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From Hack-Ups to Mashups:

Composites Come of Age with Oracle WebCenter

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Executive Summary

From the dawn of IT, end-users, the people using the solutions, have been waiting while developers built the applications they needed, usually by assembling bits of information and capabilities from many different sources. The capacity of people with the know-how to build solutions has never kept up with the end-user's needs. IT has long recognized that this bottleneck is a problem, but the obvious solution, allowing end-users to build their own solutions with reusable parts supplied by IT, has been hard to realize.

During the same period, technologists have yearned to build solutions out of reusable parts rather than starting from scratch. If new systems and applications could be somehow constructed from reusable building blocks, more solutions could be assembled faster at a lower cost.

One common approach to addressing the needs of both of these groups is the idea of the composite application, an application built from reusable components or services. Mashups represent a simpler subset of composites—so simple that end-users can create mashups themselves.

By empowering business users to create what they need quickly and by making the IT-created building blocks reusable, the IT bottleneck can be broken. More people can be better informed and able to take action quickly. Many previous approaches partially solved the composite and mashup problem, but something was always missing.

In this paper, CITO Research reviews why attempts to date have failed and explains how Oracle WebCenter provides a complete solution that enables end-users with the support of IT organizations to assemble solutions that meet their needs.

Often, technology reaches the height of its hype cycle when it's not nearly ready for prime time. Such is certainly the case with composites and mashups. Although developers could create composites and mashups, business users really couldn't leverage the reusable components that IT was developing for their specific needs. Companies experience a number of pain points that block the way to easily creating composite applications and mashups:

- *Heterogeneous technology landscapes*. Businesses of any size operate in a heterogeneous technology environment, with a collection of legacy systems and a diverse application portfolio that makes it challenging to get a unified view of information and to interact with it holistically

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- *Difficult integration*. Despite technical standards that attempt to allow applications to work together, there have been gaps that developers had to bridge and often at great expense
- *Legacy system roadblocks*. Although it is relatively easy to put web-based applications onto one screen, as in a portal or mashup, mission-critical data typically resides in older systems that is much more difficult and expensive to reach
- *Static, unified view of business data*. To tap the power of information and people, a company must be able to tap enterprise data *and* allow business users to engage with it

This last point requires a bit more explanation. Pushing data to end-users is only half of the battle; it needs to be a two-way street where users can make decisions based on data and can easily change or annotate that data, without numerous steps into different applications. Without this bidirectional information flow, companies cannot realize the true value of social collaboration to harness 'the wisdom of the crowd'—and actually transform how they do business through social collaboration.

Picture a dashboard that lets you drill down and see data in different ways, then open a chat with relevant people so you can share the screen and have ad-hoc meetings to ask questions and clarify strategy. What if you could then annotate the trends with your conclusions? If you have a question, it's likely that other people do too. By adding in your questions and the answers, you can prevent five other people from going through the same process. Everyone gets fresh perspectives as others add in their take on the data and ideas about how to make things better.

The true value of mashups can be realized only if creating mashups is affordable and if it is easy for business users to help—and if data security and compliance are guaranteed so that IT can be assured that empowering users is not risky business. The end goal is for IT to be able to focus on creating reusable components and infrastructure and enabling business users to leverage these components to create or customize composite applications.

The Case for Composites

Let's consider what composite applications and mashups are and why people want them. The Web has conditioned us to expect to have everything just as we want it, whether that's iGoogle, with email, calendar, tasks, and weather featured, or a trip planned with directions to the location, with photos and restaurant reviews.

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That expectation increasingly becomes a consumer demand for such immediate and complete information. Take a customer banking online. The customer expects to be able to interact with the bank in a simple and secure manner, seamlessly. If the customer has a checking account and a credit card with the same bank, he expects to be able to do all his banking through the web site, easily and quickly. The customer neither knows nor cares of the bank's difficulty in bringing numerous legacy, transactional systems into the Web loop. But the customer does get frustrated that his bank makes him log onto a separate site to see his credit card account—*with the same bank!* If the bank capitalized on composites, the customer might simply click to call a rep to query a charge on his card and the rep, having access to the bank's customer relationship management (CRM) system, would recognize him as a valued customer and suggest a new card with rewards better suited to his spending style, at no additional cost. Better, he and the rep could compare card features together.

