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ALIGNING DATA GOVERNANCE WITH BUSINESS-DRIVEN DATA ARCHITECTURE

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INTRODUCTION

The role of the data analyst has gained prominence in relation to the recognized criticality of processed and analyzed information as an integral component of an organization's business processes. Yet data analysis is just one factor contributing to business success; the same data that ultimately flows through to the analysis intended to improve the business is also employed by a wide variety of transaction processing and operational systems used to run and manage the business. This continuous need for reuse underscores the importance of maintaining consistency and coherence among the varied data assets used across the enterprise.

Some organizations try to address this need holistically by defining an enterprise data architecture, although situating this practice within the Information Technology (IT) department may accentuate the need for tools, technology, and database environments over assurances of satisfying requirements of meeting business expectations and cross-functional coherence and synchronization. Defining an effective and meaningful data architecture must engage both the business and information management teams so that:

- Business objectives and business processes inform the design of the enterprise data architecture
- Data governance is operationalized to ensure standards in application data use and consistency of data utilization

Conventional siloed data design has impeded the enterprise perspective on information use, but a paradigm is emerging that recognizes the critical advantage of information and seeks to establish a consistent enterprise data architecture with harmonized semantics. In turn, by using an integrated set of repository-based business process models and business-driven data architecture, data governance can not only ensure the quality of enterprise data, it can help guarantee that the business processes will achieve the stated business objectives.

SILOED DATA MODELING IMPEDES THE ENTERPRISE DATA STRATEGY

The perception of data has changed radically in the past decade as business intelligence, business analytics, and massive-scale computing have been integrated into production use. Because early transaction processing systems consumed data as a necessary byproduct of ensuring that transaction processes were executed, each business function directed the operational requirements guiding its own applications. In turn, for many years the conventional approach to system design focused on using data models individually designed to accommodate the specific requirements of each application.

The artifacts of these historical data modeling design decisions are evident across the organization, where the same concepts (such as customer, product, or part) are modeled and implemented in slightly different ways in different business function applications. This apparent redundancy leads to semantic inconsistency, where the core entities are not only replicated inconsistently, they end up taking on slight differences in semantics.

For example, in the Finance department the concept of “customer” may refer to the individual who is invoiced for the product, while over in the Customer Service department, anyone who is authorized to use the product is considered a “customer.” In this case, though, it is difficult, if not impossible, to formulate a customer-centric strategy when it is not clear what is meant by the term “customer.”

The siloed approach to data modeling targeting specific application needs impedes our ability to have an enterprise perspective on information use. Organizational business programs need the support of consistent, high quality data. To continue the example, corporate business initiatives focusing on improving the customer experience will be stymied if they are not able to formulate a holistic view of customer data drawn from across the different business functions in a way that is both temporally and semantically consistent.

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BUSINESS OBJECTIVES AND BUSINESS PROCESSES DRIVE DATA ARCHITECTURE

As more organizations recognize the value of information as a critical exploitable corporate resource with value added through advanced analytics, they will seek to establish a consistent data architecture across the enterprise. The intent is to harmonize the structure and semantics of representations of critical enterprise entities to enhance consistency, quality, and utilization by all data producers and data consumers.

Embracing a holistic enterprise view means reconsidering the intersection of the three facets of shared data use (transaction, operation, and analytical processing) and its implications on design. Instead of allowing independent isolated modeling efforts, start with the corporate business objectives, and then examine how the full array of business processes use information to achieve the desired business goals.

There are two common factors that will inform the design of an enterprise data architecture:

- **Business objectives**, or the desired outcomes affecting the fundamental aspects of the business, such as increased revenues, lowered operational costs, improved margins, enhanced customer experience, or escalated production. Business objectives can be specified at a high level or be focused more specifically on improving a particular metric by some desired margin (e.g., “increase same-customer sales by 5% in the first quarter”).

- **Business processes**, which describe the set of activities to be executed to accomplish the business objectives.

Business process models capture the essence of the business objectives and how they are accomplished by representing the flow of the discrete steps of each process, which organizational actors participate in the process, what system procedures they interact with, and what data they consume or produce to drive decisions at critical points in the process.

