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Component-Based Architectures: Time to Migrate the Enterprise Application Portfolio?

An Executive White Paper

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Executive Summary

Pressure to speed time-to-deployment of new process functionality, develop and maintain a competent staff, and balance technology cost and complexity force Information Technology (IT) professionals to grapple with a thorny conundrum: How does an enterprise deploy business software to maintain competitive advantage while minimizing integration costs and total cost of ownership (TCO)?

To date, chief information officers (CIOs) have commonly adopted one of two of the following strategies — both involving tradeoffs:

1. Deploy state-of-the-art application functionality from multiple vendors and face higher integration requirements; or
2. Attempt to standardize on a single vendor's application suite and settle for process functionality that is good enough for minimum requirements — though not for achieving competitive advantage — and endure the negative effects of vendor lock-in.

Until recently, there has been little alternative but to accept these tradeoffs. Prior Aberdeen Group research suggests that enterprises can increasingly minimize or avoid such tradeoffs altogether by adopting a portfolio strategy based on common underlying technology — that is, open-standard, component-based architectures — because such applications are ready-to-integrate and easy to support compared to legacy terminal/server and client/server architectures.

Enterprises can minimize or avoid tradeoffs by adopting a portfolio strategy relying on component-based architectures.

Component-based solutions rely on application servers to deliver robust scalability and break functionality into multiple, self-contained units of a business process, such as creating a work request or checking item availability. And, because these so-called business components share common, open programming standards, they can (a) be upgraded individually; (b) interface directly with the logic layer of other component-based applications; (c) be distributed across servers on heterogeneous networks; and (d) be easily extended to support customer-specific business processes. A standards-based architecture provides a congruous framework on which componentized applications from multiple vendors can be cost-effectively deployed, integrated, upgraded, and extended. Such flexibility can better position a company — and its IT infrastructure — to meet rapidly changing business requirements caused by enterprise growth, process reengineering, and acquisitions.

Aberdeen acknowledges that the journey to this "IT nirvana" may be long and possibly arduous, particularly for those companies that value the comfort of a single vendor and those that have not yet invested in the necessary skill sets to support

component-based applications. However, Aberdeen research finds that component standards are rapidly being embraced by an increasing number of enterprise software vendors, particularly those that lead with new business process functionality. Component technologies are also gaining increased attention in software development circles, with the number of engineers trained on these standards increasing exponentially each year.

On the basis of these factors, Aberdeen concludes that enterprises that commit to component-based architectures today will be positioned to capture market-leading functionality as it arrives on the market without incurring higher integration, upgrade, and other ongoing application support costs. As componentized applications become pervasive, companies that adopt them will have the advantage of easily interacting with the systems of other enterprises across their entire value chains. Adopting component-based architectures will also better position enterprises to leverage emerging Web-based services, which use the same technology standards and communications protocols to share business process functionality — such as payment processing — on the Internet.

This Aberdeen Group *Executive White Paper* examines the challenges and tradeoffs facing IT decision-makers today, highlighting the differing characteristics of current best-of-breed versus application suite strategies. In addition, the document charts a new course that demonstrates that standardizing on a component-based architecture can eliminate the age-old tradeoffs between best-practices functionality and the combination of integration and ongoing support costs when managing the enterprise application portfolio.

New Economy Challenges

Continued adoption of the Internet as a viable business platform and increasing economic uncertainty are placing unprecedented pressures on companies everywhere. The proliferation of the Internet has given rise to new, global competition; increased customer expectations; and a new emphasis on speed and flexibility. The fluctuating global economy is forcing companies to reorganize and manage assets both within and outside their four walls to optimize returns.

Pressures to increase productivity demand that enterprises adapt ever more quickly to industry change while holding in check or actually decreasing operating costs. The imperatives for speed, flexibility, and cost control will require companies to realign their organizational structures as well as their technology infrastructures. Such dynamics pose significant challenges for IT managers who are now being pressured to deploy technology faster and more cheaply — and with fewer resources — than ever before.

