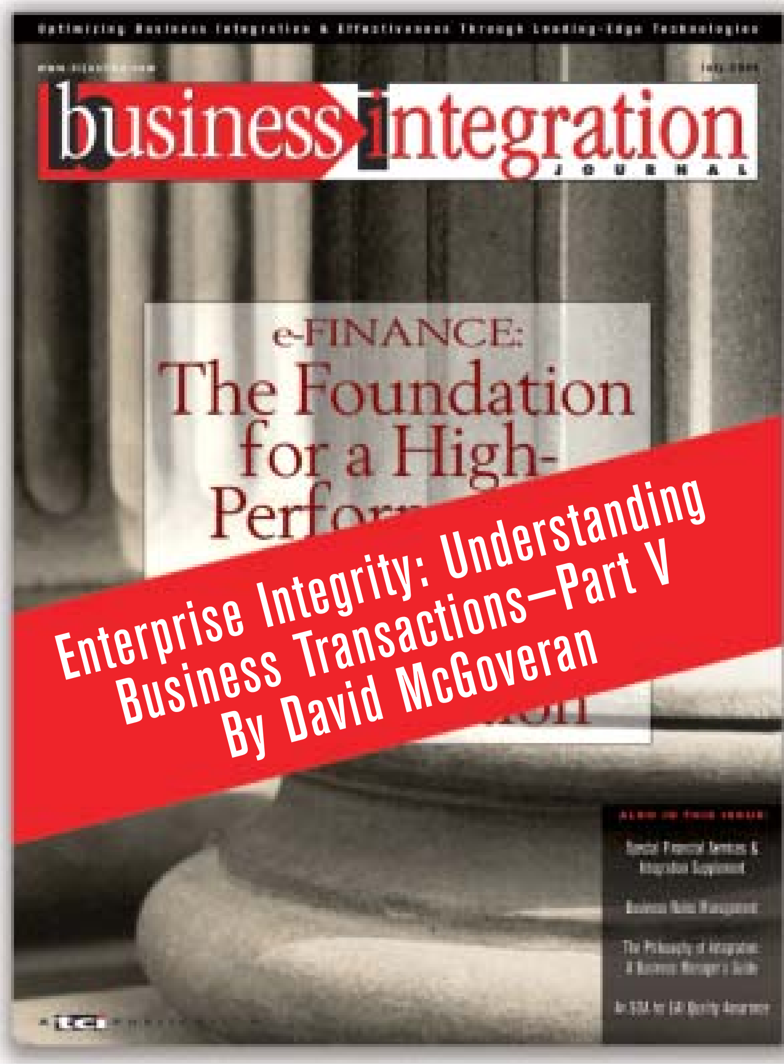
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Enterprise Integrity: Understanding
Business Transactions—Part V
By David McGoveran

ENTERPRISE INTEGRITY

BY DAVID McGOVERAN

Understanding Business Transactions: Part V

Business transactions are increasingly important to both business and technology managers. For business managers, both the beginning and end of business transactions are key events that can change the course of a business. As such, regulatory compliance may require that they be tracked and reported. The savvy business manager attends to business transactions regardless, monitoring business transactions in order to know the state of the business and manage it wisely. Technology managers who do not know how to translate technical metrics associated with physical transactions into business metrics associated with business transactions cannot hope to align IT with business. But not to worry: This series will help.

Having already endured four months of gnarly transaction fundamentals discussion (with a few postgraduate concepts thrown in here and there), you're ready for the final step in understanding the relationship between physical transactions, logical transactions, and business transactions. A word of warning: As far as I am aware, this is original work you won't find in a textbook. Hopefully, you'll be convinced of its correctness and value. The key step is to generalize the definitions of atomicity, consistency, isolation, and durability so that the usual definitions become special cases:

Atomicity: Either all of a transaction's defined component operations between consistency points succeed or else all fail. The traditional assumption that a transaction's potential steps are determined at transaction begin is unnecessarily restrictive and a special case.

Consistency: Every observable state of a transaction satisfies a well-defined class of consistency conditions, which effectively define the transaction. By contrast, the usual requirement that a transaction's begin and end states satisfy specific consistency conditions is, again, a special case.

Isolation: Transactions interact only at consistency points. Note that, if the only consistency points are transaction begin and end, the traditional definition is recovered.

Durability: The effects of earlier transactions provably determine the effective initial state of subsequent transactions (auditable temporal dependence). The usual prescription that transaction effects must be permanent (i.e., survive system crash), and that success or failure cannot be circumvented after the fact, is but one way to meet this requirement.

These generalized ACID property definitions have broader applicability without being weaker than their traditional counterparts. With them, the business transaction analogues of atomicity, consistency, isolation, and durability (described in the last two columns) can be formalized. We can now treat business transactions in a manner that is consistent with our understanding of logical and physical transactions.

One way to do this is as follows: Define a physical transaction as a unit of recovery (transforming state between points of synchronization), and which can be nested. Similarly, define a logical transaction as a unit of consistent change (transforming state between consistency points), which can be nested, and which shares its initial state with that of at least one physical transaction and its final state with that of at least one physical transaction. Finally, define a business transaction as a unit of auditable change (transforming state between audit points), which can be nested, and which shares its initial state with that of at least one logical transaction and its final state with that of at least one logical transaction.

Our new understanding of business transactions enables us to understand the OASIS Business Transaction Protocol (BTP) for B2B business transactions, and to enable a formal foundation (apparently missing). BTP is merely a pragmatic protocol standard, providing neither an explanation of business transaction mechanics nor a theory of correctness. For example, it does not explain the circumstances under which consistency is propagated and maintained across the enterprise since it permits a concept of consistency that is negotiated transaction by transaction. Neither does it explain how to maximize consistency during the negotiation process. When errors occur, it explains neither how to recover to a consistent state nor how to determine what that consistent state should be. It does not explain what anomalies can occur or when. Finally, there is no predictable outcome after a communication failure (BTP just requires re-establishment of communication to recover) or network failure (BTP requires some implementation-defined persisted information for network failure to act like a communication failure).

Given these issues, old hands at transaction processing might ask "why bother?" It seems likely that the XML-based BTP will play a significant role in Web Services transaction processing, where familiar XA protocols may not work. Next month, we'll examine BTP in more detail. With discipline, you should be able to use BTP without jeopardizing your *enterprise integrity*. **bij**

About the Author

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