy to deploy, they are based on multidimensional data extracted primarily from data marts and data warehouses.

OLAP Data Cubes

OLAP technology packages carefully selected sweet spots of information from data warehouses, relational databases, data marts, and other data sources into multidimensional data arrays that are commonly referred to as 'cubes'. These cubes are models of the business that users can draw on to measure and manage business performance, track KPIs, and turn their findings into high-impact reports. Cubes can be customized to reflect the information (also called dimensions) and calculations (also called measures) most commonly used in a given organization.

OLAP reports are generated from data cubes. Because each cube contains a wide variety of dimensions and measures, a vast number of reports can be built from the information in the cube. You can think of the cube as a master report or a collection of components that you assemble to create a specific report.

Interactive Data Analysis

OLAP reports deliver the information users need in order to do their jobs effectively. They provide a starting point for multidimensional data exploration, but with sophisticated security features to ensure users only have access to information they are authorized to view.

With OLAP reports, the user's initial view of the data reveals patterns and trends at a glance. Once users have identified issues in this summary-level information, OLAP reports enable them to fully explore and analyze the data set from any angle, to any level of detail. This means that report consumers can answer their own questions, easily investigating data sets that would otherwise be inaccessible.

For example, a monthly sales forecast may list all sales offices, with their 30-, 60-, and 90-day pipelines. In an OLAP report, this information would be represented on the front page, as a summary-level introduction to data that might also include customer and product information.

² "Analytical Applications: Fulfilling the Promise of Business Performance Management", 5 August 1998, The Meta Group

The initial view of this critical information quickly shows sales managers the pipeline numbers, enabling them to evaluate their relevance. If a manager is concerned about a particular office’s pipeline, he or she can easily dig deeper into the data to understand which customers are not included, which sales reps are not performing, and so on. By the same token, a manager could choose to look at the pipeline data in a completely different way—for example, by product type instead of sales office—to determine whether there are underlying problems or trends that he or she had not previously considered.

		Current Month	Last Month	Trends	By Quarter
All Products	Discount (%)	-2.6%	-2.5%	4.63%	-2.5%
alpha	Revenue	\$4,960,244	\$2,999,309	65.38%	\$69,956,899
	Units	460	278	65.47%	6,310
	Avg Sale	\$92,671	\$76,905	7.50%	\$77,990
	Sale Conversion	51.05%	49.82%	2.48%	48.94%
	Discount (%)	-2.4%	-2.4%	2.20%	-2.5%
charger	Revenue	\$6,145,048	\$3,269,588	87.95%	\$62,204,445
	Units	392	208	88.46%	3,839
	Avg Sale	\$81,934	\$90,822	-9.79%	\$87,489
	Sale Conversion	82.18%	73.34%	12.21%	44.07%
	Discount (%)	-2.6%	-2.4%	11.30%	-2.2%
nova	Revenue	\$2,375,623	\$3,479,936	-31.73%	\$10,080,779
	Units	171	250	-31.60%	749
	Avg Sale	\$87,986	\$72,499	21.36%	\$76,895
	Sale Conversion	75.33%	86.81%	-13.22%	86.79%
	Discount (%)	-2.9%	-2.7%	6.74%	-3.1%

OLAP reports give users a significant head start when performing critical business performance measurement tasks.

Robust Formatting

OLAP reports must accommodate the sophisticated report formats end users require. Users often need to receive standard reports, like Income Statements, in a specific format that adheres to regulatory requirements. Report-writing tools that do not, for example, allow nested or unbalanced crosstabs are woefully inadequate for specific types of reporting like financial reporting. Cognos PowerPlay enables organizations to create these highly formatted reports from OLAP data.

Ease of Use

OLAP reports enable users to slice and dice, drill down, and change graphical views of their data—something paper reports cannot offer. The user interface must be intuitive, so users can interactively explore data, and uncover what lies behind trends and totals, with little training. In addition, users should not have to go back to IT for additional information about a trend or total—the information must be easily accessible, right at users’ fingertips.

To be widely accepted, an OLAP reporting solution must also be extremely responsive. Most users will not tolerate even a 3 or 4 minute turnaround time when exploring their corporate data.

Drill Down to Details

OLAP reports that take an Analyze-then-Query™ approach allow decision makers to access data the same way they identify and solve problems: by reviewing totals or summary information first, then looking at the underlying details. To gain a complete view of the business, users must have the ability to drill down to transaction-level details whenever necessary. They must also have access to information beyond what is present in the data cube.

Ease of Deployment

The emergence of the Web as a mainstream computing platform has in part answered the need to easily and cost-effectively deploy reports across the enterprise. A highly effective OLAP reporting solution accommodates the needs of a wide range of users, from those who are connected by LAN, WAN, or the Web, to those who are mobile.

Central Security

OLAP reports must be completely secure, so users only access information that they are authorized to see. Through central, server-based security and control, IT administrators should be able to easily build, maintain, and deploy OLAP reports throughout the organization.

Business Rules

Both report writers and report consumers must have access to business rules that provide a standard way of calculating values not contained in the original source data. This includes calculations of growth, market share, and return on investment. The Cognos OLAP reporting solution makes this easy by enabling report authors to build these business rules right into the cube.

MEETING THE DIVERSE NEEDS OF A WIDE USER AUDIENCE

An effective OLAP reporting solution enables report authors to quickly build and distribute reports that meet the needs of a broad user audience. Users must be able to work with the reports they need, in the most appropriate format.

Analysts, Report Authors, and Content Creators

This group is often referred to as OLAP ‘power users.’ It includes such people as financial analysts, who author the company’s financial reports and send out monthly updates, as well as marketing specialists who perform ad hoc analyses of sales data and publish their findings across the company.

The role of these people within the organization is to collect and analyze information, track KPIs, identify trends, and highlight anomalies. They are expected to understand information at a deep level. They spend a significant amount of their time performing analyses and, as a result, quickly become comfortable with the advanced features of an OLAP tool. As well,

power users are often tasked with sharing their critical findings with the organization as a whole, so that others can take advantage of the insight they have gathered. Typically this group represents about 15% of an OLAP deployment.

