

MICROSTRATEGY VS. BUSINESS OBJECTS

A COMPARISON WHITEPAPER

Executive Summary

In the business intelligence marketplace, MicroStrategy competes vigorously with vendors such as Business Objects. At first glance, both MicroStrategy 8 and Business Objects XI Release 2 can be used to report and analyze corporate data, providing business insight to organizations. However, once customers implement these business intelligence (BI) solutions and understand deeper the DNA each of these BI platforms, they recognize critical differences derived from the architecture and paradigms of these very different product offerings. Key differences that affect the variety of report types, breadth and depth of analysis, as well as the cost required to maintain the BI application. The technology and architectural differences increase or decrease the performance, scalability, usability, efficiency and reliability of the system, which highly impacts user adoption and ultimately, the success of the BI project.

Ironically as user and business requirements become more complex, IT budgets have come under increasing pressure. Business intelligence applications must now be developed, deployed and maintained with the minimum of IT resources, serving more users across the global organization. Clearly, the BI platform can be either a hindrance or an aid to IT departments. A technologically superior platform will meet all the needs of the end user, while minimizing the amount of IT maintenance and administration. An inferior platform will require redundant and repetitive administration, and the constant development of one-off workarounds.

MicroStrategy technology is based on a completely relational object-oriented metadata that is abstracted from changes in the IT environment. This centralized and reusable metadata is self-maintaining and adapts real-time to changes in user requirements, data schemas and business logic. The metadata is as reusable as building blocks are in a skyscraper. In MicroStrategy, report developers don't need to duplicate report metadata definitions across hundreds of reports like Business Objects report developers would, which only increases the cost of ownership and change management of the BI application. With MicroStrategy, IT departments have an industrial-strength administration infrastructure on which they can rely to enhance the value of their BI applications.

Securing corporate data is a paramount priority in today's enterprise BI applications. Drug prescriptions records, human resources records, cell phone call records and financial transactions are just a few sources of sensitive data. The security imperative becomes more urgent when information is open via extra-nets or when users drill from the high-level performance reports to detailed transaction information, anywhere in the data warehouse. MicroStrategy provides airtight security with 128-bit end-to-end encryption and cell level protection. Business Objects does not provide the same level of security out of the box and requires security setup and maintenance from multiple locations.

Business Objects has pursued a growth strategy based on technology acquisitions which it is directly correlated with its lower levels of customer loyalty¹; whereas MicroStrategy has concentrated on a single product architecture that spans reporting, ad-hoc query, analysis, proactive notification, scorecards and dashboards under the same user interface and metadata, providing a unique "version of the truth." . Business Objects XI Release 2 still requires heavy desktop dependence and many different architectures and interfaces. In Business Objects most development is done on the desktop and you will need Web Intelligence for ad-hoc query, OLAP Intelligence for OLAP, Crystal Reports for formatted reporting, Dashboard Manager for dashboards, and Performance Manager for scorecards. Heavy reliance on the desktop results in less deployment and a great number of different architectures mean more products for IT to maintain, and a great number of user interfaces means more developers and end users to train, elevating the total cost of ownership of the business intelligence application.

For over a decade, MicroStrategy customers have built thousands of enterprise mission critical BI applications with MicroStrategy technology. With an administration friendly architecture, robust security, a self-service zero-foot print Web interface, and proven user and data scalability, MicroStrategy 8 is the only business intelligence vendor to obtain the highest technology score from the Gartner's Vendor Ratings. MicroStrategy has been proven in the market place as unanimously confirmed by 2,100 enterprise global customers on the most respected independent survey in the industry, the OLAP Survey 5. MicroStrategy surpassed Business Objects, delivering higher business value and better technical support resulting in the highest customer loyalty ratings across any BI vendor.

This document discusses in detail the important characteristics outlined above of the MicroStrategy 8 platform, the key differences between MicroStrategy 8 and Business Objects XI Release 2, and the critical questions that anybody should be asking when evaluating Business Objects and MicroStrategy. Every attempt has been made to ensure that all explanations are rooted in facts and not subject to individual interpretation.

¹ The OLAP Survey 5- Author: Nigel Pendse <http://www.survey.com/olap/>

MicroStrategy – A Market Proven, Industrial-Strength Technology

The MicroStrategy architecture is the result of 4 years of development and 5 years of refinement, driven by the needs of the most demanding BI applications in the world. MicroStrategy is industrial-strength technology, serving the niche market of BI applications characterized by the largest scale, most sophisticated analytics, highest report volumes, and most users. This caliber of BI technology is now being sought after by companies, not just for their most demanding BI applications, but for the purpose of hosting all of their BI applications – standardizing all BI onto a single, highly-functional and economical architecture and reaping significant economies of scale and enterprise-wide consistency.

Unlike BI Suites and BI Series offered by other vendors, MicroStrategy offers the only organically grown BI architecture. All of the MicroStrategy 8 components were expressly built to work within a unified architecture and not as separate standalone products or acquired technologies that were subsequently joined together.

MicroStrategy 8 Overview

Launched in January 2005, MicroStrategy 8 offers the latest in technical innovations with over 2,000 enhancements across the platform. One of the key differentiators of MicroStrategy 8 is its integrated BI platform, eliminating the need for companies to use numerous distinct products from different vendors for reporting, analysis, and performance monitoring. MicroStrategy 8 provides a BI platform that companies can standardize all their BI needs.