Instead, what seems easy to the customer is a technological snarl for the bank. How to combine data from the bank (in this customer's case a corporate acquisition) with the parent bank's credit card system? How to access customer data from a database and have it speak to the call center application that is based on newer technologies like HTML5 and REST? Then, if the customer accepts the new card offer, how to link that back to the ordering system? And on and on.

Businesses also have thousands or tens of thousands of internal customers, and IT is equally challenged serving them. Even if end-users had access to the plethora of company applications that could potentially help them to do a better job, how could they find just the features they need, buried in the complex menus of traditional enterprise applications? They both need and demand shortcuts. What if they could jump to (or better yet, be presented with) the options or functions they need, securely, and make changes on the spot? No extra navigation, logons, or application expertise required.

Oracle WebCenter provides a way to do just that, giving end-users both a dashboard and a way to immediately act on or augment the information they see in that dashboard, to interact with others, to bring in other information, to annotate existing information, and so much more.

The dashboard shows the data the firm has pushed out, giving the user a tailored composite view of information—a bit like an at-work equivalent of iGoogle. The difference is going beyond dashboards to give the user power to act on the information, allowing him to work better because he has the power to easily access all relevant applications and update information that is consistent with his role.

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Take the example of someone whose work involves invoice processing. That part of the enterprise resource planning (ERP) system feeds into her personal portal or dashboard. She notices a customer is late paying, but is aware that the firm is about to obtain a major order from that customer. She can annotate that invoice and send it to accounts receivable, alerting them not to assess a late fee.

Instead of letting end-users easily get in and out of the enterprise systems they touch, such as ERP, firms routinely spend tens of thousands of dollars writing programs to customize systems for particular groups of users.

You might think of it in terms of enterprise applications and niche applications needed by a select group. Enterprise applications, such as Oracle E-Business Suite (for ERP), a Siebel CRM system, or PeopleSoft for human resources, have so much data and the businesses using them vary so much that no programmer could ever imagine and code all their different uses into a single application. Composite applications let business users surface just the pieces of functionality that they need, allowing business users—with the help of IT—to build appropriate views of enterprise applications into their own niche applications. And they are applications, not just views, because Oracle WebCenter creates a way for data from the various systems to interrelate.

Vital data today lies buried in the bowels of enterprise applications. That's often the very data Oracle clients want to include on their company intranets and portals.

Earlier composite applications attempted to integrate systems that predated the Web onto users' screens or web pages. Creating these applications called for computer programmers, not tech-savvy business users. Composites from the world of service-oriented architecture (SOA) were difficult to create. Oracle WebCenter's major accomplishment is overcoming this historical difficulty, making it far easier for business users and IT to work together to the benefit of both. IT creates reusable building blocks, maximizing efficiency, and business users can take those blocks and use tools such as the Business Mashup Editor to create simple apps.

The Composite Holy Grail

Why did previous approaches to composites and mashups fall short? Here are some of the main historical approaches and their methods.

- *SOA* was an effort to access enterprise data in legacy applications, but it did not address the user experience layer or offer business user tools. It was still very much a programmer's game