Caught up in the electronic business (e-Business) frenzy, top executives at many companies set corporate edicts to transition a wide range of business operations online — from frontline sales and marketing to procurement and Supply Chain

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Management (SCM). The intent of such initiatives is to gain competitive advantage (and, in some cases, notoriety) by being among the first to capture the process and cost savings afforded by new Internet-based business applications.

Such goals are admirable and attainable. Research conducted by Aberdeen Group and others has documented significant benefits recognized by early adopters of Internet-based procurement (e-Procurement) and Customer Relationship Management (CRM) applications. However, the mad rush to hop the e-Business bandwagon made it clear that many enterprises lack the technology infrastructures and staff skills to keep up with the pace of change — and, worse, they continue to rely on existing legacy technologies. Many of these projects either failed or went over budget, decreasing (if not eliminating) the intended return on investment (ROI). The fluctuating fortunes of the global economy have complicated matters further by forcing many IT departments to operate within even tighter budgetary constraints.

The rush to e-Business made it clear that many enterprises lack the technology infrastructures and staff skills to keep up with the pace of change.

These vise-like demands have IT professionals struggling, on the one hand, to support state-of-the-art business processes while on the other hand minimizing or reducing the TCO of their companies' application portfolios.

Enterprise Integration Versus Functionality

Under intense pressure to address this issue, the IT community today displays one of two competing tendencies. The first is to aggressively pursue strategies designed to deploy the best business processes available to gain competitive advantage. The alternative tendency is to take a more cautious approach to implementation costs — i.e., selecting a fully integrated application suite from a single vendor. In a worst-case scenario, companies careen from one policy to the other.

At times, companies have stifled best practices efforts over a concern for costs. Justification for this line of thinking was simple: "Our application suite vendor's module is good enough. We do not need to consider best-of-breed vendors." At other times, enterprises have launched ill-conceived projects on little more than executive whim. The recent e-Business craze is a prime example, whereby company executives used mantras like "We have to sell online to avoid being 'Amazon-ed'" to justify spending on yet unproven e-Commerce and Net Market technologies.

In either case, IT managers knowingly accept tradeoffs between application performance — and possibly business success — and ongoing cost. Aberdeen explores the pros and cons of each decision in the remainder of this section.

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Best-in-Class Application Approach

Often described as a best-of-breed strategy, accessing the best business process functionality generally involves the use of applications from multiple vendors who in the past used different, often proprietary, development tools and technologies. These independent software vendors (ISVs) offer process-specific applications that generally lead in the areas of time-to-market and functionality breadth and depth, particularly where industry-specific processes are concerned.

Aberdeen research indicates that enterprises deploying such process-specific solutions as e-Procurement and Asset Lifecycle Management (ALM) have demonstrable competitive advantage as a result. Specifically, adopters of these focused solutions have been able to do the following:

- Streamline operating cycles on high-volume business processes;
- Reduce processing and inventory costs;
- Improve contract compliance; and
- Enhance collaboration while strengthening long-term relationships with strategic trading partners.

Accordingly, enterprises deploying best-in-class, process-specific applications typically realize a rapid return on their IT investments, often achieving payback within nine months.

Enterprises emphasizing the best-in-class strategy have also responded more quickly to change, such as that which accompanied the recent rush to adopt e-Business technologies, during which best-in-class application vendors have often been quickest to market with needed software solutions and functionality enhancements.

However, there is a downside to this strategy. Enterprises that have deployed best-in-class applications from multiple vendors have generally experienced higher integration costs. That is primarily a result of line-of-business managers making purchases with little thought to the fit between the new application technology and existing IT infrastructure.

Such oversights are not insignificant. Because of the myriad, disparate business systems in most companies, the percentage of enterprise IT budget committed to application integration is 40%, on average. In individual cases, integration efforts have accounted for as much as 70% of an IT budget. High integration costs also suggest that upgrades and other ongoing support costs will be high as well. Higher support and upgrade costs further constrain the flexibility companies need to respond to changes in the economic and competitive environments. Unless managed properly, integration issues such as these have the potential to mute (or eliminate) much of the benefit gained from best-in-class applications.