With a scalable architecture and a single metadata, users can seamlessly navigate from scorecards and dashboards to reports and analysis without being required to open and close multiple BI tools and navigate dissimilar interfaces. MicroStrategy 8's newly designed Web interface is specifically tailored for the business user. The user interface includes an array of "one-click" actions with familiar paradigms to make business users more productive. For the first time, users can format reports and scorecards in WYSIWYG (what-you-see-is-what-you-get) mode and leverage the formatting skills they already have to radically reduce the time it takes to develop and deploy new reports.

Why Companies Choose MicroStrategy?

- **Integrated architecture:** The MicroStrategy product set is built from a single architectural foundation, delivering all 5 Styles of BI: Scorecards and Dashboards; Reporting; OLAP; Advanced Analysis; Alerts and Proactive Notification.
- **Full featured Web interface:** MicroStrategy's Web interface delivers a Windows-like feeling with drag-and-drop interactivity from any Web browser. The advanced Web architecture provides a zero-footprint, using no Java or Active X controls, and delivers a rich reporting experience both inside and outside the firewall.
- **Seamless integration of reporting, analysis, and monitoring:** MicroStrategy can embed OLAP features directly into enterprise reports like scorecards and dashboards, providing a seamless user experience that uncovers root causes without the need for programming or switching interfaces.
- **Ease of use and self service:** MicroStrategy's unique WYSIWYG report design and editing allows MicroStrategy end users to easily design and refine reports over the Web using familiar skills similar to PowerPoint® or Excel.
- **High performance scaling to thousands of users:** Unlike other BI providers, MicroStrategy software expands with the application to efficiently scale from hundreds to thousands of people.
- **Proven data scalability:** For the past five years, The OLAP Surveys have ranked MicroStrategy highest in data scalability. With terabyte-size databases commonplace, MicroStrategy's field-proven technology enables customers to deploy more BI applications with greater analytic sophistication and user functionality.
- **Automated report maintainability:** Dynamic metadata architecture ensures that changes ripple throughout all reports automatically.
- **Pervasive security and user administration:** Security is automatically applied to all users, reports, and data through role-based user administration.
- **Engineered on a single code base:** MicroStrategy is widely recognized for its meticulously engineered software based on a single code base, scaling to organizations and applications of all sizes; leveraging any hardware, operating system, and data source infrastructure while making BI more approachable for the average business user.

Key BI Requirement	MicroStrategy 8	Business Objects XI Release 2
<p>Unified BI Architecture</p> <ul style="list-style-type: none"> Seamless integration of analytics and reporting for root cause analysis Single code base across platforms Single Web Interface Single metadata 	<p>Yes ●</p> <p>MicroStrategy's unified architecture provides a seamless integration of analytics and reporting from a single web interface.</p> <p>MicroStrategy is a single code base that is truly platform independent. A single shared metadata consisting of all reports and underlying reporting objects ensures one version of the truth. A unified web interface means a common reporting and analysis paradigm for all users.</p>	<p>No ○</p> <p>Business Objects (BO) is a loosely integrated set of tools, not a unified architecture.</p> <p>Release 2 is still multiple overlapping tools (each with a varying interface and paradigm); multiple different code bases, multiple separate metadatas and repositories resulting in redundant setup and administration tasks.</p> <p>BO's portal, Infoview, is necessary to overlay the 10 user interfaces together since BO functionality and reports do not fully translate across tools due to the different metadatas and file structures;. REP, RPT, .WID, .CAR</p>
<p>Market Proven Enterprise Scalability and Performance</p> <ul style="list-style-type: none"> 64 bit business intelligence processing Minimal re-query of the database Multi-layer caching technology Large user and data scale customer references Aggregate awareness Multi-pass SQL Leveraging the right platform for the right processing Minimal network traffic 	<p>Yes ●</p> <p>The MicroStrategy platform is designed for enterprise scalability. MicroStrategy's ROLAP and multi-pass SQL approach leverages the latest innovations from database technology. It efficiently processes large volumes of transaction level data in the database, minimizing network traffic.</p> <p>Data is cached at multiple levels to reduce redundant computations and network traffic. MicroStrategy's SQL engine aggregate awareness can dynamically determine the most efficient table in every analysis. 64-bit processing allows MicroStrategy to support much greater numbers of users and data sizes while improving performance.</p>	<p>No ○</p> <p>BO performance is constrained by its heavy desktop dependence and its inefficient SQL engine.</p> <p>High degree of local processing in both BO and Crystal means most analysis is performed inefficiently on the desktop or web server and does not leverage database optimizations. High amounts of detail data must be extracted out of the database and replicated on the desktop for local Microcube-based processing.</p> <p>BO's basic SQL engine does not support Multi-pass SQL and many other performance enhancing features such as automatic aggregate awareness and database specific tuning optimizations. Aggregation can only be accomplished via hand coding the specific table access for each calculation and for each report. BO cannot leverage the extra memory provided by 64-bit hardware.</p>
<p>Reusable and Rich Metadata Layer</p> <ul style="list-style-type: none"> Robust abstraction layer (where all physical constructs can be modeled logically and hidden from business user) Highly reusable metadata Automatic change management Object oriented metadata 	<p>Yes ●</p> <p>MicroStrategy object-oriented metadata defines your enterprise's business layer in a single repository. The objects could be nested as building blocks to create more complex objects e.g. Profit (revenue, cost). If an object changes, every other object dependent on it automatically changes. This ensures consistency across business definitions and minimizes the number of objects to maintain.</p> <p>MicroStrategy stores objects and dynamically builds the report SQL during run-time. It does not store a finished report as a static SQL statement.</p>	<p>Limited 🟡</p> <p>BO's multiple metadatas vary in functionality and are stored in different local repositories. Calculations, conditions and prompts must be created by user by report and cannot be used as building blocks to build other reporting objects.</p> <p>Crystal stores report objects i.e. prompt values and formulas in the report, not in the Business View metadata. With Desktop Intelligence much functionality is local by report not in the Universe including user objects, formulas, local variables, and functions. Multiple products have their own repositories meaning redundant metadata setup and manual "export" and "publish" before reports can even be statically viewed by other users.</p>
<p>Interactive WYSIWYG Web interface</p> <ul style="list-style-type: none"> Fully interactive reporting, completely zero-footprint over the web from any browser WYSIWYG document design and editing over the Web Self-service Easy to learn, familiar windows on the Web paradigm 	<p>Yes ●</p> <p>Business users create highly formatted reports using any reporting object via a zero-footprint WYSIWYG design and run-time editor that drastically shortens the report development time.</p> <p>End users have a high degree of interactivity and are able to create, manipulate and format information through a single Web user interface. Changes are available right away without any need to "publish" or "export" information to other environments.</p> <p>MicroStrategy does not rely on ActiveX. Report designers can use any browser.</p>	<p>Limited 🟡</p> <p>Web interactivity is minimal and differs highly among the multiple BO interfaces requiring heavy desktop report development.</p> <p>Crystal development is limited to the desktop with the static Crystal Explorer used only for basic web viewing; no sorting, filtering values, formatting while viewing a Crystal Report. Web Intelligence interactivity varies considerably by program download. HTML and ASP versions are missing key functionality including no manipulation of any report created by other users, limited filtering, no sorting, a report can only contain one table or chart, no adding subtotals, no adding calculations, no formatting, no slice & dice of results.</p>

