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# **Enterprise Information Management: Tentative Past, Promising Future**

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- ▶ *Why EIM is finally becoming a reality*

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Audience: CIOs, IT managers, database administrators, data stewards, data architects, data warehouse managers, compliance managers, systems integrators

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## Why Has EIM Success Eluded Us in the Past?

Pick up a typical textbook from the 1960s or early 1970s about data processing and you will likely come across diagrams depicting a single, comprehensive “data bank” of information intended for use by most or all key applications throughout the enterprise. This “data bank” would, of course, be housed on a single mainframe—either the enterprise’s one and only computer, or at least its most significant one—as would the transactional and reporting applications that would make use of that information content. Essentially, these diagrams and the accompanying text described what, in retrospect, can be thought of as prehistoric enterprise information management (EIM).

Fast-forward through the 35 or 40 years that followed this noble but typically ill-fated concept and one sees a long string of attempts that rarely reached their ultimate objective. Even when enterprise computing power was clustered on a handful of mainframes, each application typically bypassed the centralized data bank (if one even existed) and created and used its own files and early databases for customers, products, employees, and other critical data (see Figure 1) that by all rights should have been shared through a common shared service. The result—one application’s customer file inevitably became out of synch with all other applications’ corresponding files (efforts at behind-the-scenes reconciliation and resynchronization notwithstanding).

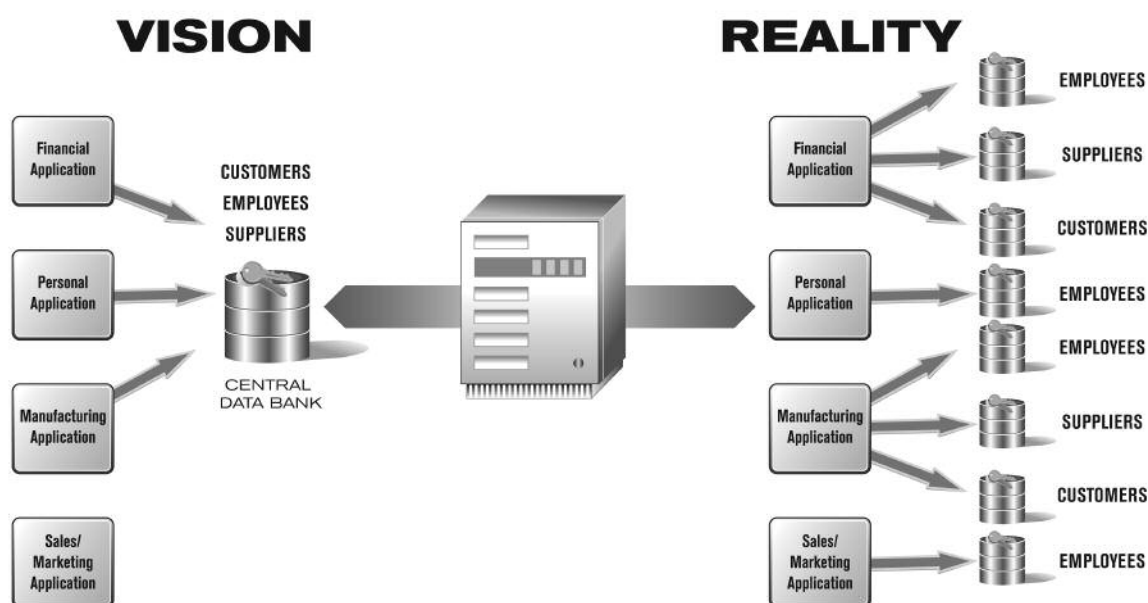


Figure 1. The earliest visions of EIM, circa mid-1960s, contrast sharply with what really occurred.

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The advent of the minicomputer in the 1970s and into the early 1980s only worsened the problem, distributing multiple application-specific customer, employee, and product files across different physical computing platforms. Examples include Digital Equipment (DEC) PDP and VAX systems, IBM minicomputers (System 3x series, AS/400s), and Data General minicomputers. On the one hand, organizations had all the computing power they thought they would ever need—on the other hand, the mainframe use meant to be contained only a decade earlier continued to grow.

Personal computers and local area networks in the 1980s only made the problem worse, with personal files stored in PC databases (dBASE family, Microsoft Access) and spreadsheets suddenly elevated in importance to become increasingly mission-critical.

