

# Business Intelligence Integrating the Data



Today's corporate performance initiatives require greater visibility into all corners of the enterprise. Business intelligence has become a central element to every part of the business.

# Business Intelligence: Integrating the Data

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Companies of all sizes depend on meaningful, right-time information about customers, sales, production, internal operations, finances, etc. This is more than data; it's data that's been massaged and analyzed into business intelligence (BI) designed to support decision-making and performance management processes.

Traditionally, BI-related assets — BI data and BI applications that gather, provide access to, and analyze this data — have been siloed as departmental or line-of-business point solutions. The result: duplication of effort, unnecessary costs, multiple versions of the truth, and limited ability to see the whole enterprise picture.

Of course, the most important corporate decisions require business intelligence from across the enterprise, which is why the demand for enterprise BI has become so intense. As pressure increases to boost corporate performance, there's demand for greater visibility into the continuously changing metrics of corporate processes — that is, business intelligence.

<10%

of organizations will succeed in a first attempt  
at data governance.  
(Gartner, 2006)

## The Push for Corporate Performance Management

If business intelligence is to become a key part of a performance-oriented enterprise information framework, BI management must not only be consolidated into an enterprisewide function, but it must also be aligned with legacy information — something that requires a rethinking of governance over processes that define, maintain and disseminate corporate information and intelligence.

Commoditization and consolidation among technology vendors and offerings, along with open source alternatives, now provide IT managers with the means to cost-effectively launch a variety of corporate performance management initiatives that begin to accomplish this. These initiatives aim to justify IT investments in terms of business strategy and boost enterprise visibility and growth with IT innovations. How? By ...

- **Generating enterprisewide performance metrics that can be aligned with strategic goals and initiatives**, including, as necessary, new ways to define and manage such “soft” performance metrics as customer satisfaction and innovation. A balance between predictive, operational and outcome metrics is essential.

**\$2.6 billion**

will be spent in 2011 on data integration tools.  
[Gartner, Forecast: Data Integration Tools, Worldwide, 2008-2011, May 2007]



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- **Establishing executive-sponsored, enterprise-level governance committees to ensure that BI data integration and process changes remain true to business objectives.** Business people — not just IT people — should participate in managing master data, defining data-mapping rules between systems and managing data security.

**17.3%**

is the compound annual growth rate of spending on data integration tools between 2006 and 2011.

[Gartner, Forecast: Data Integration Tools, Worldwide, 2006-2011, May 2007]

## When BI Goes Operational

A variety of techniques can integrate data for use in the sort of operational BI that's becoming part of corporate performance management. Operational BI is characterized by low tolerance for data latency, fast and frequent decision turnaround requirements, and need for solid data quality — and these characteristics shape how BI data needs to be integrated.

“It's becoming increasingly common to leverage two or more integration techniques to meet the needs of a single business capability, such as maintaining an operational data store to support operational BI requirements,” writes Forrester principal analyst Rob Karel in *Evaluating Integration Technology Options* (March 2007). [See Sidebar: *Data Integration Techniques*]

Thus, data integration vendors, including Business Objects, IBM, Informatica, SAS and others, are now offering multiple alternatives in their data integration tool sets.