Key BI Requirement	MicroStrategy 8	Business Objects XI Release 2
<p>Industrial Strength Multi-level Security</p> <ul style="list-style-type: none"> • 128-bit encryption - extranet ready • Integrate with any security infrastructure with single sign-on • Same report yields different views of the information based on user profiles • Truly zero-foot print. No use or download of ActiveX and other plug-ins • Cell level security 	<p>Yes ●</p> <p>MicroStrategy provides centralized security administration across reporting, analysis and delivery. User profiles and privileges ensure users only access to the appropriate information and functionality. Security filters provide the right access down to the cell level.</p> <p>MicroStrategy supports 128-bit end-to-end encryption with a zero-foot print Web client making it a secure platform behind the firewall. MicroStrategy integrates with existing security authentication infrastructure such as LDAP, NT, and databases.</p>	<p>No ○</p> <p>BO has security holes, must be setup in multiple tools and interfaces and is maintenance intensive.</p> <p>Security holes include no inherent Microcube security, no automatic data level security, and no 128-bit end-to-end encryption out of the box.</p> <p>Security is overlapping and must be setup separately for Crystal Reports, Web Intelligence, and Dashboard Manager users in various metadatas; Business Views and Universes, and in the Central Management Console, Designer and Business Views Manager tools.</p> <p>Data level security requires hand coding a SQL WHERE clause by user by table by report for each level of data accessed.</p>
<p>Dynamic Report Personalization</p> <ul style="list-style-type: none"> • Comprehensive parameter and question prompting • Security profiles personalize report content for individual users • Report bursting 	<p>Yes ●</p> <p>In MicroStrategy, a single report can span hundreds of possibilities tailoring different user needs. Advanced report parameters, like object and hierarchy prompts, allow users to pick the business attributes and KPIs to include in the report.</p> <p>A single report definition for IT to maintain can burst personalized information to hundreds of users.</p>	<p>Limited 🟡</p> <p>Severely limited prompting and a basic SQL engine constrain BO's report personalization and leads to a high number of redundant and overlapping reports that must be created and maintained for each user.</p> <p>Several key prompt types are not supported in BO, including column prompts, hierarchical prompts, cascading prompts, and optional prompts. A separate report for each type of prompt is required. Most of Crystal's prompt values are hard coded into each report.</p>
<p>Centralized Enterprise Administration</p> <ul style="list-style-type: none"> • Self-tuning scalable server for maximum performance • Usage monitoring / auditing • Controlled environment for analysis • Object management / migration • Single management console 	<p>Yes ●</p> <p>MicroStrategy's centralized administration provides a single console for real-time user and system management.</p> <p><i>Enterprise Manager</i> provides hundreds of KPIs and corresponding dashboards to perform impact analysis, auditing and tuning of the BI application.</p> <p><i>Object Manager</i> facilitates life cycle, metadata dependencies and project management.</p>	<p>Limited 🟡</p> <p>BO administration is not centralized and is missing required functionality.</p> <p>Users and processes are administered in multiple locations. BO security must be configured in 3 different places: Central Management Console, Designer and Crystal Business View Manager.</p> <p>BO's functionality for monitoring usage, auditing, managing metadata and performing impact analysis are limited and vary by product.</p>
<p>Seamless Microsoft Office Integration</p> <ul style="list-style-type: none"> • All Office products supported (Excel, PowerPoint, Word, Outlook) • Leverage all BI reports and reporting objects • Full new report creation • Persistent and Interchangeable formatting across Office and Web 	<p>Yes ●</p> <p>MicroStrategy delivers the complete reporting and analysis environment to Microsoft Excel, PowerPoint, Word, and Outlook users.</p> <p><i>MicroStrategy Office</i> applications are linked to MicroStrategy security and administration, ensuring 100% data consistency across the enterprise.</p> <p>Users are able to access existing reports or create new ones. Changes are immediately reflected interchangeably across MicroStrategy Office and Web interfaces. Microsoft Office formatting changes are preserved after automatic data updates.</p>	<p>Limited 🟡</p> <p>BO's Office Integration is missing key functionality and provides limited access to the BO environment.</p> <p>Live Office cannot access BO Universes; meaning no Desktop Intelligence or Dashboard Manager reports. Missing functionality includes no report creation capability meaning users are limited to running pre-defined reports only.</p> <p>BO is constrained by the 64,000 Excel row limit. Formatting changes made within Microsoft Office do not persist as all changes made are blown away when a user refreshes data.</p>