Power users build OLAP reports directly from OLAP cubes. These cubes provide a vast collection of report components—dimensions and measures—to compile an almost infinite number of reports. Because power users are in the business of understanding information, they need a solution like PowerPlay that has full analysis functionality, but that makes report design and deployment easy.

Decision Makers and Knowledge Workers

These users need information in order to do their jobs effectively—in fact, the better the information, the more effective they are. However, analyzing data is not their primary responsibility. Their real work is managing the company: meeting with customers, developing products, hiring employees, coordinating shipping, and so on. This group includes people like sales and marketing managers, whose main objective is to generate revenue but who need to understand real performance concerns like bottlenecks in sales cycles, the productivity of certain sales regions, the effectiveness of marketing campaigns, and the growth of sales channels.

Knowledge workers make hundreds of complex decisions each week. They are often forced to make choices in an information vacuum; appropriate data is simply not always available, or the reports are delivered at such a detailed level that they have no hope of recognizing trends or patterns. If the information is available, they often rely on others to compile and distribute it. They do not have the time to wade through reams of data looking for the proverbial needle in the haystack.

Decision makers and knowledge workers benefit most from dynamic reports that are streamlined for their particular business function—such as a sales pipeline analysis that drills down to regions and offices, a shipping delay report that displays details, or a P&L statement that allows in-depth exploration of revenue and expenses.

The best way to respond to their needs is to provide them with a prepackaged collection of the reports they need most. In this way, the majority of the exploration work is already done; the sweet spots of information have already been identified and relevant views of the data have already been created. This is analogous to providing knowledge-workers with a specific URL to a key document on a Web site, versus sending them to the home page and having them search the entire site for information on their own. With OLAP reports, decisions makers can spend their time using the information instead of finding it.

Information Consumers

Information consumers are users who need status information to do their jobs effectively, like training coordinators who need to know how many new employees were hired last quarter in order to schedule orientation sessions, or inventory administrators who need to know the status of stock levels for reordering.

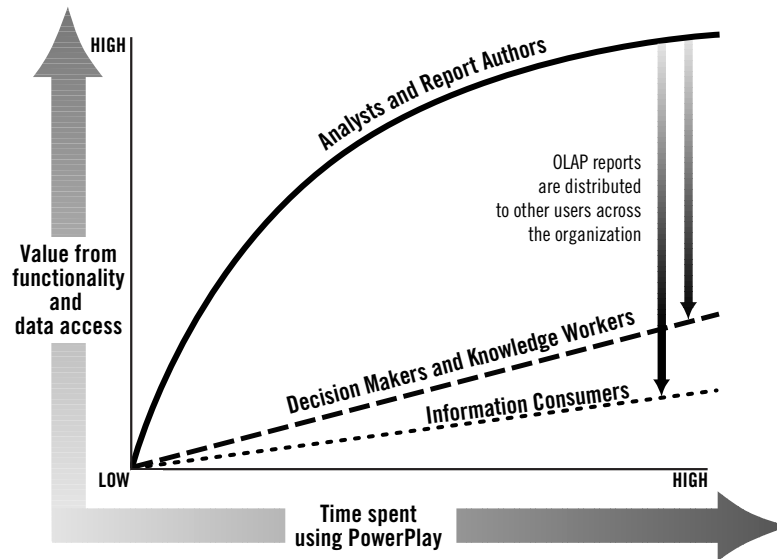
This group of users benefits most from status OLAP reports that are generated on a regular basis. These reports give information consumers a snapshot of a particular data set—such as a weekly product inventory, a shipping status report, a quarterly financial report, a production quality report, and so on, that is based on information stored in the OLAP cube. Although there may be some filtering capabilities in these reports, in general the user does not need to interact with the data to any great extent. For information consumers who have little need to track trends over time, status reports give them the precise information they need, when they need it.

The screenshot shows a web browser window displaying a Cognos PowerPlay report. The report is titled 'Revenue' and is filtered by '1996' and '1997'. The columns represent different margin ranges: 'Under 20%', '20-65%', 'Over 65%', and 'Margin Ranges'. The rows list product lines: 'Environmental Line', 'GO Sport Line', 'Outdoor Products', and 'Products'. The values are displayed in dollars.

Revenue	Under 20%	20-65%	Over 65%	Margin Ranges
1996				
Environmental Line	\$ 0.00	\$268,363.83	\$72,608.94	\$340,972.77
GO Sport Line	\$26,202.00	\$82,340.48	\$ 0.00	\$108,542.48
Outdoor Products	\$121,945.41	\$279,077.98	\$ 0.00	\$401,023.39
Products	\$148,147.41	\$629,782.29	\$72,608.94	\$850,538.64
1997				
Environmental Line	\$ 0.00	\$148,014.12	\$417,227.18	\$565,241.30
GO Sport Line	\$21,230.00	\$107,333.92	\$ 0.00	\$128,563.92
Outdoor Products	\$123,604.62	\$222,419.09	\$ 0.00	\$346,023.71
Products	\$144,834.62	\$477,767.13	\$417,227.18	\$1,039,828.93
Years	\$292,982.03	\$1,107,549.42	\$489,836.12	\$1,890,367.57

PowerPlay's zero footprint, HTML-only Web client lets users explore business data on the fly, perform ad hoc trend analysis, and analyze exceptions with ease.

These users also have little time for in-depth product training. As a result, their reporting solution must be intuitive and must integrate effortlessly into their work processes. In addition, the large number of information consumers in most organizations means that the deployment of a new reporting technology must also be cost-effective. A Web solution offers an ideal reporting environment for information consumers. It leverages Web technology to enable organizations to deploy OLAP reports via the browsers that are already on most desktops. Virtually no training time is required, and deployment is effortless.



PowerPlay OLAP reports enable organizations to provide all users with the right information, in the format that best suits their decision-making needs.