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- *Business Process Management* (BPM), conversely, provided lovely depictions and orchestration of business processes, but visualization wasn't tied to execution
- *Object-oriented programming* intended to recombine data blocks (objects) as new applications, but it took years to create enough objects to reuse, and reuse was once again limited to programmers
- *Legacy Portals* had much the same problem as BPM: they could assemble information, but often couldn't easily connect to all required sources of information, such as legacy systems
- *Early mashups* offered a browser-based approach to simpler composites, but still required programmers to offer the framework to plug in various pieces
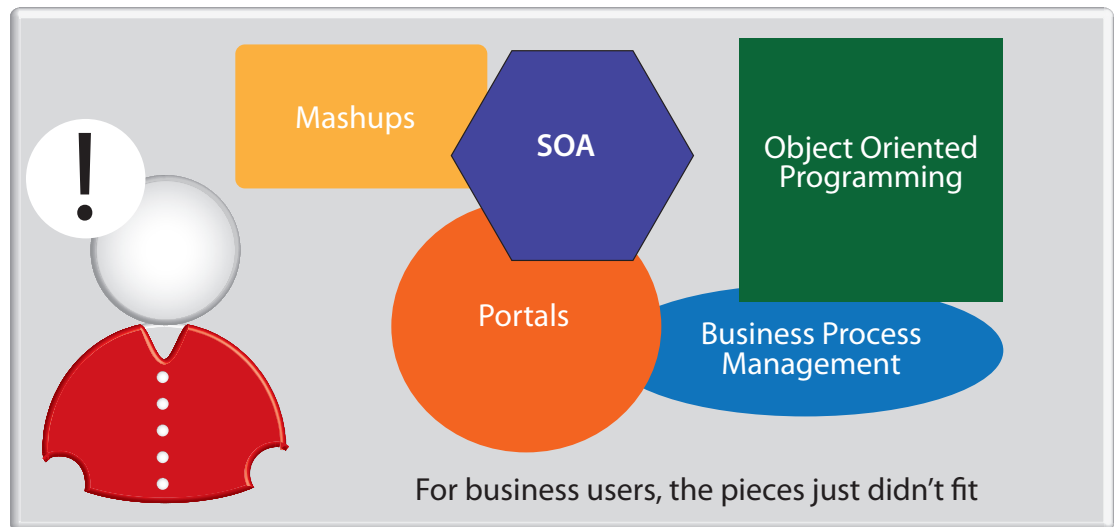
Figure 1. Technology to create mashups and composites didn't fit together

To date, some individual vendors handle a part of the process well—for example, great data visualization by a firm that cannot help companies access legacy data—but there's a general need to knit it all together and connect service capabilities that empower business users to act.

Also, data security is very difficult when drawing from so many diverse sources and early portals gave near universal access, but without the enterprise controls that a business needs.

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The Oracle Difference

Oracle addresses the core challenge in composite applications: creating a business context in which users can participate in creating their own mashups to accelerate business processes and meet their own needs. In-context mashups and social media tools mean that users can act, right where they are, rather than navigating through numerous screens, windows, or applications. Users engage with applications; they are not just passive recipients.

Oracle WebCenter solves the issue of accessing data and applications. It provides data visualization and workflow. And, by providing an environment in which elements are designed to be combined (mashed)—everything is tightly linked. This commonality means data security, for example, is built in. The data being accessed uses *introspection*—a way of looking inside itself in computer-programming terms—in order to ensure that it offers operations or viewing in concert with existing business rules. While Oracle WebCenter empowers business users, it also makes it possible for business strategists and IT to lay down some ground rules.

Oracle WebCenter Portal is a departure from the limitations of traditional portals. Part of Oracle WebCenter, the portal sits atop prebuilt integration services, rather than being an integration service. It's more malleable than an old-style portal built solely on Java standards. In Oracle WebCenter, mashable elements such as service access, content integration, and social collaboration are core, native concepts, whereas traditional portals often bolted them on later.

This seamless integration contrasts with the normal development of mashups, willy-nilly—an iterative approach in which each solution brings up a new problem for the next stage of development.

With many tools available claiming to create mashups and composites, businesses are tempted to purchase something off-the-shelf to get up and running. But without the integration that Oracle WebCenter provides, IT will have to go from system to system, creating interfaces, adding workflow, and applying security. Shortcuts to composites like these wind up being false economy.

How Oracle WebCenter Works

Two key elements of Oracle WebCenter are a common data/content repository across the enterprise and a way to represent that data and incorporate it in workflows: the Data Control and the Application Development Framework.