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Application Suite Approach

Aware of the challenges of integration and needing to operate with limited IT budgets and resources, many companies are opting to purchase business application suites from a single vendor. This single-source vendor strategy offers immediate and measurable reductions in costs by delivering multiple business applications such as financials, human resources, and manufacturing on a single technology platform, though still likely a relatively proprietary one.

Proponents of the single-vendor suite approach are primarily motivated by cost and risk avoidance, believing that delivered integration and a single set of IT skills outweigh tradeoffs in the timing, breadth, and depth of business process functionality. IT managers are also sometimes more comfortable dealing with "the devil they know" as opposed to adding a new vendor to the portfolio. Though the lock-in costs associated with non-competitive IT sourcing are well documented, an assumption developed in the early 1980s is that fewer IT vendors is better, and one application vendor is best. That assumption persists to this day. As a result, those companies tend to select new business applications based on the base-level functionality being offered by the company's existing financial, manufacturing, or human resources software application vendor, *not* on the best process functionality.

Aberdeen Group research suggests that vendor-based standardization is shortsighted, especially for many large global enterprises, and particularly in light of new technology that undermines the outdated software-buying assumptions that were developed in the 1980s. Specifically, it is rare for a single application suite to meet 100% of a company's functionality requirements. That is particularly the case with Global 2000 organizations that have multiple, geographically dispersed divisions and sites and rely on myriad legacy applications. In these scenarios, the best companies can hope for by adopting an integrated application suite is to minimize the number of systems they must integrate. Yet, by limiting themselves to suite vendors, such companies assume the architectural burden of those highly engineered, proprietary applications, creating potential hazards — that is, middling business process functionality and higher-than-expected integration and support costs.

The challenges of successfully deploying a single-vendor application portfolio within the Global 2000 were made clear earlier this year when SAP, a longtime proponent (and benefactor) of the application suite model, publicly stated that this approach was difficult, if not impossible, to execute. "SAP never achieved our dream that we could cover all application areas so that our customers can support all business processes using only SAP," said Hasso Plattner, SAP co-chairman and CEO, at the company's user conference in June. "We have learned that never, ever, will the world be standardized on one set of systems, one set of applications. We must work in a heterogeneous world."

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Even Oracle Corporation, one of the few remaining stalwarts of the application suite vision, has recently conceded that potential buyers may not be willing to forgo certain best-in-class applications to install its suite. As a result, Oracle is in the process of publishing application programming interfaces (APIs), data schemas, and data definition languages to ease integration with its suite.

Notwithstanding expressions of openness, the SAP and Oracle suites still require extensive training in their respective vendors' proprietary development environments. So, IT managers are still saddled with the training, recruiting, and retention headaches associated with highly specialized IT skill sets. Likewise, integration and extensions developed with the suite vendor's tools are not reusable with another vendor's applications because they do not use open programming standards. These vendors are taking steps in the right direction but still have a long way to go before fully embracing (and supporting) the standards-based component application model.

When it comes to delivering new business process functionality, application suite vendors lag process-specific application vendors by two to three years, on average. Even then, the initial releases delivered by suite vendors are often considerably less sophisticated in functionality, ease-of-use, and "configurability" to customer-unique processes. Aberdeen research finds that it can take up to three years for the integrated software vendors to deliver capabilities that are on par with focused-solution vendors. By then, the state-of-the-art has moved on as well, leaving suite vendors (and their customers) constantly rushing to catch up with best-in-class process functionality.