CREATING AND DEPLOYING COGNOS OLAP REPORTS

There are two stages to implementing Cognos' OLAP reporting solution. The first step is to create OLAP cubes, the multidimensional structures that house summary-level details of your corporate data. Typically, these cubes are created by IT and deployed to information analysts and report authors. The second step is to use these cubes to build the browsable OLAP reports that are distributed to decision makers and other information consumers.

PowerPlay is a universal OLAP solution that enables organizations to use its powerful OLAP reporting capabilities with their existing OLAP cubes. Companies with Hyperion Essbase, Oracle Express, IBM DB2 OLAP, and Microsoft SQL Server OLAP Services, for example, take full advantage of PowerPlay's OLAP reports without abandoning their infrastructure. For organizations that are just introducing OLAP, PowerPlay is a complete solution that enables both cube building and OLAP reporting.

PowerPlay's OLAP cubes, called PowerCubes, can be stored and managed directly within Oracle, Sybase, Microsoft SQL Server, and Informix databases, on a LAN, or on a PC. Database functions like back-up, recovery, and replication are leveraged through in-database cube storage. By using the system you already have, you draw value from your existing expertise and your users' familiarity with your current system.

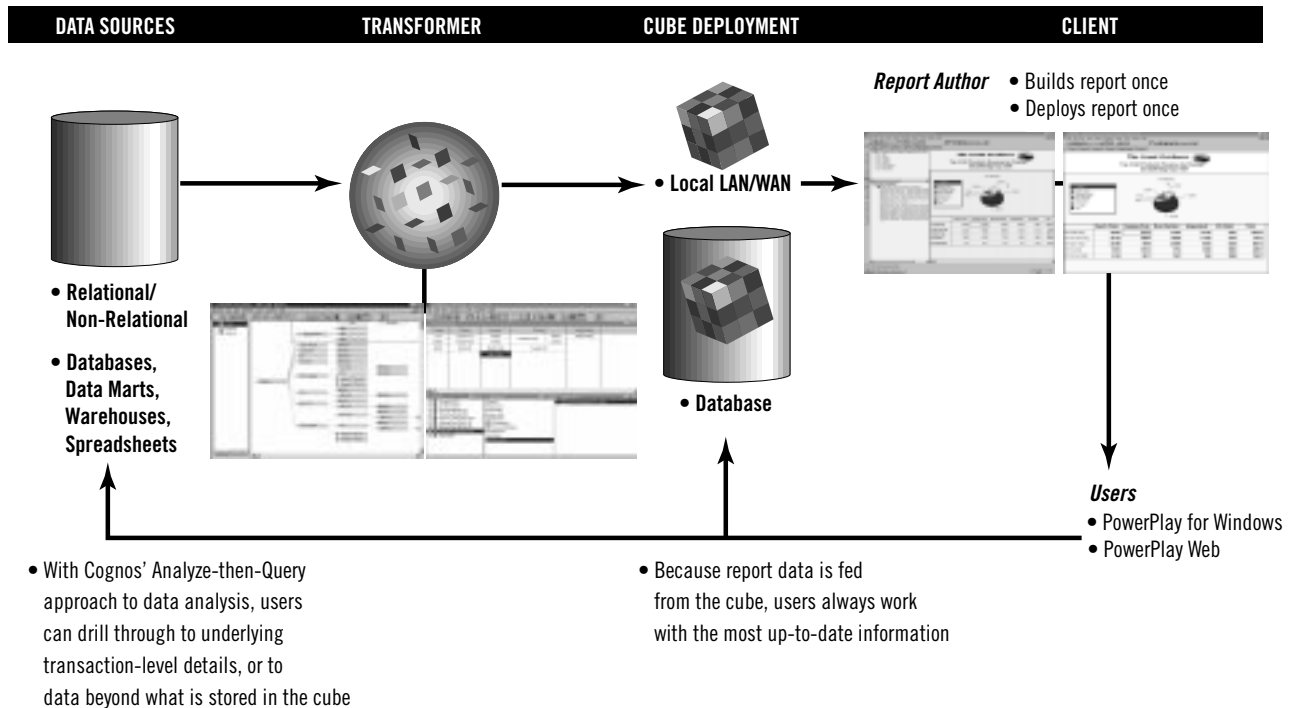
Building and Maintaining OLAP Cubes

As discussed in the previous section, OLAP cubes are customized models of your business that reflect the unique characteristics of your company. The structure of a cube is defined in terms of dimensions and measures. Dimensions are hierarchical categories of information like time, products, and geography. For example, the product dimension hierarchy may be organized by product line, product group, and then individual product or SKU. Measures are the calculations that are used to track the business like revenue, units sold, cost of sales, etc.

OLAP cubes generally contain only the dimensions and measures relevant to a specific analysis. For example, sales analysis data and human resources data would be housed in separate cubes. This ensures that cubes remain manageable, not just in terms of their size but also in terms of the clarity of the information they contain. In most cases, users confronted with more than 20 measures quickly become overwhelmed by too many analysis options. With PowerPlay, cubes can be easily linked together so that users can move effortlessly from one cube to another, accessing information from all areas of the company. Often this kind of flexibility is a requirement for information analysts who need a deep, yet broad, understanding of corporate data.

Populating Cubes

Determining what data should be contained in each cube and where that data is coming from is a critical exercise. IT or line-of-business administrators, who are usually the ones tasked with building PowerCubes, rely on significant input from users to ensure that their requirements are being met.



Building and Distributing OLAP Reports

With PowerPlay, the PowerCube build process is automated with the product's Transformer module. Administrators use Transformer to create a model with data from various data sources. The model specifies the location of the source data, as well as the structure of the data in the cube. Transformer then uses this model to create PowerCubes and populate them with data.

Because PowerCubes can be built on both UNIX and NT servers, administrators can quickly construct cubes of any size. Populating PowerCube models is not constrained by where the data resides, so IT can harness both relational and non-relational data from multiple sources like databases, data warehouses, data marts, and spreadsheets. This lets your organization reap maximum value from your current infrastructure—and from any new data sources you may introduce.