Enterprise resource planning (ERP) initiatives in the 1990s sought to get the data proliferation problem under control through a rebirth of the centralized “key data” concept across distributed platforms, but the Y2K problem diverted most ERP initiatives into Y2K remediation, with lofty goals of sensible EIM deferred until CIOs could become confident their systems would survive the arrival of January 1, 2000. In the meantime, customer relationship management (CRM) and internet-driven e-commerce added an entirely new dimension to the enterprise information management problem, with competing camps from these worlds clashing with the ERP proponents for whose EIM strategy would win out within any given organization.

And so, some four decades after early “data processing strategists” realized the importance of a comprehensive, manageable approach to truly integrated information across any given enterprise, the typical organization is no closer to achieving those objectives.

The question must be asked, then: will we ever achieve true, well-architected enterprise-scale information management and if so, when?

The answer, and the good news, midway through the first decade of the twenty-first century: a somewhat confident “probably...and soon.”

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## What Is EIM?

At the most rudimentary level, EIM is exactly what the words that comprise the acronym mean: managing critical business information at an enterprise level. While this may appear to be little more than a statement of the obvious, it is the characteristics of EIM, listed below, that serve to delineate successful implementations from the majority. Without a comprehensive EIM strategy, the majority of organizations will continue to struggle with an IT environment hallmarked by poor (or at least suspect) data quality, little or no metadata management, coordination and synchronization of master data, and—in general—little chance of evolving architecturally for years to come.

Critical characteristics of successful EIM include:

- A solid infrastructure and foundation of core technologies and well-integrated products that provide the functions described above: inter-component data movement, metadata management, master data management, data quality, and data integration.
- An overall architecture specifically designed to evolve, with outdated components replaced by more modern technologies over time without the whole environment “breaking.”
- Well-disciplined methodologies and work processes for lifecycle management, introducing new functionality, incorporating new source systems and data feeds, and, in general, expanding the breadth of the EIM environment without breaking it.
- A realistic alignment with the organizational structure and culture of the enterprise, specifically with regard to the degree of centralization versus decentralization. More highly centralized organizations should architect their EIM environment in a more centralized manner, with critical components crafted for a broader base of functionality and data. Similarly, highly decentralized or even entrepreneurial enterprises should strive for components that are more tightly defined with regard to their respective functionality, and data that is more complex than a highly centralized architecture—particularly with regard to inter-component data flows—but is more likely to be accepted by user constituencies and avoid the plague of in-house efforts outside the EIM scope that too often doom these efforts.

Successful EIM implementations are invariably built upon an interacting collection of components (e.g., databases and—increasingly—stores of unstructured content) with agreed-to and adhered-to business rules for exchanging and synchronizing data across those components. EIM may be built around some sort of “bus architecture” (e.g., a pipeline-like flow of data from “upstream” components to “downstream” components), a hub-and-spoke architecture, or even some complex combination of multiple architecture styles. Implementation architectures for EIM will vary from one enterprise to another, and that’s the key: there is no such thing as a one-and-only, out-of-the-box EIM deployment.

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# Why Is EIM About to Become a Reality?

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So what gives today's attempts at EIM a greater chance of success than its predecessors? Three very important factors:

- 1. A better understanding of what EIM is...and what it isn't.** The preceding section discussed what EIM is, or at least what it should be. It's just as important to understand what EIM is not. Specifically, it's not an early 1990s-style, dump-everything-in-and-hope-for-the-best, enterprise-scale data warehouse. You've no doubt seen diagrams like Figure 2 depicting dozens of neatly lined up boxes representing source systems all happily feeding data into a single, monolithic database courtesy of "PowerPoint magic" (or "Visio magic"). The reality, as we've all painfully learned, is real data warehousing is far messier and, at the enterprise level, typically ill-suited for a monolithic, single-database architecture intended to serve the broad needs of much or all of an entire enterprise. Even when downstream data marts are added to the picture, the many complexities of a highly centralized, monolithic approach typically catch architects, designers, and developers off guard and the phrase "late on schedule, over on budget" is uttered more and more.



Figure 2. The "dump-everything-in-and-hope-for-the-best" early approach to data warehousing is often mistaken for EIM.

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Similarly, EIM cannot be achieved by simply applying some sort of magical access and integration layer over a collection of disparate databases and applications. While data federation or enterprise information integration (EII) technologies that permit virtual access to disjointed, heterogeneous sources have their role in an EIM strategy, the reality is today they are best suited for a limited set of near real-time needs with limited historical information, very limited data transformation and synchronization needs, and few needs to detect and correct data quality problems.