Enterprise architects can envision how the business process models from across the organization can be interleaved to show both process and data dependencies. This knowledge can inform the design of a conceptual enterprise data model that aligns IT and the business around the different ways that data is consumed. Keep in mind the need to modulate a top-down approach that guides design from a high level with a bottom-up approach that provides the necessary detail to make the data usable for specific processes. But at all times, remain outcome-driven: maintain focus on a data architecture that supports the achievement of business strategies and objectives.

ENFORCING DATA POLICIES USING DATA GOVERNANCE

A modern enterprise's data strategy will encompass key aspects of information management and utilization, including standards for data persistence, data integration, data quality, and ultimately data delivery. But guaranteeing that the data architecture can meet the needs of the business means that policies standardizing data structure, establishing organization, harmonizing meaning, and ensuring quality must not only be defined, but enforced as well.

One can attempt to impose data governance policies by fiat, but this approach is often met by resistance. In practice, operational data governance is guided by how data is used by the various consumers and how user data validation expectations can be certified to ensure that the data is of the level of quality to meet defined business goals. In particular, there are three aspects of data governance that use an integrated set of repository-based business process models and data models to link the points of data consumption for business processes to the ability to achieve specific business goals:

- **Semantic harmonization:** Providing insightful access to metadata including structure, semantics, and lineage to inform the data consumer.
- **Enforcing data usability requirements:** Implementing operational procedures to ensure that data quality, usability, and protection requirements are met.
- **Business policy compliance:** Complying with the business policies as interpreted from the corporate business drivers, such as those for supporting regulatory compliance, increased revenue generation, cost management, or enhanced customer experience, among others.

When aligned with a business-driven data architecture, these three facets of data governance combine to provide a cumulative effect for achieving business objectives. Harmonizing metadata enables your data stewards to operationalize compliance with data quality and usability standards, while observing data rules demonstrates compliance with the encompassing business policies.

BUSINESS-DRIVEN DATA ARCHITECTURE ACTUALIZES DATA GOVERNANCE

There are some discrete steps that enable your organization to align data governance with business-driven data architecture:

- **Seek to understand:** Survey how critical business processes use information to help achieve the corporate business objectives.
- **Document what you learn:** Capture the representative business process models in operation across the organization.
- **Validate your perceptions:** Solicit feedback from among representatives of the communities of data consumers (both automated and human) to assess their perception of how data is used to meet the business goals, and validate that their perceptions are aligned with the business process models.
- **Transcribe and transform:** Document data linage, provenance, and consumption models that provide the context for logical data model design.
- **Establish policy:** Define and enforce data policies about data sharing, data quality, accessibility, and semantics.
- **Identify control points:** Map the logical models to physical models, and annotate the data touch points in the lineage maps where policy compliance can be monitored.
- **Operationalize:** Integrate data policy compliance and data governance within the application environment.

It may seem that these process steps result in different types of isolated models, but the contrary is actually true: to get the best outcomes, business process models, data consumption models, data lineage, logical data models, physical data models, data policies, and data controls should all be managed within an integrated repository. That being said, to jump-start your business-driven data architecture, look for tools that help you interpret data policies in the context of business objectives and allow you to:

- Document the business processes with the appropriate level of detail for use by the organization.
- Capture information about core entities and relationships, and how those are utilized by different business processes.
- Map among the different conceptual, logical and physical models and link those models to specific metadata artifacts.
- Define and enforce standards for common data element concepts and reusable constructs.
- Validate the different models and identify conflicts or gaps between business process models and the different types of data models.
- Manage lineage and provenance to link data specifications to their application implementation data touch points as part of the operationalization process and advise the developers where those data elements are used.
- Integrate data controls that monitor compliance with business objectives.

Evaluating and selecting data modeling, metadata, and data governance tools that exhibit these characteristics will help you to establish a foundation for data governance that is aligned with business objectives.

ABOUT THE AUTHOR

David Loshin, president of Knowledge Integrity, Inc., is a recognized thought leader and expert consultant in the areas of analytics, big data, data governance, data quality, master data management, and business intelligence. Along with consulting on numerous data management projects over the past 20 years, David is also a prolific author regarding business intelligence best practices, with numerous books and papers on data management.

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