Handling Time

PowerPlay automatically creates time dimensions such as week, month, quarter, and year, or users can incorporate custom time periods like 5-day production weeks. PowerPlay can also create relative periods, such as year-to-date, quarter-to-date, prior month, and so on, which allows report authors to easily compare current results against previous time periods. For organizations whose fiscal year does not coincide with the calendar year, PowerPlay can include both periods in the same cube.

Applying Standardized Business Rules

With PowerPlay, IT can capture and standardize your organization's business rules in a cube and deploy them to the entire organization. At the same time, using sophisticated mathematical expressions and calculations such as Percentage Growth, Change, Market Share, ROI, and Average, administrators can also create new categories of information from existing data. This capability ensures consistent results because everyone in the organization is using the same values for critical calculations. Because these mathematical expressions are built right into the cube, training time for report authors and consumers is greatly reduced.

Maintaining Currency Conversions

PowerCubes also handle currency conversion with ease. The IT administrator treats currency exchange information like any other data source, building it into a cube quickly and easily. This ensures that conversion rates are historically correct for any measure. When viewing an OLAP report, decision makers can automatically convert currencies with a simple display change. This is particularly useful for global companies that may report in different currencies for local sales offices and head-office. For companies doing business in Europe, PowerPlay meets the regulatory requirements for Euro-triangulation.

Central Security

PowerPlay lets administrators easily define and govern the data that each user is permitted to access or analyze. You can restrict user access by cube, by category, and by measure, or by any combination of these factors. Secure user classes allow one PowerCube to serve the diverse requirements of many users. For example, although all salary data may be housed in one cube, restrictions can be defined so that managers can only see payroll information for the employees they manage directly. This significantly reduces administrative overhead. In

addition, because security is embedded in the cube, even mobile users who are not LAN- or WAN-connected can receive cubes and still be restricted to the information they are authorized to see.

Deploying PowerCubes

PowerCubes scale to manage very large data sets—up to 50 million consolidated rows of data, and as many as 500,000 categories—which is the size of a typical data mart. PowerPlay's unique cube technology enables cubes to be built very quickly yet remain highly compressed, making them easy to distribute and update. This technology also allows cubes to be built on a daily basis, even for large data volumes.

PowerPlay lets IT automate cube building and deployment. These activities can be scheduled to run automatically, freeing up IT to concentrate on the quality of information in the cube. This flexible server processing also reduces network traffic, allows processing to be moved to off-peak hours, and accommodates recurring update schedules. Your users can work with the information they need, almost immediately.

PowerCubes can be deployed across Windows clients, servers, and LANs. Cubes can also be deployed across the Web with PowerPlay Server Web Edition.

Producing Browsable OLAP Reports

Once OLAP cubes are created and deployed, report authors have everything they need to produce a wealth of OLAP reports. The process for authoring is extremely straightforward for all types of reports: status reports that reveal a snapshot of data; ad hoc reports that answer specific questions; and business performance management reports that track KPIs.

By using PowerPlay to navigate through the OLAP cubes—drilling down and slicing and dicing dimensions and measures—report authors highlight the sweet spots of information they want to include in the report. By taking advantage of PowerPlay's powerful report creation and formatting features, they can build and package OLAP reports to meet the needs of a wide variety of users.

Effortless Exploration

Although OLAP reports can be distributed on paper, decision makers reap the most value when they are presented electronically. There are three ways to explore data in a PowerPlay OLAP report:

- > *Drill down:* Users can explore a dimension hierarchically—moving from summary-level information to the details and back—to gain fast answers to critical business questions. A financial manager who is concerned with rising expenses will want to understand what parts of the company are particularly problematic. By drilling down on a geographical dimension, she can move from looking at expenses by country, by region, by office and then finally by department.
- > *Slice and dice:* Decision makers can interactively explore corporate data in any combination of dimensions, from every conceivable angle. For example, a sales manager can look at revenue figures by product line, sales region, time period, sales channel, and so on.

> *Graphical analysis:* Users can choose from a variety of graphical displays—crosstabs, pie charts and a variety of bar charts—to visualize the key factors that are driving the business. With PowerPlay, all graphs are navigable, so you can explore data effortlessly in any graphical mode.

Advanced Formatting

PowerPlay enables report authors to choose from a variety of formatting options to provide users with reports that are best suited to their needs. Unlike other tools, PowerPlay meets the formatting requirements for financial reports—with the ability, for example, to produce unbalanced nested crosstabs. Report authors are able to nest any number of rows and columns to show parent-child relationships or intersecting multiple dimensions or measures. By displaying multiple dimensions on the same axis, a sales manager could look at quarterly revenue on one axis, and divisions and sales reps on the other.

Exception Highlighting

Report authors can easily highlight exceptions in their OLAP reports. This ensures that report consumers quickly spot unexpected results.

With PowerPlay, there are two forms of exception highlighting. Report authors and consumers can define their own exceptional values, or PowerPlay can calculate exceptions automatically by establishing an expected value based on row and column values. By default, low values appear in red, bold font and high values appear in green. This style can also be completely customized by report authors.

Calculated Categories and Measures

Report authors can create their own categories of information to add value to their reports. Using sophisticated mathematical expressions and calculations, administrators can set up commonly used categories or measurements, such as Percent Growth or Share, to apply to specific categories within a model or cube. The cube designer decides on the calculation to be performed and the level to which it applies. PowerPlay then runs the calculation during cube creation. Because these standard Business Rules are captured in the cube and are deployed to the entire organization, business performance measurement and KPI reporting are easy, and everyone in the organization is using the correct calculations.

Ranking and Sorting

Features like automatic ranking and sorting help decision makers identify best and worst performers at a glance. This is indispensable for creating Top-10-type reports.

Trend Analysis

PowerPlay automatically creates year-over-year and year-to-date calculations from detailed transactions, to enable report authors to easily track business performance over time.