**2. More mature methodologies and approaches to EIM.** In general, EIM-related methodologies should have four major components: strategy, architecture, roadmap, and implementation. Significant time and effort must be spent in the very beginning of an initiative mapping out an EIM strategy that conducts an honest, no-holds-barred assessment of the enterprise's current state—both business and technological—as well as an assessment of the organization's structure and culture (i.e., how centralized/autocratic vs. decentralized/entrepreneurial). The purpose: to help ensure the successive EIM methodology phases are “grounded in reality,”—that is, they aren't just lifted from a generic textbook but are specific to the characteristics—good and bad—of a given enterprise.

Following the EIM strategy development, the outcome of the EIM architecture component is, as might be expected, a sound, evolvable enterprise-scale architecture that depicts the high-level concepts and the nuts-and-bolts details of the enterprise's future state. Two very important factors are key to the success of the architecture phase and the subsequent implementation. First, the EIM architecture must be directly derived from the outcomes of the predecessor EIM strategy efforts: again, “grounded in reality” for that particular enterprise. Second, the future “should-be” state must be selected from among three “could-be” alternatives. That is, you will find any number of architectural alternatives that will, more or less, achieve the EIM strategy. Which one of those many alternatives is the best? Only by selecting the top three to four and then thoroughly studying and ranking these alternatives side by side will the best approach become evident.

The EIM roadmap efforts are based on the widely accepted principle that big bang implementation projects—especially those in which significant business and technological transformation across the enterprise will occur—are all but doomed to failure. The watchwords of today's complex, multi-year roadmaps: phased, iterative, and incremental. By devising a multi-year roadmap with two to three major deliveries of critical enterprise functionality each year, and with migration best practices firmly entrenched in the phases of the effort, chances of long-term, lasting success are greatly increased.

Finally, EIM implementation can be thought of in “just do it!” terms: all the tried-and-true developmental best practices for quality assurance, regression testing, deployment and user assimilation, centers of excellence (COEs), and all the rest apply to each and every phase of an EIM implementation effort. But without careful attention to and investment in the phases that precede implementation—strategy, architecture, and roadmap—a successful EIM implementation is likely to be as out of reach.

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**3. Better integration of products and core technologies.** Successful EIM requires an entire tool box of capabilities:

- Cross-platform data movement (e.g., database replication; extraction, transformation, and loading (ETL) tools, etc.)
- In-place, just-in-time data integration, such as that provided by data federation or EII technology
- Data quality assurance and error correction
- Data profiling
- Lifecycle management
- Metadata management
- Master data management
- Special-purpose data attribute creation (e.g., geocoding)

None of these products and core technologies are revolutionary, nor even new; all have been widely used in business intelligence (BI), data warehousing, and other informational/analytical environments for many years. What is different about today's tool box versus that of previous eras, however, is the significantly increased degree of integration among them. Well-architected, widely used interfaces and exchange protocols (e.g., a service-oriented architecture approach,) enables capabilities such as master data management reconciliation and resynchronization, end-to-end data lineage (e.g., users viewing a report see a complete picture of the lineage of their report's data all the way back to source systems), and similar long-sought-after, high-value capabilities that dramatically increase the confidence in decisions made and actions taken based on a sound EIM foundation.

As with most technology disciplines, literally hundreds of best practices lead to the difference between success and failure. And from these hundreds of items, one can filter out six of the most critical best practices that are the most significant to successful EIM.

