

UNIVERSAL BUSINESS INTEGRATION

An
Idea
Whose
Time
Has
Come

By
Trevor
Matz

Businesses today are dealing with two seemingly conflicting goals: improving IT infrastructure and cutting costs. While top executives are reluctant to fund expensive development of new applications, the demand for IT solutions addressing new business initiatives continues unabated. These initiatives require a new breed of solution aptly described by Gartner as business process fusion that must be delivered in the context of today's hyper-efficient business environment. These are the difficult challenges management expects IT to overcome.

Today, however, we're at an exciting juncture, as the promises of technologies, such as Web services, business process orchestration (BPO), business activity monitoring (BAM), and service-oriented development of applications (SODA) are coming to fruition. Effectively applying these technologies to existing applications and information assets will cut costs and help deliver a new infrastructure that can support the real-time enterprise by providing a platform around which the goals of business and IT can converge.

The need to more closely link IT assets to business needs has influenced the latest generation of development architectures, database, integration, application and portal servers, business process modeling (BPM) and automation tools and business intelligence (BI) solutions. While these technologies all have benefits, the goal of a comprehensive platform, incorporating the functionality of these technologies in a single, consistently built product, has been elusive.

The universal business integration platform (UBIP) is based on a new, innovative architecture that fuses these previously autonomous technologies in a single product. This fusion supports the broadest set of integration initiatives and delivers on the promise of extremely fast information and application integration, as well as rapid composite application development.

The Confusing Integration Landscape

To appreciate how universal business integration achieves this promise, it helps to understand the type of integration initiatives companies are undertaking and why existing architectures fail to deliver a single, comprehensive, efficient integration solution.

Data Consistency

Integration technology has evolved impressively from the early days of point-to-point, messaging-based solutions. Point-to-point solutions focused on achieving data consistency between disparate applications. The hub-and-spoke architecture substantially reduced the number of custom interfaces or adapters required. However, the ability and agility of this technology set (known as an integration or message broker) essentially remains limited to efficiently sharing transactional data between systems.

Business Process Management

By the late '90s, the focus of integration had expanded beyond data consistency solutions to integrating applications in support of long-running, cross-application processes. Focused on modeling, automating and streamlining enterprisewide processes, often including human steps, BPM technology began to drive the integration market. With the birth of BPM, integration technology began its journey into the realm of the business world.

Composite Applications

The advent of Web services means that service-oriented architectures (SOAs) and SODA can finally become a reality for the masses. SOA is forever changing the context of application integration and what it can achieve. Enterprises seek ways to leverage their existing information and application assets in building new applications.

The result is composite applications that fuse existing application functionality, exposed as services, with new business logic and user-facing transactional front-

ends. With the composite application, integration technology enters the realm of the application developer. Application integration and application development converge. The days of separate products for these two initiatives are over.

Enterprise Information Integration

Composite applications and the recent emergence of enterprise information integration (EII) have spawned new corporate initiatives to unify and integrate back-end data stores. EII's goal is creating a federated database, providing a single logical view of multiple physical and disparate data stores.

This virtual schema, accessible via a single database interface, lets developers build composite applications or use reporting and analysis tools as if they were working with a single data source. Although application and information integration initiatives share many of the same objectives, these two platforms remain distinct, with different architectures, and development and management environments.

Business Activity Monitoring

The path of convergence that united integration with development and business process orchestration technologies led to the convergence of real-time application integration and BI. As the integration platform sat at the nexus of the organization, the value of merging BI with real-time integration technologies became apparent.

The goal of BAM was instantaneous awareness and appropriate response to changing events. Its benefits were reduced costs and faster execution of critical processes.

Technology Assemblies

Both vendors and customers have begun to realize that these different types of integration solutions are often required for multiple projects in the same organization—and they're converging.

business integration journal takeaways

BUSINESS

- The UBIP unifies architecture, development and management across the four tiers of an integration stack (presentation, application, integration, and data).
- The UBIP places a single, shared metadata repository and highly scalable transactional message warehouse at the core of its architecture and unifies EAI and EII technologies in a single platform.
- The UBIP provides integrated BAM components as part of its BPM engine, enabling automated responses to changing business dynamics and real-time dashboard displays.

TECHNOLOGY

- The UBIP rapidly facilitates a comprehensive set of new business fusion initiatives, enabling the goals of business and IT to finally converge.
- The UBIP delivers an architecture that dramatically reduces the complexity associated with integration initiatives, resulting in significant cost savings and increased productivity.
- The UBIP is a platform that helps managers focus on the most important aspect of integration—rapidly improving business performance.

Scrambling to address these requirements, vendors assembled disparate products to support these diverse business integration needs. These technology assemblies have resulted in an increasingly confusing array of "bitter suite" offerings that IT departments have been forced to somehow cobble together into a coherent infrastructure. The symptom is excessive complexity and the high service costs typically associated with EAI efforts. The result is a legacy of failed or incomplete integration initiatives.