Generalized Reports

With PowerPlay, report authors can create standard reports. These reports maintain accurate, up-to-date information, and do not need to be rewritten when the underlying category

detail in the cube changes. For example, the underlying data for a monthly report on the top 10 sales reps per region constantly changes as sales reps join and leave the company. PowerPlay's generalized reporting capability ensures that the applicable data is always included in the report.

This feature is particularly useful for reports that are run on a regular schedule—daily, monthly, or quarterly—where it is highly likely that the underlying categories will change between reporting periods.

Deploying OLAP Reports

With PowerPlay, deploying OLAP reports is extremely efficient, because the report is very small—it is only the combination of dimension filters and formatting. The data itself is stored in the OLAP cube, not the report. This significantly reduces the typical overhead of electronic reporting.

OLAP reports can be deployed across Windows clients, servers, LANs, and the Web—whichever platform best suits particular user roles. And PowerPlay's Portfolio module allows report authors to package a collection of reports into an electronic briefing book with other OLE objects like Impromptu reports and graphics. In this way, decision-makers receive a consolidated package of information that is tailored to their particular needs.

APPLYING OLAP REPORTING TO YOUR ORGANIZATION

To reap maximum business value from Cognos' approach to OLAP reporting, organizations can draw on the experience of companies that have already embraced Business Intelligence (BI). These organizations have been able to reduce total operating costs, radically improve productivity, and enable previously unavailable strategic capabilities.

As they gradually deploy PowerPlay across the enterprise, innovative, industry-leading companies exhibit common patterns. Detailed guidelines of Cognos customers' best practices have been compiled in *The Multidimensional Manager™—24 Ways to Impact your Bottom-Line in 90 Days*. This free publication, which can be ordered directly from Cognos' Web site at www.cognos.com, details how all departments of the enterprise can benefit from OLAP reporting technology. Appendix A illustrates the application of these best practices in four departments: finance, sales, marketing, and human resources.

APPENDIX A: APPLYING OLAP REPORTING TO YOUR ORGANIZATION*Finance*

In most companies, the bulk of analysis is concentrated in the finance department because it gets the consolidated numbers from all operations. Financial analysis captures all costs, revenues, and performance against expectations and presents feedback to management for corrective action across the business. Unfortunately, the traditional practice of concentrating analysis in finance is less than optimal, for three reasons:

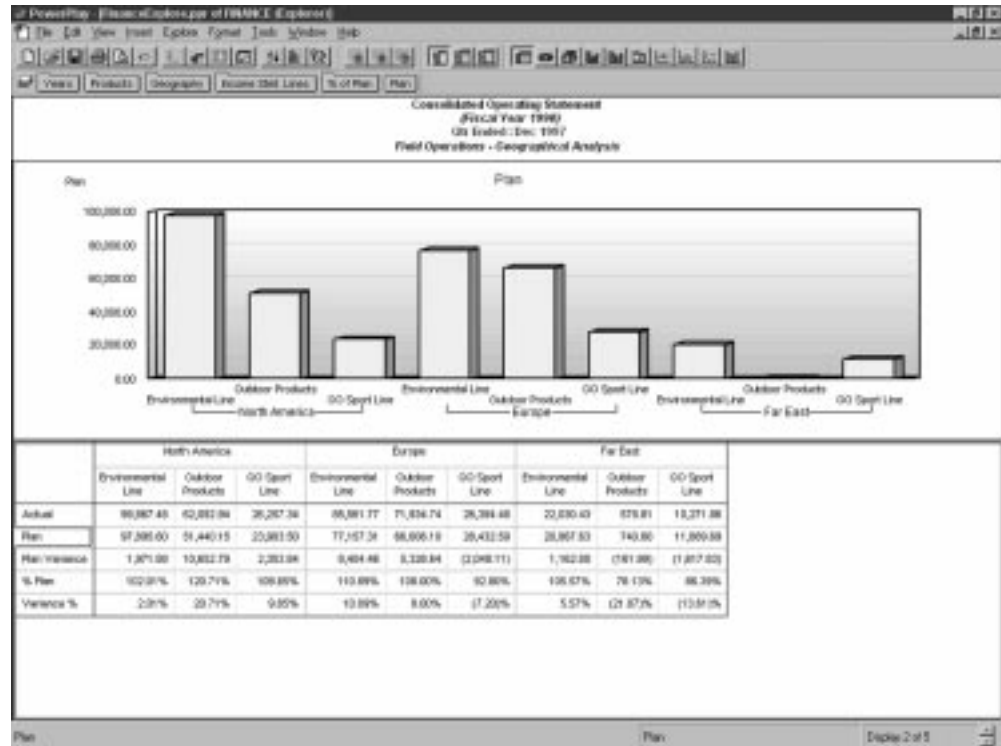
1. The vast majority of managers who have direct accountability for the business are not in finance. Although these operational managers have the best understanding of their own numbers, they are often not involved in the analysis process.
2. The major drivers of cost and margin, such as products and customers, are not generally found in the finance department's analysis picture, because financial systems are typically built around the chart of accounts. Finance can certainly see who is on plan and who is not, and it can capture all the high-level financial indicators, but in isolation it cannot pinpoint the real opportunities that drive profitability.
3. Finance often functions as a production shop where analysts spend much of their time consumed by end-of-period reporting. Their potential value to the company is thus not fully optimized.

OLAP reporting enables finance to perform more meaningful analysis at a much faster rate, reducing days of reconciliation and reporting to minutes every month. It also allows a new and highly leveraged activity: information distribution. This removes finance from the role of middleman, eliminating hundreds of repetitive interactions with operational managers, and freeing up enormous amounts of time for activities like value-added analysis.

An Example: Profit and Loss Drill-Down Statement

The profit and loss drill-down statement is designed for detailed expense and variance analysis at the lowest levels of operational planning. It enables decision-makers to understand the variance between actual expenses and plan for every category of expenditure and every cost center in the operating plan. This activity-based cost analysis is critical to enforcing planning discipline, capturing unexpected bottom-up changes in requirements or supplier prices, and verifying the accuracy of numbers. OLAP reporting significantly increases the speed at which finance can perform this activity by automatically highlighting exceptions like high and low variances.

