Using EAI Solutions for Competitive Advantage

The Challenge

A company's success in today's highly competitive environment depends on its ability to adapt to rapid change. To obtain a competitive advantage, corporations must provide new value to customers through web-based customer service, while gaining supply side efficiencies through B2B e-commerce solutions. As in the past, companies must continuously streamline and improve business processes across applications, departments and global enterprise units.

Crafting a viable, comprehensive solution to the challenge faced by today's corporations is a complex, multidimensional process that includes the following:

- Implementing new applications, including user interfaces and business objects, logic and rules
- Integrating new applications with existing ones
- Combining existing applications in new ways
- Coherently viewing and synchronizing data
- Providing the IT infrastructure to support the close collaboration of internal and external teams

One of the largest hurdles for companies to overcome is the legacy (or back-end) system that supports the current set of business processes. Existing legacy systems, with their own user interfaces, databases and application logic, contain vast amounts of data that cannot be easily distributed throughout the enterprise. Often, these systems have been implemented on a variety of platforms, including mainframes, UNIX servers and PCs using diverse computing architectures, ranging from two-tier client/server to distributed enterprise-wide solutions.

Companies typically use separate systems to perform different, but related, job functions. For example, the financial system is often separate from the inventory management system. Sometimes, multiple systems exist for the same function, resulting in both redundancies and higher costs. For example, independent order entry applications may be used for both new and older product lines. Both new and more mature enterprises face the daunting task of implementing a unified, integrated approach that streamlines business processes across these disparate systems. The growing number of mergers and acquisitions introduces additional systems into the mix, exacerbating the problem. With the Current Integration Approaches Today, every company faces the need for thoughtful enterprise application integration using one or more of the following approaches:

- Application servers that enable new thin web or wireless applications to access one or more legacy systems
- Application integration engines that synchronize data throughout the enterprise
- Purchasing new, packaged systems, including ERP and customer relationship management (CRM) systems
- Workflow technologies that integrate business processes to support information flow among people and systems
- Data warehouses to consolidate and analyze important business data

Application Servers

Providing an environment for developing Web applications, these servers help preserve a corporation's legacy system investment. Under this approach, the older legacy systems are retained for their business logic and data storage services. Application servers consolidate the business data and move transactions between the Web applications and the back-end legacy systems. The servers typically contain a powerful database access component. Application servers also provide lightweight mechanisms for communicating with legacy systems via simple gateway clients, such as Java to message queues. Perhaps their greatest strength is their ability to support a common, rational business object model for a targeted group of users. The application server is integrated with the back-end systems in three primary ways:

- Creation of new public interfaces which hide or "wrap" the legacy systems. This approach eases future replacement of the legacy system but requires the additional maintenance of the wrappers if the underlying system is still evolving and cannot be soon replaced.
- Building business objects that transparently extract information from the legacy systems. This approach also hampers future upgrades and changes, since legacy system interfaces are embedded and distributed throughout the "new" applications.
- Using an integration engine between the "new' application and the legacy systems (This approach is discussed at length in the next section).

The Trifolium Frameworks product is designed to support enterprise integration using the application server approach. This product provides for support of different clients (including browsers) and different distributed computing servers, distributed business objects, database access services and legacy system connectivity.

Enterprise Application Integration Engine

The most common approach to resolving the enterprise application integration (EAI) problem is a hub-and-spoke architecture combined with a publish-and-subscribe engine. Hub-and-spoke systems typically include adapters (also called protocol converters) and a hub (also called a data router or publishing engine).

Responsible for interfacing to legacy systems, adapters convert legacy protocols--such as CICS, TCP/IP sockets and even character screens--to a single common protocol understood by the hub. Adapters are also used to convert the structure of the data and to convert the data format into a common format, such as Unicode or ASCII. The third and most important task is the conversion of the structure of the data. For example, consider the case where the target system has "customer name data" consisting of a first, middle and last name, but the source system only has an initial for the first name, no middle name and a last name. What data will be put into the middle initial in the target system and what about the rest of the first name? Two common approaches to addressing this problem are: conversion of the source data to a common model before converting to the target model, and direct conversion of the source to the target. The hub or data router is responsible for ensuring that the source data is sent to the target system from the source system, and that data is not lost while in transit among systems. Basic hubs provide routing tables and, in some cases, rules for identifying and mapping sources and targets. More sophisticated hubs implement a "publish-and-subscribe" engine that permits the smart filtering of requests. The target systems ("subscribers") request new data or changes to specific types of data. The source systems ("publishers") publish the data and/or changes. The hub automatically routes the data to the interested parties and performs administrative tasks.