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These may sound technical, but they are key to facilitating social collaboration because they provide an easy way to insinuate business users into the process of creating composites, which was almost exclusively the preserve of technology experts.
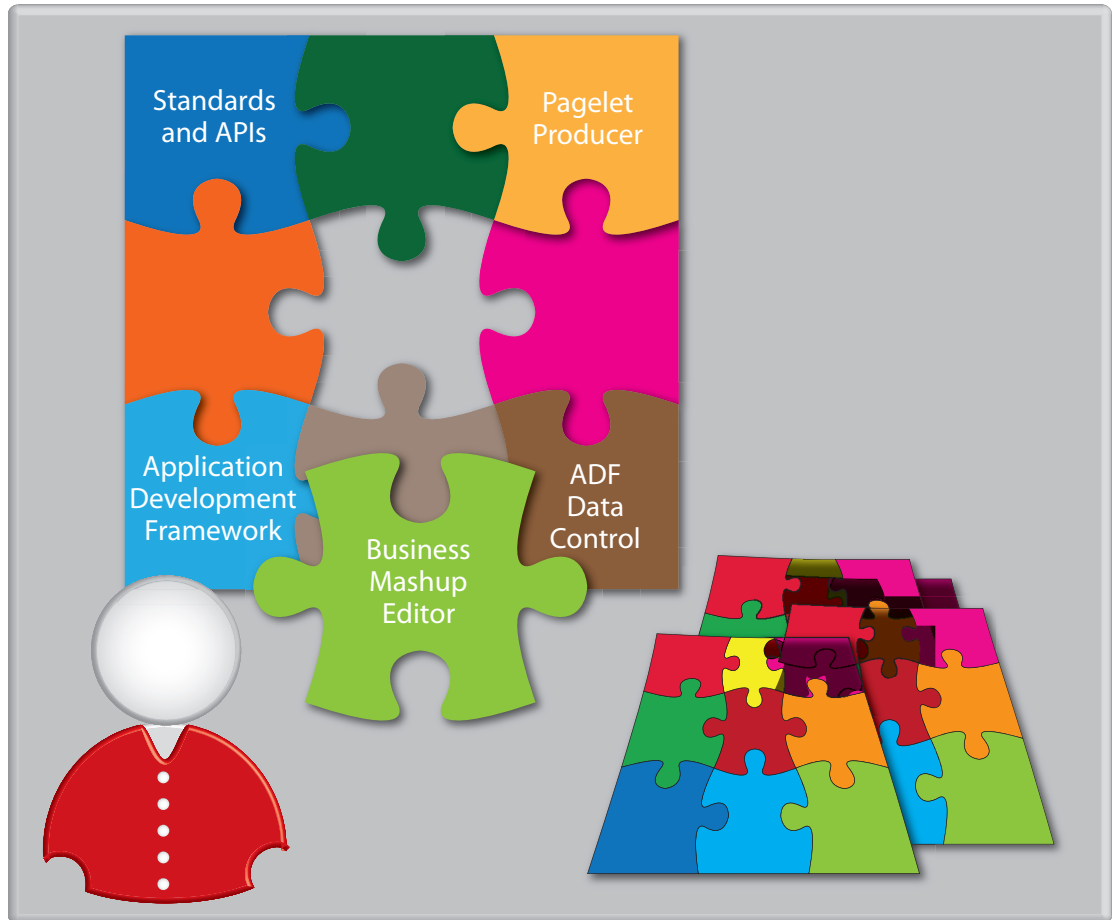

Figure 2. Oracle WebCenter delivers on the promise of user-created mashups

Application Development Framework Task Flows

The Application Development Framework (ADF) enables a fruitful partnership between IT and business users. An ADF task flow is a set of user interactions that is part of some routine behavior. For example, there are pretty standard steps to a customer purchase online. These can be captured in part or in their entirety, as one reusable element. A task flow may capture the typical sequence of a shopper providing username and password; providing customer name, address, and contact information; and providing credit card information.

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A task flow is a visualization of a set of steps. Task flows help break processes into manageable chunks. IT can develop task flows and business users can adapt them or reuse them in a variety of applications. Task flows are key for creating encapsulated, standalone services with a user interface that can be consumed in multiple pages in various applications.

Developers can surface task flows in the portal easily. If a task flow is modified behind the scenes, it is automatically updated in the portlet, saving time and ensuring that any changes are propagated automatically without any additional effort.

ADF Data Controls—Easy Access to Buried Data

ADF Data Controls shield users from the complexity of how data is accessed. The user needn't care where it's stored or how to access it. Data elements are defined once, by a developer, and then used by staff. (Backstage, so to speak, the developer uses application programming interfaces or APIs to access and categorize the data.) Once the data control extracts the data, it is housed in a standard, companywide format—the data model.

Introspection enables Oracle WebCenter to find out all sorts of things about the data so that it will be automatically used in the right way. What's there, a simple table or stored procedures? What fields and functions are there? What users can access this data? These are among the questions automatically answered through introspection. They pave the way for two-way interaction to be built into the system so that end-users can act on the data and applications they receive without IT's help. In our earlier example, the worker modifies how an invoice is treated, and that is made possible by introspection, which ensures the user has the authority to make those changes.