Key BI Requirement	MicroStrategy 8	Business Objects XI Release 2
<p>Flexible and Powerful OLAP Analysis</p> <ul style="list-style-type: none"> • Integrated predictive analytics and forecasting with best-of-breed data mining tools • Collaborative processing (between analytical engine and RDBMS-based processing) • Built-in financial and statistical functions • Business question complexity supported by multi-pass SQL capability • Drill anywhere fosters investigative analysis • Set analysis 	<p>Yes ●</p> <p>The <i>MicroStrategy SQL Engine's</i> ability to dynamically generate multi-pass SQL allows users to ask complex business questions such as market basket and set analysis e.g. view sales for the current year for all customers who purchased product 'x' last year. Users can drill anywhere for a boundary-free speed-of-thought investigative analysis.</p> <p><i>MicroStrategy's Data Mining Services</i> leverages definitions from all major third-party data mining vendors, providing predictive analytics to thousands of users.</p> <p><i>MicroStrategy's Analytical Engine</i> provides hundreds of built-in financial, statistical, and mathematical functions. The SQL Engine and the Analytical Engine work collaboratively to ensure that processing is performed efficiently on the optimal tier.</p>	<p>No ○</p> <p>BO does not support advanced analysis. BO has no OLAP server and Release 2 includes the same basic single-pass SQL engine.</p> <p>A single-pass SQL engine which does not leverage database processing features means no dynamic or multi-level analysis required for contribution or semi-additive analysis. Many key SQL constructs are not supported across the tools including no split fact table analysis, no subquery, no GROUP BY, no SET operators, no leveraging of database functions, no UNION etc. Any use of tool specific functions renders calculations strictly local to a report by user.</p> <p>Some analysis capability is provided in the Performance Management modules but is not available in Crystal Reports so analysis can not be included in highly formatted reports. Drilling is limited to static pre-defined report linking. There is no 3rd party data mining support.</p>
<p>Heterogeneous Data Source Access from a Single Web Document</p> <ul style="list-style-type: none"> • Direct access to SAP® BW for reporting and analysis • Operational database reporting with free form SQL 	<p>Yes ●</p> <p>MicroStrategy allows a single document to present data pulled directly from multiple data sources.</p> <p><i>MicroStrategy's Freeform SQL Engine</i> can generate reports from data residing in any operational database across the organization. MicroStrategy can directly query SAP BW InfoCubes and QueryCubes.</p>	<p>No ○</p> <p>Dynamic access of multiple data sources within a single document is not available in BO.</p> <p>Access of multiple data sources requires multiple interfaces; Web Intelligence is required for relational data access and OLAP Intelligence is required for OLAP source access. In BO XI Release 2, Desktop Intelligence only accesses relational sources despite previously being able to access OLAP sources.</p>
<p>Robust Enterprise Reporting</p> <ul style="list-style-type: none"> • Support for wide range of report styles • Pixel-level absolute positioning • In-place analysis • Desktop publishing formatting • High quality printing • Export to Excel 	<p>Yes ●</p> <p>MicroStrategy's Web Interface is designed to maximize business user and report designer productivity. Highly formatted documents are built using common desktop publishing paradigms such as rulers and pixel-level positioning. All over a zero-foot print Web.</p> <p>MicroStrategy offers comprehensive report styles from banded reports to dashboards and scorecards. These documents are highly interactive providing in-place analysis, pivoting, drilling and Excel-like formatting toolbars.</p>	<p>Limited 🟡</p> <p>Reporting functionality varies widely by tool. Analysis and ad-hoc query can not be incorporated in formatted reports.</p> <p>Reporting is available in some products and not others. Web Intelligence provides very limited formatting. Dashboards must be created in a stand-alone Dashboard Manager product.</p> <p>Despite being a report writer Crystal Reports has limitations such as no absolute positioning, no freeze pane, no format templates, and no hide columns. Report designers are unable to edit the report layout and format while viewing it for a real-time WYSIWYG view of their changes.</p>
<p>Information Delivery</p> <ul style="list-style-type: none"> • Wide range of output types: Web, print, fax, wireless • Alerting and Thresholds • Dashboards and Scorecards • Portals integration 	<p>Yes ●</p> <p>Users get personalized alerts triggered by dynamic events and time scheduled reports, via portal, print, email, wireless or file servers.</p> <p>MicroStrategy platform leverages highly scalable technology that slices a single report and dynamically distributes personalized information to the right users. Reusing a single report across hundreds of users saves processing resources.</p> <p>Users can easily assemble scorecards and dashboards based on existing objects and integrating several data sources, without the need of an extra application or interface.</p>	<p>Limited 🟡</p> <p>BO's information delivery varies widely by tool.</p> <p>Full report formatting is available in Crystal Reports but not Web Intelligence. Dashboard creation is available in Dashboard Manager but not Web Intelligence.</p> <p>No support for report bursting means a separate query for each user defined as a recipient is required. BO lacks dynamic distribution list capabilities. Therefore, Administrators have to define static distribution lists and cannot use conditions to segment from databases to dynamically conform the recipients list.</p>