This issue became glaringly evident with the dawn of e-Business. During this time, enterprises wedded to their application suite vendors were forced to sit on the sidelines as others reaped cost reductions and process efficiencies — and gained market advantage — by adopting best-in-class CRM, procurement, and other application functionality not yet offered by typical suite vendors. Not everyone who acted was rewarded, however. Depending on the engineering underlying their application portfolio, some companies that decided to jump on the e-Business bandwagon found that project costs spun out of control or that the envisaged integration simply was not feasible — and thus the project got canceled.

Despite vendors' claims to the contrary, application suites sometimes turn out to be quite difficult and expensive to implement and support. The engineered complexities of suites can stifle the benefits of delivered integration in many cases. Industry research indicates that an ERP (Enterprise Resource Planning) implementation requires an extremely high ratio of consulting services to software license fees, somewhere between 5-to-1 and 10-to-1. Although that might be configuration expense rather than integration cost, it is a high burden made worse by the specialized, vendor-specific IT skills required to execute and support it once completed.

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Maintaining and upgrading integrated application suites is a timely and costly process. Applications contained in a suite are highly engineered and intricately intertwined. As a result, even minor upgrades can be major events, requiring major planning efforts and significant IT staffing resources. When implementations are handled poorly or when companies lack adequately trained resources, implementation and upgrades can potentially destabilize a company. Witness the recent spate of earnings calls by high-profile companies blaming mediocre financial results on new business applications that do not work properly. In one celebrated case, the executors of a recently bankrupted company sought legal redress from their suite vendor because of failings in their implementation.

Finally, suite vendors will be doubly challenged to address the requirements of cross-enterprise collaborative activities that are becoming increasingly popular (and possible) with the widespread adoption of the Internet as a business platform. Getting an enterprise to standardize on an application suite is challenging. But getting an entire supply chain or value chain to standardize on a proprietary API will be nearly impossible. How could supply chain partners comply even if they wanted to? They have many suppliers and customers with numerous and incompatible systems.

Getting an enterprise to standardize on an application suite is challenging. But getting an entire supply chain or value chain to standardize on a proprietary API will be nearly impossible.

To be effective, long-term solutions for inter-enterprise processes such as commerce, suite vendors must eventually adopt development strategies and underlying architectures that allow their applications to natively interoperate with third-party commerce networks, e-Markets, and exchanges. Given their progress, to date, and the nature of their existing engineering, this process will take most suite vendors many years to achieve even with persistent effort.

Component-Based Architecture: A Solution

How does an IT manager balance the tradeoffs between best-in-class functionality and application integration? Aberdeen offers an alternative strategy: Standardize on a component-based technology, n-tier application architecture that adheres to widely accepted industry standards — *not* on individual applications or vendors.

Aberdeen research suggests that an enterprise can defuse the functionality-versus-integration debate by pursuing a technology framework in which all applications adhere to common standards. Unlike traditional terminal/server and client/server business applications, component technologies break application functionality into self-contained units of business process functionality that can be assembled

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and easily extended, as needed, to support customer-unique business processes in enterprises or their supply chains.

Individual business components communicate with other components by exchanging messages, whether located on the same memory space or distributed across a network. Each component is self-identifying and self-contained and is wrapped with communications, data-validation, event-handling, and relationship-management services. Functions, data, or objects located within one component can be accessed and reused by another, provided they speak the "same language." That is, they should adhere to similar messaging standards and to similar means of invoking their methods or support interoperability through two-way bridges (Figure 1).

Luckily for IT managers, standardizing on a component architecture is a much more attainable goal than standardizing on a single vendor's application suite. Case in point: There are currently more than 25 proprietary application "standards" — e.g., Oracle, SAP, PeopleSoft, etc. By comparison, there are just two prevailing component standards: Microsoft's Component Object Model (COM+, DCOM) or the JavaBeans/Enterprise JavaBeans (EJB) model. (Note that a third prominent standard, the Object Management Group's Common Object Request Broker Architecture Component Model, or "Corba Component Model" (CCM), supports interoperability between COM+ and CCM, and between EJB and CCM.) Even this division is not as daunting as it might first appear because both specifications are moving to support compatibility between these component standards. For example, the Microsoft Developer Network (MSDN) program subscription includes a Dynamic Link Library (DLL) wrapper for Java components, which maps Java methods to COM+ methods.