## DATA INTEGRATION TECHNIQUES

Integration Technique	Benefits	Drawbacks
Extract, transform, load (ETL)	<p><i>Volume:</i> Manages extremely high volumes of data movement.</p> <p><i>Quality:</i> Allows for complex data transformations, enabling much higher quality; hence, more usable information.</p>	<p><i>Data latency:</i> Optimized when scheduled as batch data movement, as opposed to real time or on demand.</p>
Enterprise information integration (EII)	<p><i>Latency:</i> Through federated queries, information can be accessed within milliseconds.</p> <p><i>Storage:</i> Data is not moved or copied from source systems, so additional storage is not required.</p>	<p><i>Volume:</i> Should only be used for small, targeted data sets.</p> <p><i>Quality:</i> Minimal transformation capabilities — efforts to include will negatively affect latency.</p>
Change data capture (CDC)	<p><i>Volume:</i> Captures only changes or "deltas" since last pull from source databases, reducing amount of data that needs to be moved.</p> <p><i>Performance:</i> With the option to access database log files vs. production database — no performance impact to operational systems.</p> <p>Can enable continuous updates throughout the day.</p>	<p>Mostly a push vs. pull technology. Can query CDC targets for pull but wouldn't go to the right source.</p> <p><i>Performance:</i> If data is not extracted from database log files, operational system performance can be affected, depending on size of query.</p>
Data replication	<p><i>Latency:</i> Can capture changes or "deltas" from various distributed databases in close to real time.</p> <p><i>High performance:</i> Most database replication solutions now read data directly from transactional logs, and therefore don't affect production databases.</p> <p><i>Continuous:</i> Can enable continuous updates throughout the day.</p> <p><i>Volume:</i> Can manage high volumes of data movement.</p>	<p><i>Volume:</i> When dealing with large amounts of data, it can slow down the performance.</p> <p><i>Quality:</i> Minimal transformation capabilities — efforts to include will negatively affect latency.</p>

Source: Forrester Research, *Evaluating Integration Technology Options*, March 19, 2007.

## Extending What You Have?

Arguably, the necessary enterprisewide integration is more easily accomplished if a mature architecture and set of best practices can anchor the effort. Existing BI platforms and data warehouses, some say\*, fill the bill and should be extended beyond classic extract, transform, load (ETL) functionality to also encompass data profiling, data quality and cleansing, data lineage and audit (metadata), enterprise application integration and enterprise information integration.

BI solutions are effective at integration and data quality improvement, capturing and retaining metadata, creating master and reference data conformity, and storing large information volumes. However, most enterprise information management environments treat BI as a service. Thus, organizations seeking to extend their BI platforms face several challenges:

- **Where's the global data model?** Perhaps closer than you think. The data warehouse typically incorporates an enterprise perspective on business data, even if it's ad hoc, which can be extended, possibly into an enterprise data warehouse.

**>50%** of the skills and capabilities for new BI implementations will be supplied in North America through 2012 by service providers. [Gartner, Magic Quadrant for Business Intelligence Services, North America, 2007]

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- **How bad is the quality of legacy and in-house operational application data?** Generally BI data is cleaner, so BI data quality techniques and practices can be imposed across all enterprise data. Where data cleansing and transformation belongs is a function of latency requirements as well as transformation rule complexity.

- **Should integrated data be represented in a persistent view or a virtual one?** The answer will depend on what data integration approaches are used — ETL, enterprise information integration, change data capture.

- **What will an enterprise data integration architecture look like?** Typically, operational apps run from disparate data silos. BI solutions have a better record of data integration, but issues remain. For instance, metadata tends to be poorly integrated and managed; it needs to be cataloged and classified at the enterprise level. Similarly, master data management must migrate to the enterprise level.

- **What role will service-oriented architecture (SOA) play?** With SOA, BI solutions are poised to evolve into an information transformation infrastructure that traverses architectural layers and can deliver seamless access to both offline and real-time data. Such use of SOA must be built on a foundation of solid data governance and master data management so there's a single enterprise semantic supporting integration.

**\$20+ billion**

will be spent in North America on business intelligence services in 2010. [Gartner, Magic Quadrant for Business Intelligence Services, North America, 2007]



## Picking a Solution

As for solutions, there are plenty. "The range of potential technology solutions is already large," Karel states. "When you consider as well the ever-changing boundaries between the product categories, picking the best solution for a particular type of integration can be a daunting task."

Karel advises that the "right" solution depends on so many variables that infrastructure architects should run integration scenarios appropriate to their organization to narrow down choices among software tool alternatives. In addition to solution performance criteria, other factors may play a role in an organization's choice, including cost, solution delivery requirements, available development resources and the organization's application strategy.