Critical Questions to Ask when Evaluating MicroStrategy and BO

There is a fundamental difference between the software architectures of Business Objects and MicroStrategy. Despite the introduction of some new tangential BI functionality in Nov 2005, Release 2 is still the same BO legacy of multiple tools with non-unified architectures. Very few relative improvements in the back-end infrastructure have been made in the last 3 years. Web user scalability is still constrained and administration is not centralized. Core functionality is still restricted by its desktop legacy of local microcube and file-based processing and a basic SQL engine. BO's R&D has been focused on product line integration at the expense of product innovation. Growing through acquisition has left BO with a loosely integrated set of tools with multiple overlapping metadata layers. BO is still 3 years away from a truly unified product offering which is truly re-architected for the Web.

In comparison, MicroStrategy's code base was completely rewritten over the course of five years as a unified server-centric architecture. MicroStrategy has been building its platform organically and keeping the utmost integrity and efficiency. This basic difference allows MicroStrategy customers to benefit from:

- A greater range of functionality through a single Web interface and unified architecture which decreases training and maintenance costs.
- A productive WYSIWYG edit environment which can be used across any Web browser.
- A market proven user and data scalability with more efficient use of network and server resources.
- Greater analytical breadth, including predictive analytics.
- A market tested and bullet-proof security infrastructure.
- Lower total cost of ownership by lowering IS support and maintenance requirements.

The following questions elicit these basic MicroStrategy strengths with some very specific comparisons that should be made when evaluating Business Objects and MicroStrategy.

1. **MicroStrategy provides all the major styles of BI – Scorecards and Dashboards, Enterprise Reporting, OLAP analysis, Predictive Analysis and Alerts and Notification from a single unified web interface. Why does Business Objects require two desktop products to create and as many as four web-based products to deploy a limited subset of this same BI functionality?**

MicroStrategy supports analysis and reporting functionality; from dashboard creation with OLAP analysis to WYSIWYG creation of formatted reports from a single Web interface. MicroStrategy Web, allows business users to move seamlessly between all necessary styles of BI and combine multiple styles within a single report display.

Business Objects XI Release 2 requires a separate product and interface for each style of BI making transition from one style to another very cumbersome. Despite BO marketing claims of an integrated architecture BO still requires a separate Crystal Reports desktop environment for reporting and separate, somewhat overlapping, Business Objects Desktop Intelligence environment for ad-hoc query and light analysis with very little functional integration between the two. From the web a minimum of four web interfaces are required; formatted reporting is only available to Crystal Reports Explorer users; ad-hoc query of relational sources requires Web Intelligence, but for OLAP source analysis the OLAP Intelligence product is required. Finally, dashboard creation requires Dashboard Manager. Functional integration is limited to manually coded static report linking from one interface to another. Most core functionality including, level of interactivity, prompts, calculations, filters and formatting varies widely, in use and implementation, among the products.

This BO tool fragmentation negatively impacts both end users and IT administrators. End users need to learn and use multiple interfaces and reporting paradigms. For example, reporting centers around “Business Elements” and a “Data Foundation” in Crystal Reports and is a completely different paradigm than Desktop Intelligence which uses “classes”, “objects” and “dimensions”. End users need to know which tool other users have in order to export, publish and share documents properly. The negative impact to IT administrators is much greater; IT administrators must create and support reporting environments for multiple tools; including manually migrating and reconciling the metadata of the various tools.

2. **MicroStrategy's 64-bit native platform takes advantage of customer's investments in the latest hardware 64-bit innovations and operating systems from Windows to UNIX. Can Business Objects XI Release 2 leverage 64-bit hardware and operating systems ?**

MicroStrategy 64-bit platform is compiled natively to leverage the address memory space benefits from 64-bit operating systems and microprocessors. Business Objects XI Release 2 is compiled in 32-bit native mode even if it is running on 64-bit operating systems which results in Business Objects not being able to leverage the benefits of 64-bit environments and customers 64-bit hardware investments.

MicroStrategy has the industry's more modular code base which allows just a portion of its 'kernel' to be compiled for the appropriate OS-chipset combination. This allows MicroStrategy to perform very little work to support a broad range of platforms. An inherited benefit of MicroStrategy's unified code base is that every enhancement done in the code is common for all the platforms supported. Therefore "software bugs" are less prone to be introduced. Business Objects XI Release 2 is a retro-fitted code base with a mix of C++ and Java code taken from different products that requires major changes to support new environments or enhancements; the reason that BO's UNIX versions always lag the Windows versions by approximately six months.