Data from an ADF Data Control might be surfaced in a web browser, as part of a mash-up, or used to create new applications.

Pagelet Producer—Safely Abstracting Web Data

Pagelet Producer is a set of tools that enable users to go to any web application and extract the content that they want to incorporate in their mashup. The user might simply want to pick up a newspaper's daily list of exchange rates or might want to take an interactive portion of a web page and surface it in their portal. Rather than just showing a part of a web page, the Pagelet Producer preserves the interactivity of that page with any backend systems. Most importantly, when allowing elements from outside systems onto the company computer system, Oracle WebCenter handles all of the security mapping, the mapping of roles from the portal environment into the

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end application. Identity is passed seamlessly from one application to another application. This ensures that the portal environment conforms to the enterprise level of authentication and authorization.

Business Mashup Editor Makes Mashups Easy

The Business Mashup Editor simplifies the process for developers to create reusable components that business users can then use to create mashups and personalize mashups that have been created for them.

Using the Business Mashup Editor, developers, administrators, and power users can create mashups in the running portal or social and collaborative application without bringing the system to a halt. Developers easily create components that retrieve information from different data sources while business users have the flexibility to customize their view of mashups.

Mashups Mature to Industrial-Strength Security

Security is one of the most complex components in the creation of mashups. Something as seemingly simple to the customer as logging on could, in fact, require communication with four backend systems, two confidential databases, and two applications. The security system plays a gatekeeper role, a go-between that maps the customer request on the web site back and forth from these proprietary systems.

In Oracle's approach, both the security application and the portal speak the same language, making it easy to prevent security loopholes. All Oracle applications are certified using Oracle Access Management, which can tie into vendors' security systems, too.

Optimizing Traditional Approaches: Standards and APIs

Oracle WebCenter implements a wide range of standards. It goes beyond adopting technical standards—such as JSR168, WSRP 1.0, 2.0, and so on—to test and certify that each works perfectly with Oracle WebCenter. Standards-based approaches ensure that however heterogeneous your system landscape is, everything can be incorporated into Oracle WebCenter Portal.

Application programming interfaces (APIs) provide a common language so that applications can talk to each other. Oracle uses many APIs, including SOAP for older systems and REST for web applications. All in the background, these APIs allow Oracle to combine data and applications from any system, be it Oracle's, another vendor's, an old homegrown application, or the latest thing on the Web.

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Oracle Fusion Applications: The Next Evolution