Aberdeen research indicates that an increasing number of software vendors are aggressively migrating their enterprise-class applications components based on these industry standards. Some of these efforts are documented below. The goal of these initiatives is to establish a highly scalable, Net-ready framework that is based on open standards and messaging — in lieu of traditional, monolithic application engineering. This loosely coupled, open architecture alters the structure of business applications in the following two key ways: (1) it moves from a database-centric integration model to one of database independence; and (2) it moves from intra-enterprise functionality to *inter*-enterprise process automation.

Encapsulating business logic in components and delivering it through an open interface allows companies to deploy and integrate functionality very systematically. Such rolling deployments speed time-to-payback and minimize upgrade expense by shortening the planning cycles and extended implementations that have traditionally accompanied functionality upgrades.

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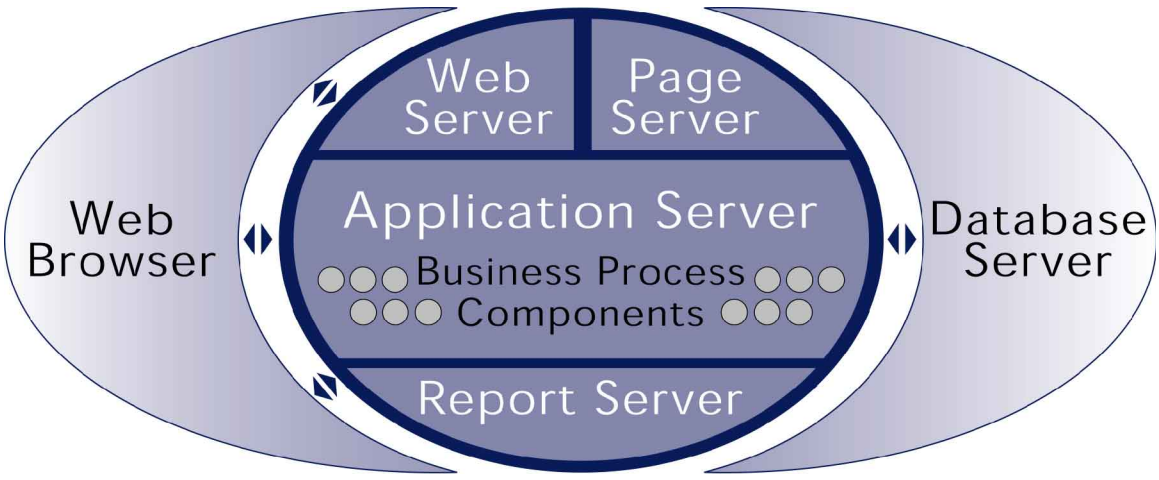
Componentization also enhances the customer's ability to extend or modify certain business functionality without disrupting the rest of the application's data structures and process workflows. By eliminating direct interaction with data elements, component-based solutions make it easier for companies to link with their other internal processes, as well as those of their trading partners. Such flexibility facilitates easy access to state-of-the-art business processes and can make the entire supply chain more responsive to changes in market conditions.

By eliminating direct interaction with data elements, component-based solutions make it easier for companies to link with their other internal processes — as well as those of their trading partners.

In summary, devising an enterprise IT environment in which all business applications are built on standards-based components can deliver benefits in the following four key areas:

1. Minimizing deployment and integration issues;
2. Shortening upgrade cycles;
3. Reducing IT staffing issues such as recruitment, training, and retention; and
4. Enhancing best-practices adoption and supply-chain responsiveness.