- 1. Building the EIM foundation on a set of products with a significant level of out-of-the-box integration among the various components and tools.** One of the primary reasons for the long history of failure with past EIM-type initiatives was the overwhelming degree of product-to-product integration required in the attempt to build a single foundation with the required breadth and depth across the enterprise. Today's EIM technologies—data integration, data quality, metadata, and lifecycle management, and others—are increasingly integrated with one another when offered as part of a leading vendor's platform, as is the case with the Business Objects EIM solution (details are found in the next section).
- 2. Implementing and supporting a formally budgeted EIM Competency Center (EIMCC) that has substantial authority.** Many organizations have tried to implement various types of competency centers (CCs) or centers of excellence (COEs) with mixed results. Experience has shown that when they are 1) formally budgeted with headcount and resources, and 2) bestowed with substantial authority to guide the enterprise as a whole, they can have an extremely positive impact and proven success. Business Objects has long advocated its customers implement a business intelligence competency center (BICC) as part of the overall BI value proposition. The same is true for EIM, and in many cases, the convergence of the BICC and EIMCC should be an organization's ultimate objective in the pursuit of long-standing, evolvable value obtained from both their BI and EIM investments.
- 3. End-to-end data lineage delivered through a comprehensive metadata management capability.** Even the most robust and high-performing BI environments are typically hampered by doubts and skeptics as to the accuracy of the information being provided through reports, queries, and analytics. When an environment's metadata capabilities are structured in a manner that they can reach back to key information from source systems, ETL processes, databases, and other beneath-the-covers components of the overall system, confidence in the accuracy of reports and analytics is dramatically increased. Similarly, it becomes much easier to locate errors—and the causes of those errors—when transparency to all of the underlying processes is instantly available through an integrated metadata management facility. By increasing the confidence in the EIM and BI environments, individual user organizations are less likely to insist on foregoing the official delivery of reports and analytics through enterprise-wide data warehouses and data marts and building their own unsanctioned environments.
- 4. Embarking on a once-and-for-all program of master data management as a cornerstone of EIM.** Master data management has long been one of the weak points with enterprise-scale data warehousing and in the integration of enterprise-class applications such as CRM, e-commerce, and ERP. The vendor and consulting communities have applied significant resources to the master data problem in recent years and any EIM program must have a strong foundation for understanding the current state of the enterprise's master data and—more importantly—finally implementing an architecturally evolvable solution.

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5. **Working periodic architectural tune-ups into the multi-year, multi-phase EIM roadmap.** Every two years or so the overall EIM environment should undergo a tune-up in much the same way one's automobile would. That is, for a period of three to four months, only the most mission-critical functionality that cannot wait should be scheduled for inclusion within the EIM infrastructure and the analytic environments it supports. During this period, an end-to-end program of upgrading and—when necessary—replacement of existing components should occur, the objective being that the EIM environment will undergo periodic change but for the most part, be architecturally evolvable and therefore viable for years to come.
6. **Avoiding hype and over-promise and focusing efforts on building a foundation of lasting business value.** Like BI, enterprise performance management (EPM), data warehousing—and, for that matter, ancestors of these initiatives such as management information systems (MIS), executive information systems (EIS), decision support systems (DSS), etc.—EIM is fraught with significant hype and, in many cases, aggressive promising of business value, architectural elegance, and other long-sought-after objectives. The reality is while today's EIM technologies and platforms are more functional, more highly integrated, and feature faster performance than their predecessors—EIM will still be doomed to failure if an organization doesn't approach it as a holistic solution comprising not only technology and products but also human factors (organizational structure, organizational culture, ongoing support through an EIMCC, training and skills upgrading, etc.) and sound, real-world methodologies. EIM shouldn't be thought of as the latest in a long line of promising initiatives that will inevitably be found lacking, awaiting the next successor to get people excited again. Rather, if EIM is approached realistically and in the scope of what it really is—and isn't—chances are very good this will truly be the dawn of an age of integrated electronic information first envisioned forty years ago.

# EIM Products from Business Objects

The goal of EIM from Business Objects is to ensure organizations and their employees are always working with trusted, integrated, and timely information. The Business Objects products that support EIM are grouped into three categories:

- Data quality
- Data integration
- Metadata and lifecycle management

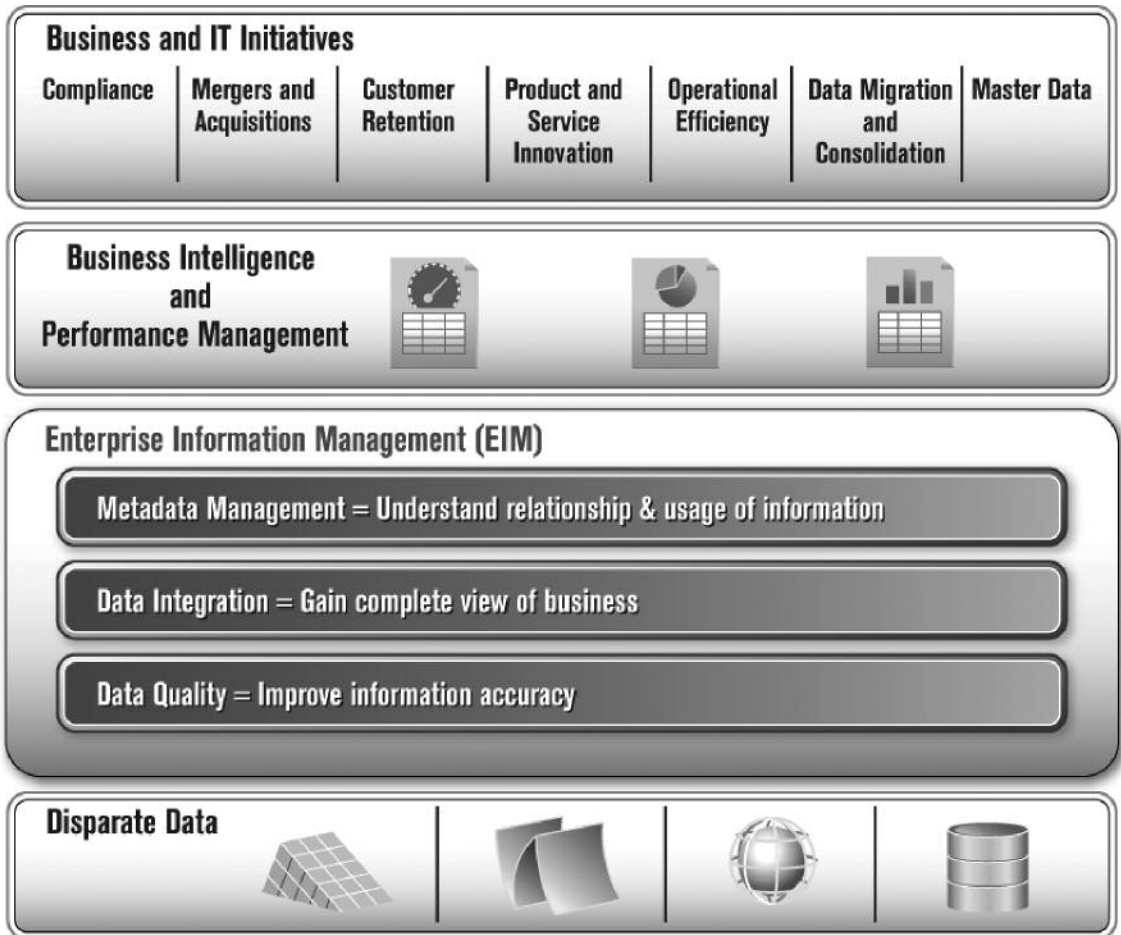


Figure 3. EIM products from Business Objects deliver business intelligence you can trust.

## Data Quality

Business Objects data quality solutions allow organizations to ensure their business data is correct, consistent, and complete. Business Objects provides market-leading data quality software that is:

### Centralized

- A single-instance data quality service (or hub)
- Centralized business-rule management

### Collaborative

- An environment for implementing best practices
- Unique customer-defined transforms

### Consistent

- One methodology for managing all enterprise data quality deployments
- Business-rule inheritance and re-usable components

In addition, Business Objects also provides robust data profiling and assessment tools that allow organizations to continuously monitor data quality and help create an accurate, single view across the enterprise.

## Data Integration

Business Objects provides enterprise-class data integration for batch-oriented ETL. Recognized for its ability to explore, transform, and move data anywhere at any frequency, some of the benefits and key features of Business Objects data integration include:

### Trusted information

- End-to-end impact analysis
- Report-to-source data lineage

### Developer productivity

- Single interface to design
- Web-based administration to deploy

### Scalability

- Pervasive parallelism and distributed processing
- Services-based architecture

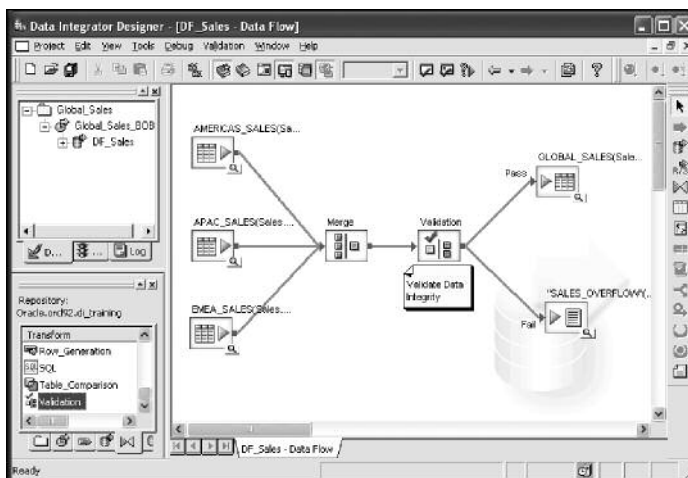


Figure 4. BusinessObjects™ Data Integrator includes built in data quality transforms for batch and real-time ETL.