This approach ensures that data changes in one system are reflected in other systems. In addition, new subscriber systems can be connected without affecting the operation of the publisher systems and with minimal manual intervention. The Trifolium Integration Manager is an example of an integration engine designed for enterprise-level applications.

Purchased Solutions

Legacy systems can be consolidated or replaced with a purchased solution, such as an ERP system. However, one purchased system usually does not answer all the business needs of a particular organization.

In a best-of-breed approach, third-party solutions that meet specific business process requirements are acquired and then integrated into the overall solution. The integration requirement is often solved with an integration engine, such as the Trifolium Integration Manager.

Workflow Technologies

Workflow process integration involves defining, monitoring and changing business processes, often using a graphical model. Information flows across systems and organizational boundaries are mapped into the graphical model, and an integration solution is generated. However, business processes are typically too complex to be remapped into an artificially generated modeling tool. In addition, many implementations simply change the way information is routed and do not provide support for collaborative processing of the data.
Workflow technologies have been very successful in highly ordered settings, such as the factory floor, where repetitive tasks need to be executed efficiently in a predefined way. However, most companies contain complex, multifaceted business processes spanning various departmental and organizational boundaries. In these cases, workflow systems are not sufficient to the task of data and application synchronization.

Data Warehousing

The data warehousing approach involves passively capturing data feeds from different systems on a scheduled timeframe. Data warehousing can be "wrapped around" older legacy systems, so that these systems do not have to be rewritten to support an integrated data warehouse, therefore keeping costs low. While solving data processing issues, this approach does not provide for real-time transactions and true systems integration.

Data integration tools, which extract, transform, move and load data, generally provide batch or point-in-time solutions suitable for the initial loading of the warehouse or large batch transfers. The data integration tools extract and load data directly, permitting data replication only at the physical level. Focusing on moving data from one point to another at a specified time, this approach fails to transmit the value-added business logic that resides above the database layer.

Beyond the Technology

A key obstacle to implementing a viable business solution is the inability to engage the entire organization. A business solution is not simply about technology. Companies need to share their "vision" throughout the organization. Those chartered with using the systems must clearly understand and support the applicable business process changes.

Introducing a common understanding of the need for change and the expectations relating to the integrated processes is perhaps the greatest challenge of any information technology project. A successful implementation requires communicating clear, compelling reasons for the change; ensuring that all stakeholders understand the new processes, roles, and responsibilities; and designing realistic measurements and rewards for the completed project.

An Emphasis on the Business Process

At Trifolium, we believe a viable integration solution focuses first on the key business issues to be addressed. Rather than concentrate on the "plumbing" or physical interconnectivity among systems, where data is simply moved from point A to point B, organizations should create business processes that span the systems. An in-depth business analysis generates a clear understanding of the business processes and workflows that need to be changed for a successful integration project. The proper methodology can then be used to build an appropriate model for the implementation.

The Trifolium Solution

As a solutions-oriented company, Trifolium understands that the different approaches to solving the integration challenge are valid, and that a workable solution will likely involve more than one approach. For companies requiring a custom solution that provides a competitive advantage while minimizing time to market, Trifolium offers its proven Frameworks application server technology. When combined with our expert business analysis services, experienced development teams and highly qualified engineers, Frameworks enables the rapid deployment of highly scalable, fault-tolerant solutions. For companies adopting the best-of-breed approach, Trifolium's Integration Manager (IM) provides real-time, reliable communications among specialized systems. Designed as a turnkey solution, the IM provides a rapidly deployable "hub-and-spoke" integration approach for back-end systems or newly purchased best-of-breed applications. The integration hub decouples applications so that multiple systems can easily send and receive information.

The Trifolium Integration Manager addresses the common problems encountered when integrating products from multiple vendors. The solution includes easily configurable application adapters, proprietary vendor database key mapping tools and the ability to run multiple hubs for extremely high fail-safe redundancy and reliability. Based on proven and scalable technology, the Trifolium IM enables organizations to build highly integrated transactional business processes. In addition, the IM hub can capture business process events into a business process repository that is part of a wider data warehouse solution. The hub can also integrate into a variety of industry-standard workflow solutions.

The appropriate selection of integration approaches enables organizations to join key business applications together to create a seamless "super-process" capable of meeting today's demanding business requirements.