When the finance department distributes this information to operational managers (who are actually in charge of cost centers) via browsable reports, these managers can really put it to its most effective use. Rather than only having access to static facts, managers can interactively explore the drivers behind their numbers. Not only can they quickly see that expenses are 7% above plan in their department, they can now quickly drill down or slice and dice the data to understand what lies behind this trend.



Cognos OLAP reports enable decision-makers to understand the variance between actual expenses and plan for every category of expenditure and every cost center in the operating plan, then quickly distribute their findings to managers across the enterprise.

OLAP reports can be delivered quickly, so operational managers see their numbers as soon as the month ends. For the first time, they can analyze their variances and report their adjustments back to finance before the accounting cycle is closed. Their operational plans and forecasts for the next month are based on accurate numbers.

Sales

Sales teams should be primarily motivated by a revenue-centric view of the world, rather than a profit-centric one. The ultimate goal of OLAP reporting in a sales organization is to align the sales force’s mandate with the corporate goal of maximizing profit.

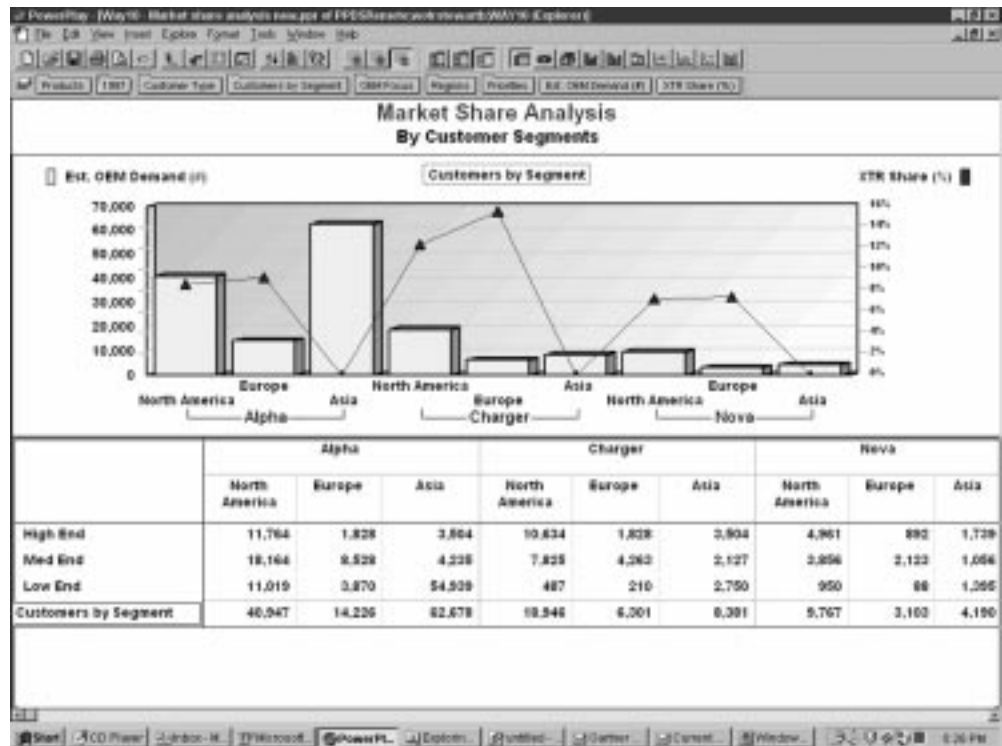
The problem most companies have when it comes to analyzing and presenting sales information is that it generally takes too much time. Even the most basic questions—what is driving the business, how are we doing against plan, what is coming down the pipeline, which customers contribute the most to our bottom-line—cannot be answered without hours, or even days, of research. However, a sales force that can put the information it gathers to strategic use has a clear advantage over competitors that cannot. They can focus on the relative profit contribution of each of the products and customers in the mix and can direct the business toward the most profitable combination.

OLAP reports enable sales teams to quickly navigate sales information as inexpensively as possible. This dramatically simplifies the work of understanding and communicating what is happening in a world of information overload. These reports remove the barriers that prevent companies from adopting fact-based selling and profit-centric selling. They transform unworkable information into competitive advantage by presenting only the sweet spots of information. This enables rapid discovery of key trends and drivers.

An Example: Sales Analysis Report

The Sales Analysis Report is an ideal OLAP application. A completely multidimensional solution, the Sales Analysis Report is built from sales order information that is readily available in most companies. For the first time, everyone in the organization can see what is driving the business and the sales organization can align itself around a consistent view of the business.

With the interactive Sales Analysis Report, managers can instantly see which product lines have momentum. If one product dominates, they can drill down to find out which specific products are driving the performance of the entire line. They can isolate a major customer and then slice the overall customer revenue by product to see which products are driving the business in that account. In fact, they can grab any combination of customer, product, and sales territory to understand growth, mix, and trends. With this approach, decision-makers are continually discovering growth patterns that were never visible before.



Interactive sales analysis reports let managers instantly see which product lines have momentum. If one product dominates, they can drill down to find out which specific products are driving the performance of the entire line.