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Business Objects also provides data federation capabilities for on-demand information access that combines data across data marts, data warehouses, operational data stores, and transactional systems. Some of the key benefits and features include:

**Agile and rapid data integration**

- Code-free, rule-based mapping utility
- Automated Business Objects universe generation

**High-performance, on-demand access to information**

- Optimized query engine
- Selective data materialization

**Real-time delivery of trusted information**

- On-time access to volatile data
- Query-time data cleansing and reconciliation

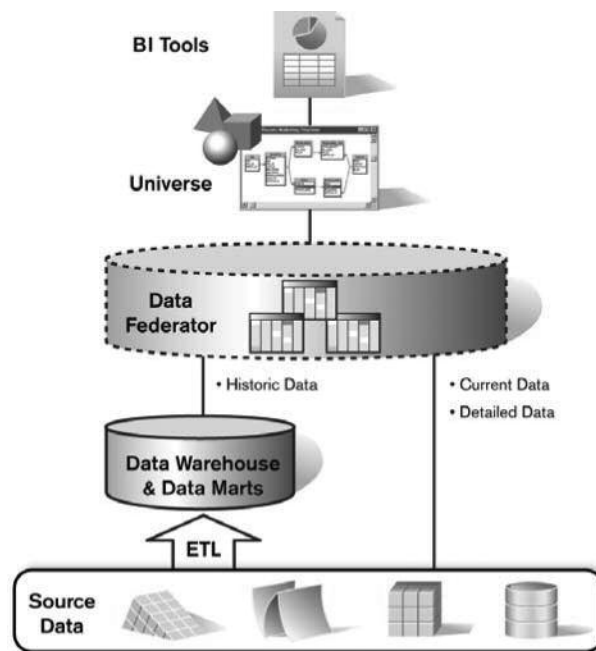


Figure 5. BusinessObjects Data Federator allows you to instantly integrate data from multiple sources on demand.

## Metadata and Lifecycle Management

Metadata management tools consolidate, integrate, and audit metadata from disparate tools and data sources. Whether it's business, operational, or technical metadata, metadata management tools from Business Objects help organizations explore and understand relationships by bringing metadata into an open relational repository where it can be versioned, browsed, searched, audited, and reported upon. Critical to EIM, IT organizations benefit from source-to-report impact analysis and BI users benefit from end-to-end data lineage.