3. MicroStrategy's unified architecture and centralized administration minimizes the effort in developing, broadly deploying and maintaining multiple applications across multiple platforms. Why is BO so maintenance intensive and hard to deploy broadly ?

MicroStrategy's ROLAP engine dynamically generates optimized SQL for any type of analysis minimizing the need for any manual workarounds or custom SQL. MicroStrategy is fully automatically aggregate aware; meaning that the MicroStrategy Engine automatically selects, every time, the most efficient table for data retrieval.

MicroStrategy provides comprehensive centralized administration through *MicroStrategy Administrator* which automates the development, deployment and maintenance of multiple applications across multiple platforms. A remote administration console enables complete control over system monitoring all tasks and administration of users and objects. The Object Manager component facilitates complete life-cycle application management. Reporting objects can be migrated easily across development, test and production environments and can be shared between users, groups, and projects.

BO is maintenance intensive and challenging to deploy primarily due to a basic SQL engine which requires a high degree of local custom processing and manual workarounds for key functionality such as aggregate awareness and the implementation of data security. Heavy local processing such as is required for BO's user objects, formulas, local variables and functions means reports are not sharable across users and must be recreated for each user. Multiple products have their own repositories meaning redundant metadata setup and manual "export" and "publish" before reports can even be statically viewed by other users.

For example, since BO does not provide any object oriented definition of the data and has only a basic SQL engine there is no automated support for aggregate processing. The workaround for a BO Administrator is to manually point each calculation by report and by user to the most efficient table. The steps are tedious and risk, in the form of double counting, is involved if "incompatible" tables, or tables not at the appropriate calculation level are not fully defined.

To illustrate the extra work effort involved for each calculation measure; leveraging aggregate tables within BO is a 3 hour task per calculation measure and includes the following five steps:

1. define aggregate table(s)
2. manually join each aggregate table to all related tables
3. define all possible table(s) where calculation could be made
4. within each measure list tables in order of descending size (so the BO SQL Engine knows which table to access)
5. define all possible incompatibilities relative to all other reporting objects.

The high degree of manual setup and maintenance limits the performance, maintainability and scalability of the deployments.

In addition, multiple metadatas and limited support for centralized administration hinders BO's deployability.

4. MicroStrategy fully supports sophisticated "n" order analysis. Why is BO only suitable for simple first order questions ?

MicroStrategy provides a number of optimized features necessary to provide comprehensive sophisticated analysis at the desired level of detail which include:

- Collaboration between MicroStrategy's optimized SQL engine and mid-tier analytical engine in an iterative fashion to enable "n" order calculations.
- Analytical library consisting of over 200 built-in statistical, financial and OLAP functions. In addition, end users may define their own analytical functions and embed them into the platform.
- Integrated Set Analysis or the filtering of an attribute based on its relationship with another attribute. In supporting this MicroStrategy is implicitly using the result set of one analysis as a filter for a second analysis all completely transparent to the end user.
- User-defined custom groups or dynamic virtual attributes which support multiple levels of analysis on one report.
- Nested aggregation capability to transparently support calculations at varying dynamic levels of analysis.
- 3rd party out-of-the-box integration with best-of-breed data mining systems like SPSS, SAS and IBM Dataminer for predictive analysis

All analytical sophistication either occurs seamlessly, as in the case of iterative processing and nested aggregation, or is user defined such as with custom group definitions. No administrative support is required. In addition, the use of all of these features is fully available to web users; any web user with full report creation privileges can leverage the full range of analytical sophistication.

BO supports none of the analytical features discussed above and they probably never will due to the limitations of Microcube architecture and the inherent challenges of integrating cube-based processing with database access. BO offers very limited analytical function which can be shared across users. Crystal Reports does not expose RDBMS specific analytic functions

Most importantly, the BO approach requires any degree of advanced analysis to be set up by an administrator as a pre-defined measure via in BO's Designer product. Web end users can only use existing simple measures and apply sum, avg, min, max, count, and percentages to existing calculated values. This removes valuable analytical flexibility from end-users and also means that new analytical requirements require administrators to rebuild universes. Given this, BO is only suitable for simple desktop report writing for departmental-only needs; where a small number of users need basic report access to summary data. Users will not be able to analyze transactional level or customer-centric data in any truly meaningful way since all data must be returned to the desktop for processing.

BO cubes answer simple first order questions, but any further analysis requires costly non-optimized database access. End user reporting queries will change significantly and grow as users start to explore data. Due to local memory and disk capacity constraints which limits microcube size users typically spend approximately 40-60% of their time accessing the database instead of the local microcubes. The only workarounds are for users to try to pre-select as much as possible from the universe (not feasible given microcube build times) or schedule everything for batch execution. Any type of meaningful ad-hoc analysis will result in Microcube explosion and multiple trips across the network to the database. No support for multi-pass SQL means limited multi-level analytics.