Figure 1: A Component Solution — One Example



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Web Services: The Next Generation of Software Development

Companies that build an enterprise application portfolio based on a consistent component-based platform will also be better positioned to take advantage of a shift to Web services. Because existing component-based applications can be encapsulated to support Web services, companies that want to access (or deploy) such services do not have to start from scratch. Like distributed components, Web services are standards-based, self-describing application components that are shared across the Internet, similar to the way that the phone company provides automated directory assistance for information on every listed business and home, regardless of geographic proximity or location. Web services rely on industry-accepted eXtensible Markup Language (XML) standards to facilitate communication between components across organizational boundaries, making them code and platform independent.

The basic intent of Web services is to allow enterprises either to fill gaps in their (or their trading partners') existing application infrastructures by accessing Web-delivered process functionality — e.g., vendor directories, product configurators, supplier price and availability, and credit and payment processing — or to assemble multiple services into a complete business process flow, such as automating the entire procure-to-pay cycle for maintenance and repair purchases. Since June 2000, all major platform vendors have announced Web services initiatives, including Microsoft's .NET, Sun's Sun ONE, HP's Netaction, IBM's Dynamic e-business Web Services, and Oracle's 9i Web Services. Aberdeen anticipates that Web services will become part of most enterprises' technology strategies, particularly as companies pursue automation of inter-enterprise activities, such as inventory sharing and demand planning.

The Well-Paved Road to Component Standardization

Aberdeen acknowledges that transitioning to component-based technology will be a long and challenging journey for most enterprises, taking months — if not years — to complete. Standardizing on these technologies will require a radical shift in the way IT managers evaluate, purchase, and deploy Enterprise Business Applications (EBA).

Standardizing on component technologies will require a radical shift in the way IT managers evaluate, purchase, and deploy Enterprise Business Applications.

In the short term, IT managers will need to set aside delivered integration and sole-sourcing preferences; they will also have to select business applications based on adherence to a component standard and their ability to deliver appropriate and best-in-class process functionality. However, companies that make the commit-

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ment to component-based architectures will be in a better competitive position at the end of their journey — and will also see measurable benefits along the way.

The following two key trends suggest that the road to component-based standardization is already well paved:

1. An increasing number of enterprise software vendors have announced that they are phasing out legacy development environments and have committed to building applications based on standard component technologies instead. For example, Oracle recently announced plans to set aside its proprietary Developer 2000 software development language in favor of Oracle JDeveloper, a development tool based on Java and XML standards.
2. Universities and IT training camps are teaching the skills required to deploy, configure, and support component-based applications.

In fact, by some estimates, within the next three years, nearly 70% of new EBA will be deployed as hybrid architectures — that is, a combination of pre-existing legacy code and newly created components.

Component-Based Development Has Matured

The promise of component-based development (CBD) and software reuse was not realized in the 1980s despite the level of interest in solving the "software crisis" problem. The majority of reuse initiatives failed for the following reasons:

- Technical infrastructure supporting reuse was immature;
- Cataloging and then finding and qualifying software assets were difficult tasks;
- Software assets were too diverse and of varying quality;
- The interfaces and behavior of assets were poorly defined;
- The culture of reuse was undervalued; and
- Sponsoring organizations insufficiently rewarded reuse.

Software reuse was revived in the late 1990s based on CBD advances and has made significant progress because:

- Object-oriented technologies and component models have matured and gained acceptance;
- Better tools are now on the market;
- Domain-specific component sets and frameworks are appearing that will make the cataloging and composition of components much easier to manage;
- Companies have learned from prior experiences; and

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- Internet computing has created higher user expectations for rapid access to sophisticated functionality at low cost.

Application Vendors Get Component Religion

Component standards are being embraced by a growing number of EBA vendors. Lured by the ability to rapidly develop and market individual modules of process functionality, leading application vendors are embracing component technologies, albeit at different levels and time tables.

Not surprisingly, the charge to standards-based component technologies has been led by startups that have no fixed installed bases or legacy applications to contend with. Thanks in part to their early lead with component technology, these vendors continue to be first-to-market with new application functionality.