Marketing

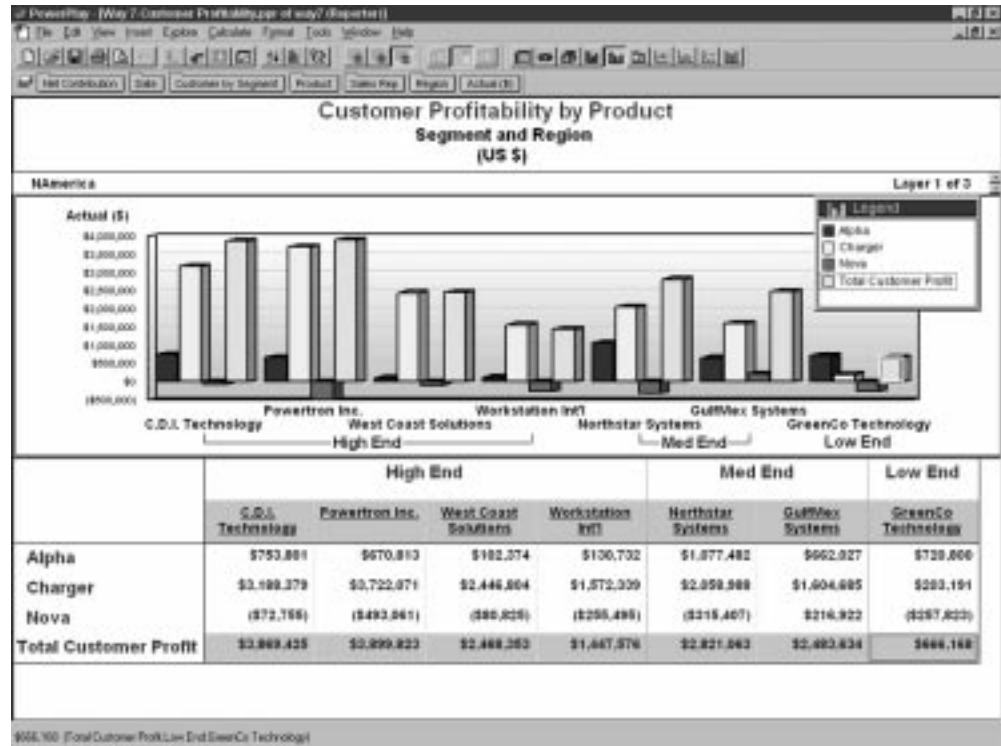
Gains in market share are the usual measure of success in marketing. Yet big gains in market share only happen during relatively short periods of time, when a market is created. Over the long term, the most critical issue is how to maximize profitability from the customers you acquire. The key question this begs is: how do you acquire customers who will maximize your profitability? Financial institutions have successfully adopted this portfolio view of a customer. Many leading banks now look at their customers in exactly the same way they have traditionally viewed investment portfolios: they analyze the profitability of customer accounts and concentrate on the top tiers. OLAP reports give companies in all industries the ability to understand their customers in the same way.

In the past, there has been no easy way to sweep rapidly across the entire customer portfolio—to classify customers by their level of profitability, to identify which characteristics define customers in the higher levels, and to understand whether the organization is gaining or losing customers in the higher levels. In general, companies do not get maximum return on their marketing investment because they do not evaluate their campaigns against high-profit profiles.

OLAP reports can capture the profitability profile of the existing customer asset, as well as allow for bottom-up strategy building and early adjustment to unexpected successes and failures. This enables decision makers to gear their marketing investment towards building the strongest possible portfolio of profitable customers. It also enables them to line up the efforts of the entire organization so that they are focused on the customers who will generate the most profit in the future.

An Example: Customer Profitability Report

This OLAP report organizes customers from most profitable to least profitable, charts their lifetime value to date, and captures the number of customers in each profitability tier so that trends in the profitability mix can be easily seen over time. This report also enables the practice of regular acquisition and erosion reporting. Senior managers with a browsable version of the Customer Profitability Report are constantly in touch with what is driving the inflow and outflow of customers in high-profitability tiers. These decision makers can easily compare the profitability mix of their customers by geography, industry, volume of business, the number of different products they buy, and any number of other characteristics. For the first time, they can also see which combinations of product attributes—color, scent, materials, contents, and so on—are driving sales and profitability in each market.



The customer profitability report puts decision makers in touch with what is driving the inflow and outflow of customers in high-profitability tiers. These decision makers can easily compare the profitability mix of their customers by geography, industry, volume of business, the number of different products they buy, and any number of other characteristics.

Human Resources

After finance, human resources is the second largest provider of information for internal customers. But HR has few of finance's advantages in this role. It has a tighter budget, no mandate as an information provider and no supporting cast of analysts on hand. Although HR tracks a lot of information that contributes to employee productivity, such as skill set, educational background, professional qualifications, and performance rating, the link back to a company's financial statement is rarely made. By connecting costs and people's skills mix directly to output, organizations significantly increase their strategic capabilities.

OLAP reports give HR managers a new ability to perform staffing evaluations based on job function ratios, skills mix, and salaries. At the tactical level, they increase the productivity and analysis capability of HR managers without adding layers of additional cost. At the strategic level, they connect the cost of people, the skills mix of these people, and the impact of the combination on profit.

An Example: Human Resource Administration Report

This OLAP report captures the company's entire investment in its people. It includes all labor costs and headcount across the company, as well as the distribution of these costs across job functions, organizational departments, and salary grades. The HR Administration Report provides substantially greater drill-down detail on all wage, sales, and general administration items in the company's income statement.

This report significantly increases the rate at which HR managers can analyze HR data and create reports. As in finance, before the appearance of OLAP reports, the HR department functioned largely like a production shop. They answered similar questions over and over again for operational managers. The questions themselves are important, like headcount and salary growth rates, but gathering the information to answer the questions consumed HR resources.

	QTD				
	< 40%	40%-60%	60%-80%	> 80%	Not evaluated
Cust. Service	0.0%	19.0%	33.3%	0.0%	47.6%
Data Processing	0.0%	10.0%	30.0%	50.0%	10.0%
Exec Mgt & Staff	0.0%	20.0%	40.0%	0.0%	40.0%
Finance and Admin	0.0%	14.3%	42.9%	28.6%	14.3%
HR Training	0.0%	12.5%	12.5%	62.5%	12.5%
Production	0.0%	0.4%	99.2%	0.0%	0.4%
Distribution	0.0%	0.0%	100.0%	0.0%	0.0%
Purchasing	0.0%	0.0%	100.0%	0.0%	0.0%
R&D	50.0%	50.0%	0.0%	0.0%	0.0%
Sales	0.0%	6.7%	86.7%	0.0%	6.7%
Marketing	0.0%	91.7%	0.0%	8.3%	0.0%
Total	0.6%	6.5%	84.5%	3.7%	4.8%

HR administration reports enable managers to instantly view critical information about employees, job functions, salary grades, and more—from any angle, in any combination.