BO cannot answer your most important business questions. Most necessary sophisticated analytics are not supported across the architecture; limited, manually intensive metric dimensionality means no true % to total analysis, no non-aggregatable metrics means limited inventory or account balance analysis, no prompted conditional metrics means no prompting on sophisticated calculations as required to allow the user to pick the start and end date at run time, no ranking within ranking means no Show me my top 5 products for my top 5 customers support. Many analytical requirements are only supported via manual SQL coding;

5. MicroStrategy has a single unified highly reusable metadata layer. When will BO have a single unified metadata that is reusable and fully shared by users?

MicroStrategy reporting objects are all object-oriented. Report objects can be used as building blocks for other objects, so the same report component can be used by multiple reports, reducing redundant work. Since MicroStrategy reports are objects, they automatically inherit changes to related objects without any additional developer effort. For example, if a metric's formula changes; all reports that use that metric will seamlessly inherit the new formula. MicroStrategy's object-oriented

metadata lowers development time by reducing redundant work, and reduces maintenance work by minimizing the number of objects that need to be maintained.

BO has multiple independent metadata; BO Universes, Crystal Business Views; Performance Manager Metric Universes; none of which are object oriented. Further complicating matters, the file formats between Web Intelligence documents (.WID) and Desktop Intelligence documents (.REP) are different (neither of which are scalable as they are local to the analysis) making it hard to seamlessly move desktop reports to Web-based reports without recreating various underlying reporting objects, manually synchronizing and undertaking manual web publishing steps.

The lack of metadata integration means limited functionality with duplicate separate storage, manual synchronization, ultimately resulting in “multiple versions of the truth”. Most underlying reporting objects, including conditions and calculations, formulas, variables, and user defined objects are strictly local in context and are not reusable across reports, across BO tools i.e. cannot share local reporting objects across reports and are not sharable among end users.

The lack of an object orientation means multiple report versions must be maintained and significant limitations in metadata management exist. BO does not support impact analysis and change management. There is no way to proactively detect which specific reports and reporting objects are impacted by a change to the physical database or a change to the ‘profit’ measure, for example.

While BO marketing claims they are moving towards a unified metadata and that two metadata versions is not limiting an organization will have to determine if all following challenges created by multiple metadata is acceptable:

1. Metadata is populated by different products; Designer, Crystal Business Views Manager etc.
 2. Metadata is stored in different physical Repositories; requiring exporting and publishing among Repositories
 3. All Metadata is not available from all products.
Ie Crystal Business Views can only be used by Crystal Reports; not by any of the other BO products
Ie BO Live Office – Excel can not access BO Universes or Desktop Intelligence documents.
 4. Not all functionality is available from all metadatas.
Ie: significant functionality (i.e. multiple SQL SELECT statements, embedding of objects that contain HTML links etc) from BO’s Universe metadata is not available to the Crystal environment
 5. Varying degrees of functionality; some functionality available in one metadata is not available in other. metadata
Ie: Crystal Business Views do not support functionality such as basic aggregation calculations, ability to handle multiple STAR schemas.etc
 6. A manual process of some type (depending on the desired synchronization is required to port metadatas.
BO offers various Import and Migration Wizards to assist with some of the required porting.
 7. BO web tools (i.e. WebIntelligence) cannot leverage key Desktop Intelligence reporting objects; including BO Formulas.
 8. Metadata Implementation differences exist
Ie: A much higher degree of intelligence is built locally (ie on a by report by user) into Crystal Reports vs. BO Universes.
6. **MicroStrategy allows users to run any type of report from within Excel, Word and PowerPoint. Does Business Objects’ Live Office support the access of all pre-defined Business Objects Enterprise reports or the creation of any new report?**

MicroStrategy Office provides full MicroStrategy reporting, analysis, and monitoring to Microsoft Excel, PowerPoint and Word users. Users are able to access any existing MicroStrategy report, or create new reports completely from scratch, from within any Microsoft Office product.

Business Objects’ Live Office is missing key functionality and provides limited access to the BO environment. Live Office cannot access Business Objects Universes which means no access of Desktop Intelligence or Dashboard Manager reports or report objects. In addition, key functionality is missing including no report creation capability; users are limited to running pre-defined reports only. BO is constrained by the 64,000 Excel row limit with minimal workarounds. Formatting changes made within Microsoft Office do not persist as all changes made are blown away when a user refreshes data. Live Office is a step backward from the prior Business Objects Business Query Excel Add-in product which at least supported Universe access.

7. MicroStrategy can perform full analysis across the breadth of transaction-level data. The amount of data that MicroStrategy can support is limited only by the amount of data the RDBMS can support. Why is BO so limited in the amount of data it can analyze ?

MicroStrategy's third generation ROLAP architecture fundamentally scales to Terabytes of data by performing analysis on the optimal server-based platform; in the database or on MicroStrategy's Intelligence Server in an iterative fashion. By definition, database technology scales and is the optimal location to perform high volume data processing assuming the underlying BI platform generates highly optimized platform-specific SQL as is the case with MicroStrategy 8. MicroStrategy's Intelligence Server is the optimal location to perform multidimensional analysis, such as applying various OLAP functions or performing cube-like slice and dice fully off loading analysis not handled efficiently by a database.