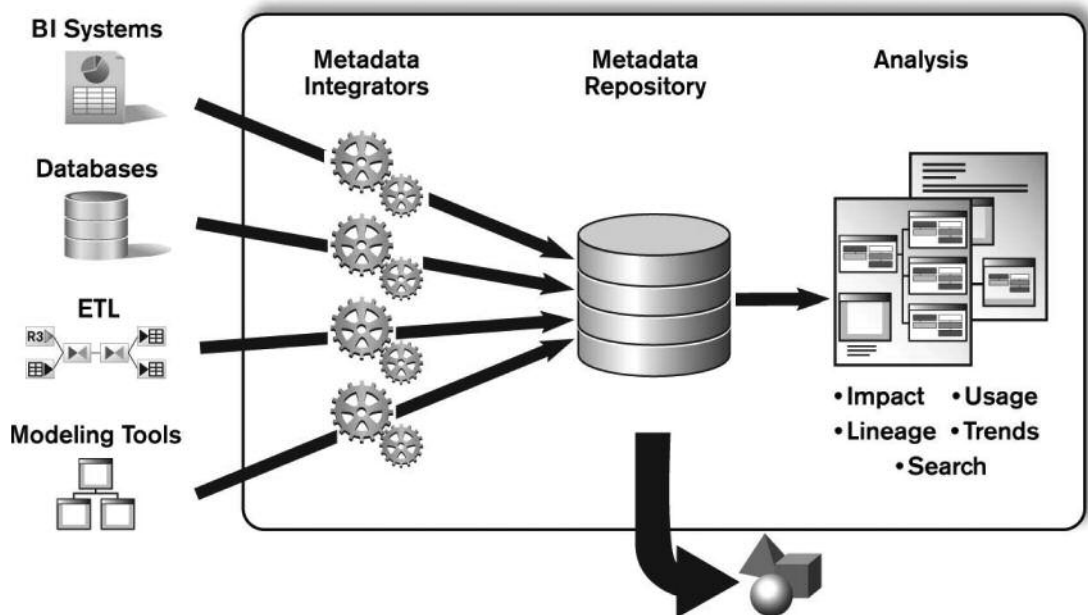


Figure 6. Business Objects provides an open repository that actively collects and unifies BI, ETL, database, and third-party metadata.

Business Objects also provides a graphical tool to accelerate ETL design and implementation. Helping organizations efficiently manage and plan data warehouses and marts before development and deployment, lifecycle management tools also help shorten the amount of time spent in the critical early phases of data integration projects. By validating ETL design and identifying problems early on in the process, these tools help kick-start BI implementations by generating starter ETL jobs based on source-to-target mappings and definitions. They also help document the entire ETL process through a web-based user interface.

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## EIM Services from Business Objects

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In addition to EIM tools and technologies, Business Objects provides the following innovative services and solutions to our customers:

### EIM Strategic Offerings

- **EIM Vision Workshop.** A summit-like offering, typically lasting two to three days, beginning with a comprehensive overview and critique of your current EIM environment and leading to a set of high-level recommendations for how to embark on a sound path towards EIM, along with an honest assessment of your risks and how to mitigate them.
- **EIM Current State Assessment.** A thorough, end-to-end offering that typically lasts four weeks and covers all aspects of your EIM current state from the underlying tools and platforms to the quality of the reports and analytics delivered from that environment.
- **EIM Strategy, Architecture, and Roadmap.** An offering that encompasses the EIM Current State Assessment described above, but also continues into the exploration of multiple “could-be” alternatives to achieve the desired future “should-be” state of EIM for your enterprise. Typically lasting 10-12 weeks, the offering culminates in a phased, iterative, and incremental roadmap that depicts in detail what EIM capabilities you should deliver—and when—over the next three to five years.

### EIM Tactical Offerings

- **Data Quality Assessment.** Many enterprises know their overall data quality is suspect, yet when pressed for details of where the weakest points are and how to fix those problem areas, they are unsure of the answer. The Data Quality Assessment offering is a hands-on engagement—typically lasting four weeks—in which a highly qualified Business Objects team uses our data profiling and data analysis tools to authoritatively determine the state of your data so your subsequent EIM efforts are realistically scoped.
- **Master and Reference Data Management Assessment.** As with data quality, most enterprises know they have some degree of a “master data problem,” yet are unsure how severe that problem is and what to do about it. An expert Business Objects team will, over approximately four weeks, look at the content, creation processes, synchronization processes, and reconciliation processes for your critical enterprise master data and produce sound recommendations for what must be accomplished to help make your EIM efforts successful.
- **Metadata Management Assessment.** Most enterprises already have some degree of metadata management built into their BI and data warehousing environments. In fact, the typical problem is these enterprises have too many metadata management capabilities that either aren’t connected with one another, or, if metadata interoperability does exist, it is neither comprehensive, timely, nor accurate enough to provide the required degree of end-to-end data lineage. Over a four-week period, the Business Objects team thoroughly assesses your current metadata management capabilities and notes the areas that are most problematic yet can, when properly reengineered, provide the greatest value to your users and those who support your EIM and BI environments.

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## Conclusion

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All the pieces required to finally achieve lasting enterprise-scale management of information—real EIM—seem to be in place. While hype and over-promising will never truly disappear, there appears to be a critical mass of those of us who have survived earlier efforts and are much wiser—with a healthy degree of cynicism and skepticism—for our pains. Technologies themselves and the interaction/interoperability mechanisms among those technologies have advanced to the point where things we've tried to do in the past that weren't successful because of limitations in performance, networking bandwidth, and other characteristics are now achievable. Finally, we've learned from the shortcomings of our past efforts and when a sound, grounded-in-reality methodology is applied to the EIM problem, we can get beyond the stumbling blocks of the past. EIM is still very much a "moon shot" in terms of complexity, but just like with man's journey to the moon, failures and shortcomings of the past are about to give way to a new era of success that previously could only be dreamt.

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