For example, Ariba, Inc., a leading provider of Internet-based procurement and sourcing solutions, has built its applications on a Java- and XML-based component architecture that enables easy scalability to support additional users, as well as easy extensibility to support new functionality. This object-oriented architecture allows organizations to customize and upgrade Ariba solutions without needing to reconfigure existing business objects. This component-based design also supports the plug-in attachment of best-of-breed, third-party software modules, such as tax or freight management, allowing Ariba solutions to expand in accordance with an organization's business needs. All Ariba applications use XML for integration and interoperation with Ariba's own commerce network, as well as third-party business systems and online marketplaces.

It should be noted that e-Business startups like Ariba had the luxury of building applications from scratch on standards-based component technologies, avoiding the challenges faced by more mature ERP and best-in-class, process-specific vendors that had to rearchitect their monolithic EBA as componentized solutions while supporting the needs and functional requirements of their existing customers.

While slower to move, some of the leading ERP vendors, most notably PeopleSoft, have made more progress toward componentizing their application suites. Among Tier One ERP vendors, in fact, PeopleSoft was one of the first to take steps to transition to a componentized technology architecture. To date, PeopleSoft has componentized key elements of its application suite for deployment as entirely new, process-specific applications over the Internet. Like the other early adopters of component technology, PeopleSoft also relies on an XML-based technology framework that supports distributed computing across heterogeneous computing platforms on the Internet.

Best-in-class application vendors have traditionally maintained their lead against bigger competitors by leading in business process functionality. In recent years, forward-thinking competitors in this space have realized that they also must lead

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the market in terms of their underlying technology architectures as well. Two of the best examples of this shift are BroadVision, in e-Commerce platforms, and MRO Software, in plant asset and industrial SCM. Both vendors have made the transition to component-based architectures while staying at the bleeding edge of application functionality — despite the challenges.

BroadVision, for example, has converted its e-Commerce platform application to a Java-based technology architecture that uses Java Server Pages, servlets, and Enterprise JavaBeans to ease extension and modification of its business objects. Individual business process flows are organized into applications that are interoperable and that are organized and accessible to authorized users through a common Web-based portal. BroadVision applications support inter-enterprise integration and collaborative processes through standards-based XML schemas.

Likewise, MRO Software (formerly PSDI) was an early proponent of component-based architectures, introducing its first componentized functionality in 1998 and recently completing the reengineering of its flagship asset lifecycle management and MRO supply chain application, MAXIMO, into more than 40 business components. Built to Java 2 Enterprise Edition (J2EE) standards, MAXIMO 5.0 makes an extra effort at openness with support for open-source servers, Apache and Tomcat, as well as numerous messaging protocols including RMI (Remote Method Invocation), Corba/IIOP, COM+/DCOM, and XML. Solution architects are planning support for the emerging Microsoft .NET Web services initiative as well, enabling enterprises to easily incorporate third-party Web services into the MAXIMO solution while allowing selected MAXIMO functionality to be delivered as Web services.

Component Standards Become Core Curriculum

The growing adoption of component-based technologies by leading applications vendors spurred universities and IT training groups to develop curriculum and certifications for standards-based component development and deployment. For example, Java is being taught at more than 80% of universities worldwide. Aberdeen expects that this trend could help alleviate many of the current challenges IT managers face in hiring and retaining competent staff.

As the number of skilled component engineers grows, recruiting the resources necessary to develop and manage an enterprise application portfolio based on architecturally consistent Internet standards will become increasingly cost effective. Put simply, by standardizing their IT infrastructures on open standards, companies will no longer require unique, high-cost, vendor-specific skills or complex systems integration expertise. Instead, enterprises can operate with leaner, low-cost IT staffs where the core skill sets incorporate an employee's knowledge of widespread Internet technologies such as HTML (Hypertext Markup Language) and XML and one of two basic component messaging standards.