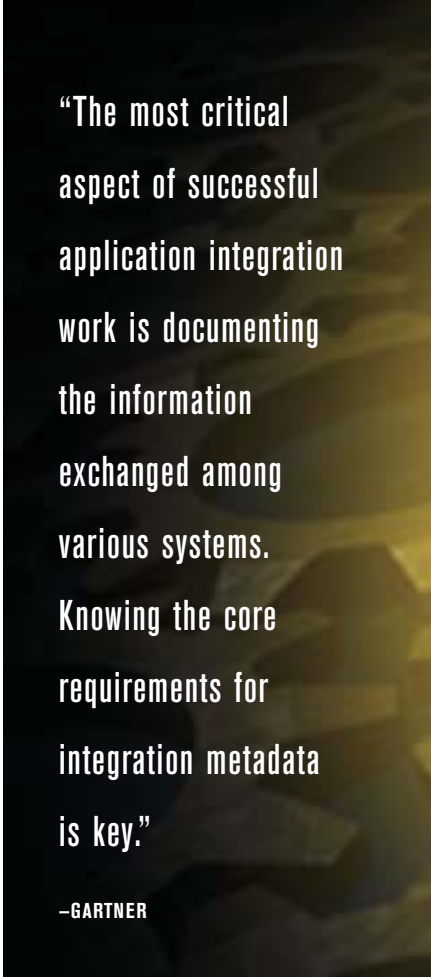
Recognizing the Pandora's box that these technology assemblies were opening, later entrants into the integration market focused on building a new integration platform architecture. Centered on the ubiquitous application server, the application platform suite (APS) unifies architecture and development across the three tiers of the integration, application and portal servers. While this is a big step forward in reducing the complexity found in the assembly approach, the APS doesn't include the data management tier in its unification strategy.

This results in the introduction of a new development architecture (relational vs. objects), programming language (TransactSQL vs. Java) and run-time environment (database management system [DBMS] vs. application server), as well as different management and development tools for the data management tier. An architectural leap that will remove this remaining complexity is still required to make universal business integration a reality.

Universal Business Integration

The goal of universal business integration is to help business and IT managers implement a "leave and layer" architecture that dramatically cuts the costs of building comprehensive integration solutions. Recognizing that successful business integration solutions are driven by metadata definitions representing all the integration touchpoints, and transactional messages that represent the data flow between these loosely coupled autonomous systems, the UBIP places the data management tier, with its single, shared metadata repository and ultrascaleable transactional message warehouse, at the core of its architecture. The result: unified architecture, development and management across all four tiers: the data server, integration server, application server, and portal.

Seamlessly combining these previously independent technology stacks in a single product, the UBIP fuses EAI with EII. It also unites:



- SOA architectures with event-driven architectures
- Real-time business intelligence with business process orchestration
- Long-running business processes with real-time composite applications
- Data management with application development
- Message warehousing with message tracing
- Relational technology with object technology and Web services.

It does this using a single development and management environment across all four tiers. It's a single platform that can dramatically reduce the complexity, costs, and time associated with complex business fusion solutions.

The Complexity Buster

Business fusion solutions link the processes of previously autonomous systems into loosely coupled but tightly integrated composite transactions. By abstracting the relevant interfaces, data and business logic models of these independent, back-end processes into a single, consistent and efficient canonical form, the complexity associated with integrating heterogeneous systems is dramatically reduced.

These independent, back-end processes need to be abstracted in the integration platform in as close to native form as possible to be effectively and efficiently used as the building blocks of new business fusion solutions.

Representing diverse application program interfaces (APIs) and data models as a consistent set of classes with properties and methods, the UBIP represents an SAP business API (BAPI) in the same way it represents an Oracle-stored procedure. A FIX or HL7 document is represented in the same way as a relational table. A JMS or WebSphere MQ message has the same class representation as a Siebel transaction.

After abstracting all the integration touchpoints in a single canonical form, the universal abstraction layer can then present these diverse components in many different ways:

- Relational tables and stored procedures
- Rich objects and methods in the native format of almost any object technology implementation, such as Java, Enterprise JavaBeans (EJB), C#, and component object model (COM)
- XML and Web services.

These can all be used simultaneously with complete concurrency control. While an application developer working in a Java environment can access an SAP BAPI as a Java class, his colleague can build reports that access the BAPI as an SQL stored procedure. The .NET team building the corporate portal can access the BAPI as a .NET class, while the business analyst modeling new business fusion processes can access the BAPI as a Web service using a BPM tool that complies with the Business Process Execution Language for Web Services (BPEL4WS) standard.

This flexibility is beneficial because it provides support for the widest variety of integration initiatives with the freedom to choose the appropriate method and technology for a specific integration task. This means managers can focus on the most important aspect of integration, which is improving business performance.

Shared Metadata Repository

According to Roy Schulte of Gartner, a leading industry analyst, "The most-critical aspect of successful application integration work is documenting the information that is exchanged among the various systems." He adds that, "Knowing the core requirements for integration metadata is key."