Distributing this information regularly in an OLAP report eliminates the time and cost of gathering information to answer these routine questions. HR can quickly report on what is driving hiring anywhere in the company, where salaries are increasing most quickly, and what is happening to key ratios such as managers to employees and sales reps to service people. In labor negotiations, this report offers a critical strategic advantage: it allows managers to see the current position of multiple bargaining groups concurrently, so they can instantly calculate the impact of changing offers and counter-offers.

Operational managers who receive this information as a browsable OLAP report now answer their own questions faster by removing the middleman. Because they are closer to the business, they often perform more valuable and timely analysis of their own affairs.

Scorecard and KPI-style Management

OLAP reporting is ideally suited for companies that are embracing the scorecard approach to strategic management. The Balanced Scorecard strategy was first published in the *Harvard Business Review* and entails a rigorous translation of the organization’s strategy into tangible objectives and measures. This typically includes a mix of outcome measures (revenue, profit, growth rate) and performance drivers (cycle times, defect rates) that are organized into four categories:

1. *Customer knowledge*: measures performance in customer and market segments.
2. *Internal business processes*: identifies processes that have greatest impact on customer satisfaction and achieving financial objectives.
3. *Learning and growth*: identifies the infrastructure that must be built to create long-term growth (HR, R&D, training).
4. *Financial performance*: measures the results that the enterprise provides to its shareholders.

	1996		1997			Percent Change 1996-1997
	1996 Q 4	1997 Q 1	1997 Q 2	1997 Q 3	1997 Q 4	
Financial Perspective						
Gross Profit Margin	29%	36%	44%	43%	37%	28%
Net Profit Margin	2%	(7)%	21%	29%	24%	1900%
ROA	1%	(2)%	5%	7%	5%	400%
Average Collection Period	15.35	17.14	16.30	17.86	16.83	(16.19)%
Sales/Employee	66,906.24	83,717.58	83,729.27	59,636.78	120,595.58	60.36%
Net Profit/Employee	1,671.32	(5,194.87)	17,918.54	28,760.13	20,537.51	1639.59%
Std. Cost Alpha	6,919.82	6,073.83	4,576.45	4,982.56	5,900.47	(16.18)%
Std. Cost Charger	9,656.91	8,496.89	6,388.49	7,104.93	7,826.46	(16.95)%
Std. Cost Nova	0.00	0.00	0.00	7,367.02	7,883.39	.0
Customer Perspective						
Avg. Sales/Customer	2,267,872.00	1,506,916.48	2,891,899.73	3,176,261.09	3,879,697.91	75.71%
Avg. Profit/Customer	48,563.68	(111,897.72)	428,234.41	918,731.31	918,388.95	(761.49)%
Return Rate - Alpha	28%	13%	30%	11%	16%	(54)%
Return Rate - Charger	18%	24%	20%	19%	9%	(50)%
Return Rate - Nova	0%	0%	0%	22%	7%	.0
Internal Business Perspective						

OLAP reports are ideally suited for the measurement needs of scorecard and KPI-style management because they help decision makers track and influence key organizational drivers.

Industry leaders have known for a long time that measurement is critical to translating business strategy into bottom-line results. One significant roadblock has been the inability to get an accurate picture of what is driving the business; data is either locked away or presented at such a detailed level that trends are obscured. OLAP reports enable organizations to get their business measures to decision makers in a form that they can use effectively.

THE COORDINATED ORGANIZATION

To leverage maximum business value from Cognos' approach to OLAP reporting, organizations typically move rapidly through the three general phases of deployment: individual wins, departmental coordination, and ultimately, the coordinated organization.

- 1. Individual Wins:* In the first stage, PowerPlay reports are deployed to users according to their particular role. This ensures that every decision maker can derive immediate benefits and impact the bottom-line in a short period of time. Because BI is easy to deploy, these individual users can be working towards an OLAP reporting implementation within 90 days.
- 2. Departmental Coordination:* In the second stage, the organization minimizes risk and maximizes bottom-line impact by deploying PowerPlay throughout entire departments or across the business functions that will derive substantial and immediate benefits in cost reduction, quality, customer satisfaction, or profitability. In this way, the enterprise gains immediate returns from the value of OLAP reporting spread across key areas of the organization. When several of these departmental wins have been achieved, an organization gains a days-to-minutes productivity increase from a high percentage of its employees.
- 3. The Coordinated Organization:* In the third stage, departmental reports are fed into a central repository, so departments can share facts generated from departmental wins. As a result, each department is better informed about key issues that can affect their performance, and ultimately their results. With the facts at hand from other business functions, managers are better able to align their perspectives across the organization, based upon a vocabulary of common indicators. At this point, the organization becomes truly coordinated.

At any point in deployment, PowerPlay can be used to extend access to common indicators to key suppliers and customers. Managers across this integrated supply chain can instantly share information, dynamically adjusting to changing market conditions. The result is closely coordinated action that reduces overall transaction costs, and creates a strategic cost advantage. It is a solution that meets the needs of your entire organization and ensures everyone is working towards the same goals.

ABOUT COGNOS

Cognos delivers software that satisfies enterprise-wide BI needs. With a million seats in thousands of companies worldwide, Cognos BI products consistently deliver the highest productivity gains to the user, the most manageable solution to the administrator, and the fastest return on investment (ROI) to the enterprise. The products support over 100 relational and OLAP data sources and seamlessly integrate with many enterprise applications, including Baan, Oracle Financials, PeopleSoft, SAP, and SSA. Available in seven languages, Cognos products are distributed through the company's sales offices and by 1,500 resellers worldwide.

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