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Armed with these common and highly transferable skills, even new recruits have the skills necessary to work directly with business line managers configuring, extending, and integrating components into solutions that effectively address (and continue to adapt to) the unique requirements of the enterprise. Because component-based applications are built on common standards, an IT infrastructure built on these components requires fewer staffing resources to support. And, due to the simplicity and widespread teachings of component technologies, enterprises can hire IT resources at a lower cost.

Technology Standardization in Action

Thanks to the above trends, forward-thinking companies have been able to embark on the journey of transitioning their internal software architectures to a new software components model. Although most of these companies are still in the midst of this transformation, many have already recognized benefits from their architecture decisions (Table 1).

For example, in 1997, Charles Schwab & Co. made the tough choice to transition its legacy application environment, which consisted primarily of Cobol-based applications, to a new Java-component-based architecture. The financial services giant describes its transition to a component-based architecture as a key enabler of its ability to quickly assemble and deploy solutions for online brokerage services. That move firmly positioned Schwab as a leader in online brokerage services, enabling the company to fend off myriad nimble upstarts in this sector. By the end of 2000, 75% of Schwab's business took place over the Internet. Moreover, managing trades online has allowed Schwab to cut $100 million annually from its trading costs.

Table 1: Benefits of Component Technologies

Feature	Reported Benefit
Language- and platform-independent component reuse	Reduction in development time and development cost by 30% to 50%; improved programmer productivity by 30%; improved application quality by 20%; faster time-to-deployment by 20%; and increased customer satisfaction.
Easy access to enterprise IT resources	Lowered development costs and faster time-to-deployment for sophisticated, functionally rich applications.
Runtime (dynamic) reuse of services	An easier method to develop distributed Internet applications, resulting in reduced time and cost.
Dynamic scalability	Components can be redeployed in real time to improve throughput of applications, resulting in improved levels of customer satisfaction.

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Aberdeen Conclusions

For decades, IT managers have been chasing a holy grail that would allow them to deploy advanced business application functionality while minimizing integration requirements. Widespread adoption of the Internet and global economic uncertainty are increasing the pressure on IT to balance these competing needs.

To date, the majority of IT managers have been forced to accept a tradeoff between the following two extremes: (1) accessing best-in-class application functionality from multiple vendors and contending with high integration costs; or (2) standardizing on a single vendor's application suite and settling for process functionality that lags the market both in sophistication and availability.

Enterprises selecting business applications based on either of these strategies will continually face either complex integration challenges or lagging application functionality and limited flexibility. Aberdeen Group research suggests that enterprises can minimize or eliminate such tradeoffs by basing enterprise application purchases on Internet technology and one of the component architectures.

Component-based enterprise software solutions adhere to one of two common object standards — Microsoft COM or Java-distributed components — with XML playing an important supporting role in both cases. Unlike their proprietary, monolithic predecessors, component-based application portfolios break functionality into multiple, self-contained, open-API modules that can be assembled, integrated, reconfigured, and extended relying on only a common set of technical skills learned in university curricula or IT training.

Although laying the foundation of a component-based application portfolio may be challenging in the short term, Aberdeen research suggests that the rewards of such technology standardization can dramatically reduce TCO for enterprise business applications and better position enterprises to respond to changing IT requirements and market demands. With an increasing number of business application vendors and IT training camps moving to support component standards, migrating an enterprise IT environment to a component standard will become increasingly simplified.

In short, the time is finally right for companies to develop a consistent, open-standards-based framework on which applications from multiple vendors can be deployed cost effectively. Enterprises that standardize on component technology will be well positioned to access market-leading process functionality, and they will also reduce integration and ongoing application portfolio support costs, potentially gaining competitive advantage in rapidly changing markets.

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Aberdeen Group is a computer and communications research and consulting organization closely monitoring enterprise-user needs, technological changes and market developments.

Based on a comprehensive analytical framework, Aberdeen provides fresh insights into the future of computing and networking and the implications for users and the industry.

Aberdeen Group performs specific projects for a select group of domestic and international clients requiring strategic and tactical advice and hard answers on how to manage computer and communications technology.