[See Sidebar: *Best Practices in BI Integration & Strategy*]

"Functional overlap of integration solutions is a fact of life, and ongoing software vendor consolidation and technology convergence will continue to complicate integration product selection," Karel points out. "In general, integration suites from the platform vendors and specialized integration solution providers will provide the broadest coverage, but many niche needs will continue to exist, making selection of other vendor integration products a necessity in many situations."

\*Craig Izydor and Patrick McCollum, "BI, Process and Integration Trends," DM Review, August 2007  
([http://www.dmreview.com/article\\_sub.cfm?articleId=1089409](http://www.dmreview.com/article_sub.cfm?articleId=1089409))

## BEST PRACTICES IN BI INTEGRATION AND STRATEGY

When it comes to BI data integration, says Forrester's Rob Karel, application characteristics have to be aligned with data integration mechanism. His suggestions\*\*:

- **Recognize the trade-offs.** The more real-time data transformation and quality validations required for an operational decision, the less likely that information can be delivered quickly.
- **Clean and validate data at the source.** Data latency will be reduced because the data integration tool(s) won't have to do the cleaning.
- **Build a data integration competency center.** To ensure a consistent approach to data quality and integration, organizations need a data governance operating mechanism that will bring business subject matter experts and data stewards together with information architects.
- **Understand context.** Operational BI is all about the context of the decision that the data is supporting, so data integration solutions must effectively support the decision-making process, not just the delivery of data.

- **Consider the entire business.** Data integration architects must be enterprise architects who consider impacts and dependencies across siloed business units, functional groups and technology systems — not just within the boundaries of a specific BI deliverable.

- **Standardize on data integration suites.** Be wary of vendors that offer only a single data integration technique; they may not be around for long as vendors consolidate.

Forrester principal analyst Boris Evelson offers 10 best practices for kicking off a BI strategy and implementation\*\*\*:

- **Pick a senior business executive sponsor.** BI implementations may be built from the bottom up, but they're driven and managed from the top down, so finding C-level executive sponsorship is a necessary first step.
- **Proceed with data governance and data stewardship.** Get subject matter expert representation from front-, middle- and back-office lines of business. Start small and pick the essential key performance indicators needed to operate the business.
- **Conduct a current-state analysis.** Include all components of the BI stack and all of the processes and organizational structures surrounding existing BI implementations — and involve business and IT stakeholders.

- **Define a logical and physical data architecture.** Hub-and-spoke architectures provide the best balance, but the question of physical data warehouse vs. virtualization must be answered before selecting vendors.

- **Know thy user.** Understanding the different types of users and their requirements is the first step toward a balanced BI technology portfolio.

- **Make a decision on whether to buy or build the analytical data model.** This means first focusing on picking the right data model. Homogeneous environments can favor industry-specific data models, whereas complex enterprises should start with industry standards, but plan on customization.

- **Define the architecture for all of the layers of the BI stack.** Don't overlook metadata, data integration, data quality, data modeling, analytics, centralized metrics management, presentation (reports and dashboards), portals, collaboration, knowledge management and master data management.

- **Pick a systems integrator partner — don't do this on your own.** But don't outsource. BI applications are notoriously difficult to outsource and/or move offshore because they require constant interaction between end users, analysts and developers.

- **Create an actionable road map and project plan with baby steps.** The traditional software development life cycle doesn't lend itself well to BI. Don't try to create written requirements. Put an end user, a business analyst and a developer in the same room, arm them with rapid prototyping tools, and create the first proof of concept within a few days.
- **Pick high-value, less-complex subject areas for initial phases.** For example, don't start with an operational risk data mart — a very complex, poorly understood subject area with few successful implementations. On the other hand, financial budgeting/planning or sales analytics data marts may present high-value targets that also have plenty of existing models and best practices from which to draw.

\*\*From Turning Transactions into Decisions, September 25, 2006.

\*\*\*From 10 Best Practices for Kicking Off Your BI Strategy, August 17, 2007.



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