The shared metadata repository is among the key deliverables resulting

from unifying architecture development and management across all four tiers of the integration stack. The metadata repository contains the abstracted classes of all the external integration touchpoints and is also the central repository for all components of the business fusion solution.

The request/reply transactional messages and their associated transformation functions, routing rules and publish/subscribe lists are all stored in a single, shared repository together with the adapter definitions and their configuration parameters. The business process models and their associated automation code, BAM analytics and dashboard definitions, all live side-by-side in the repository with new business logic for composite applications, user facing front-ends, and portals.

All these components are presented uniformly as a set of classes and methods in the same development environment, and are all managed from a single repository-driven portal. That translates to no metadata inconsistency or redundancy. Shared access and centralized management of all metadata components result in improved productivity through rapid integration and development.

While the UBIP provides a single, unified development environment for building all components of the business fusion solution, the architecture supports use of third-party tools and products at almost every level of the platform's stack. Via the universal abstraction layer, existing integration products, message-oriented middleware (MOM), development environments, reporting tools, BPM products and BI tools all have equal access to all components in the repository. So companies achieve interoperability and avoid dependence on vendors.

Message Warehouse

Integration is about transactional messaging. Business process fusion solutions are loosely coupled because the interactions between the autonomous processes are message-based. Previously, these valuable payloads were scattered and isolated; their vital information wasn't readily available for management and real-time analysis.

The ability to persist tens of millions of transactional messages a day, while making this data immediately available to thousands of concurrent users for reporting, analytics, and management purposes, is a fundamental requirement for a message warehouse. Relational technology has yet to combine online analytical processing (OLAP) and online transaction processing (OLTP) functions in a single DBMS

engine, and has well-known performance and scalability limitations that can be overcome only with vast amounts of hardware.

The UBIP uses an ultrascaleable, high-performance, transactional object engine, with fused OLTP and OLAP functions at its core, as the foundation for the data management tier. This integrated data management engine enables the UBIP to persist and bit-map index every message as it passes in and out of the back-end systems and through processes. This provides immediate access to all cross-application transactional data in the message warehouse. Benefits include improved reliability and state management for long-running processes, end-to-end management via message tracking, and real-time BI. These benefits mean your organization gains immediate access to all cross-application transactional data.

UBIP: Blending EAI and EII

Prior to the UBIP, organizations interested in launching an EAI initiative selected an integration platform centered on either a messaging or application server architecture. Those interested in an EII solution selected a separate platform centered on either a database server or other proprietary technology. Some companies pursued both paths. The unification of the four tiers of the UBIP into a universal abstraction layer eases implementation of both EAI and EII solutions in a single platform. You get a single, virtual schema representing the tables, views and stored procedures of multiple disparate physical databases. You can now develop, deploy and manage EII solutions with the same platform and adapters you use for EAI. Your business managers can focus on what they need to achieve to meet business goals rather than worrying about integrating the integration environment.

BAM: BPM's Feedback Loop

As Gartner has noted, "BAM will have the most benefit where real-time analysis and immediate feedback give new power to the 'management by exception' models of the past." Gartner defines the logical architecture of BAM as being comprised of three logical layers:

- Event absorption layer
- Event processing and filtering layer
- Event delivery and display layer.

The event absorption layer, responsible for the collection of events, is natively implemented via the UBIP's message warehouse. Transactional bit-map index-

ing technology and the fusion of the data and application server enable continuous real-time analysis (e.g., comparing norms, models, or templates) of the message warehouse, which supports implementation of the processing and filtering layer.

However, it's at the device-independent event delivery and display layers (responsible for recipient notification once the severity and impact of an event are evaluated) that the UBIP takes the BAM concept to the next level. Much of the BAM that exists today is more of the management dashboard variety, providing managers with insight into transactions and operations, but lacking the ability to close the process feedback loop and enable dynamic changes to the processes that determine business goals.

The UBIP's event delivery layer can notify a recipient of an exception and continuously feed this information back into the processes, letting them react dynamically to changing events. With these real-time dynamic processes working smoothly, your organization becomes the real-time enterprise.

Conclusion

The UBIP architecture unifies previously independent technologies in a single, consistent, comprehensive platform with a unified development and management environment. The result is a dramatic reduction in complexity, costs and time typical of integration projects today.

Any organization currently planning or implementing integration projects should examine the UBIP and explore how its integration of the presentation, application, integration, and data layers can enable the rapid development and deployment of the business fusion solutions enterprises are seeking today. **bij**

About the Author



Trevor Matz is managing director, Application Integration, at InterSystems Corp., which develops and markets the Ensemble universal business integration platform.

Before joining InterSystems, he was president and CEO of Route Link, a leading systems integration and groupware development company that he founded and managed. He has more than 17 years of experience in the IT sector.

e-Mail: trevor@intersystems.com

Website: www.intersystems.com