BO's desktop based processing and Microcube architecture are inherently limited because building large-sized result-set cubes is a network bottleneck, involves extensive manual maintenance and requires sizable hard disk capacity. By definition, Microcube sizes are fundamentally constrained by the amount of data which can be replicated across the network stored in desktop memory and processed on an inherently limited local desktop machine. While large data volumes can be accessed they cannot be fully analyzed

Data scalability negatively impact web users who access desktop reports and must download not only the report results but all underlying data contained in the corresponding Microcube to their desktops. In addition, even WebIntelligence based cubes which reside on the web server box must be replicated across the network and individually loaded into Web Server memory along with their corresponding project universe definition limiting the number of cubes which can analyze concurrently.

Additional architectural limitations hindering BO data scalability include:

- High number of uncontrolled direct connections from the desktop and the web to the database eventually crashing the database.
- Use of generic non-optimized single-pass SQL bogging down the database.
- Limited aggregate capability resulting in a high amount of data aggregating on the fly.
- Limited shared caching means high number of queries running live against the database
- Limited application server functionality.
- Most data processing performed locally, with some processing performed on the web server box and minimal processing in the database; BO is over utilizing the desktop and grossly under utilizing the database.

8. MicroStrategy is a pure-web architecture built from the ground up - for the internet - provides the web reporting, security, performance and web standards necessary for scalable web deployment Why is BO not suitable for a broad web-based deployment of Business Intelligence ?

BO's lack of a pure-web architecture severely limits web user scalability by placing heavy loads on the network and the web server box. No true web application server functionality, no asynchronous processing and an architecture which requires the execution of costly client / server programs on the BO WebIntelligence box means extensive memory requirements per concurrent web user - significantly limiting web user scalability. BO customers and partners cite a maximum BO web user concurrency at 20-25 users per CPU server due to the need to execute multiple BO desktop processes per concurrent web user for full functionality web reporting. Note: the comparable benchmarks for MicroStrategy are 90-100 concurrent web users per CPU server.

Equally problematic, BO requires varying amounts of client-side downloads depending on the Web requirements and the type of BO report accessed. High reliance on a heavy client plug-in for web users to view or modify a BO desktop "Corporate Document" or create a WebIntelligence reports means BO is limited in its ability to support web-based enterprise BI. Any type of access – even simple view only – of a desktop report by a web user requires some degree of program download to the web browser machine. Without this client plug-in web users will have no access to BO desktop reports and will have only very limited report creation and editing capability, no ranking, access to only very simple calculation types such as sum, count, min, max, and percent only, with limited drill capabilities. In short, BI architectures that bolt on web front ends to legacy client/server systems cannot scale to the necessary number of concurrent web users.

9. MicroStrategy provides high performance data analysis. Why is BO performance lacking?

MicroStrategy 8 provides the data scalability of a ROLAP architecture with the response times of a cube approach. MicroStrategy 8 achieves this by dynamically optimizing performance at all levels and proactively preventing bottlenecks from occurring at any point in the BI environment. MicroStrategy supports aggregate tables which optimize the performance of the OLAP and Reporting application. MicroStrategy's engine is "aggregate aware" ensuring processing against the most efficient tables.

While analysis within a pre-built microcube can be reasonably fast there are two other points where data processing occurs; the initial building of the Microcube and when analysis extends beyond the Microcube (which it often does) and all raw data must be re-retrieved and the Microcube completely rebuilt. Initial microcube creation will always require more time to build than a comparable MicroStrategy 8 query due to the non-optimized SQL generated, the extensive raw data which must be retrieved and the inefficiency of performing data processing on the desktop.

Manual Aggregate Awareness means there is no guarantee that the most efficient table is accessed.

10. MicroStrategy provides industrial strength multi-level security. Does BO support data level security and what other security limitations exist with BO?

MicroStrategy 8 security contains the necessary depth and breadth to allow the secured deployment of BI applications to employees, partners, suppliers and customers through the internet. MicroStrategy accomplishes this via the use of privileges at the application functionality level, access control lists at the reporting object level and security filters, connection mapping and support for database views at the data level. In addition, user level security is supported via MicroStrategy's integration with NT and LDAP while transmission level security is supported via 128 bit SSL transmission, 128-bit data encryption or double firewall configuration with no database connection on the web server.

MicroStrategy 8's profile-based security ensures that every part of the platform and delivery architecture is secure and can be centrally administered. In addition, MicroStrategy's implementation of industry-standard security measures ensures MicroStrategy's security model can be integrated into any existing security approach. MicroStrategy security is fully granular to the "cell level" meaning all reporting objects and underlying data cells can be controlled at the necessary level via a Right Mouse Click.

Despite being radically revamped in Business Objects XI Release 2 BO still lacks industrial strength security. BO is still not only missing key security components, but their security architecture has serious security flaws which jeopardize corporate assets; including no inherent Microcube security. BO has a number of fundamental security risks (i.e. heavy use of Active X and Java applets) and security holes (i.e. very limited support for SSL, data level security can be bypassed).

BO security is maintenance intensive as security must be setup and maintained in multiple tools and interfaces; BO's Central Management Console and Designer tools and in Crystals Business Views Manager tools. BO's data level security must be manually implemented creating significant risk. Hard-coded SQL WHERE clause qualifications must be manually written in Universes and Business Views for each user against each table at each level of data analysis to fully restrict data level access. This is very administrator intensive and if the necessary WHERE clause is left off even one table in the reporting environment for a given user unauthorized access is possible. For Web Intelligence users, microcubes, containing potentially sensitive data must be stored on the web server.