Oracle Fusion Applications bring even more standardization to the process because they are based on Oracle WebCenter. The technology used to combine applications is the same technology that was used to create them, so your mashup is almost done for you. There is even speedier creation of composite applications with Fusion Applications in that users are merely configuring parts from a common widget library. The ease of maneuver between the two means that a user could, for example, readily dip into an ERP system and combine, say, sales orders, with historical sales charts from the business intelligence (BI) system in Oracle WebCenter. Fusion Applications are essentially ADF task flows. The Fusion Middleware on which they are built invokes underlying business logic, not just data.
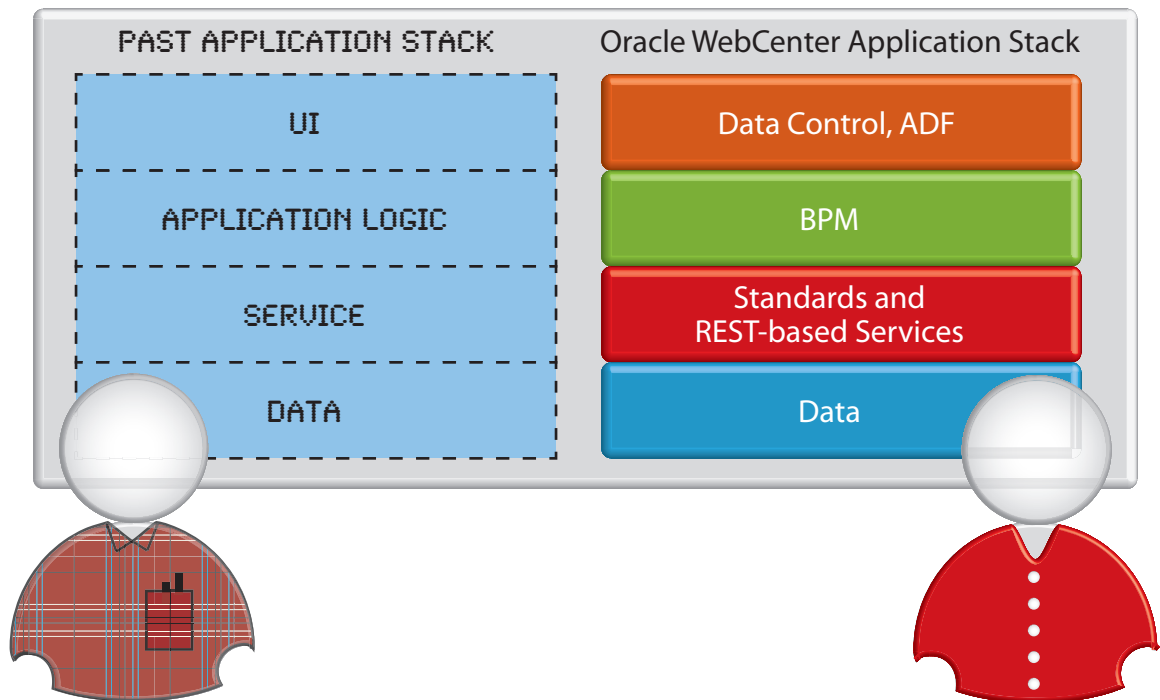
Figure 3. A new application stack supports end-user application creation

Oracle WebCenter in Action

In one simple case where Oracle WebCenter is used today, farmers who are customers of Land O'Lakes order seed directly from the firm through a web interface. It's simple, but unthinkable to allow access to previously off-limits backend systems without the data security Oracle provides. The portal provides up to date information and specific

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recommendations based on the farmers' locations. This personalization enables Land O'Lakes to offer more targeted service to its customers.

The ordering of more complicated supplies, such as technology equipment configured to the user's own specifications, is part of several Oracle WebCenter deployments. It's also part of the personal portal Alcatel Lucent offers to resellers of its networking equipment. Business customers have personalized home pages, localized in their language, reflecting the particular products they sell. The page could have a mix of content, from press releases, to the latest version of appropriate manuals, to technical notes. The portal provides customer's with Amazon-like recommendations and are customizable by end-users.

The personalization engine in Oracle WebCenter Portal plays a role in business-to-business and business-to-consumer deployments, using rule-based scenarios to segment the customer base and help ensure that marketing offers and customer service are tailored to the individual represented. Furthermore, business users can customize the portal to target particular customer segments and needs. Instead of having portals that are locked down by IT, Oracle WebCenter empowers business users with extensive personalization capabilities.

Customer service is another popular application of Oracle WebCenter. In-context collaboration provides, for example, a way for a dissatisfied customer to raise an issue and escalate his complaint online. He may generate and track a complaint ticket, see which customer service reps he dealt with in the past month, and send instant messages to the reps online.

Oracle's process is already two-way, with Oracle WebCenter not merely publishing content in one convenient location for users, but allowing users to become part of the process of creating that content.

Business can be done better, led by social collaboration—if the core data about the business can be brought into the discussion. Take a contract negotiation. Experts from the legal and marketing departments (maybe sourced though a company wiki?) could readily collaborate, but to arrive at a fair price for a service, they need to see some business intelligence about the relative standing of the company's products.

Another real point of pain, this time in the pharmaceuticals industry, is the sourcing of locations for drug trials. It's a big business risk with a big bearing on outcomes. The drug company could greatly benefit from an intranet where staff involved in site selection could, for example, pull up demographic details for any given area, informa-

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tion about leases, and so on. Even better if they had an extranet connecting them with local real estate agents to negotiate the leasing process.

How Business Benefits from Oracle WebCenter

The technology that existed piecemeal in the past to facilitate composite applications has finally converged in Oracle WebCenter Portal. It has the native tooling of Oracle WebCenter: secure data access and management, data and application visualization and personalization, and the ability for users to engage with that content and with each other.
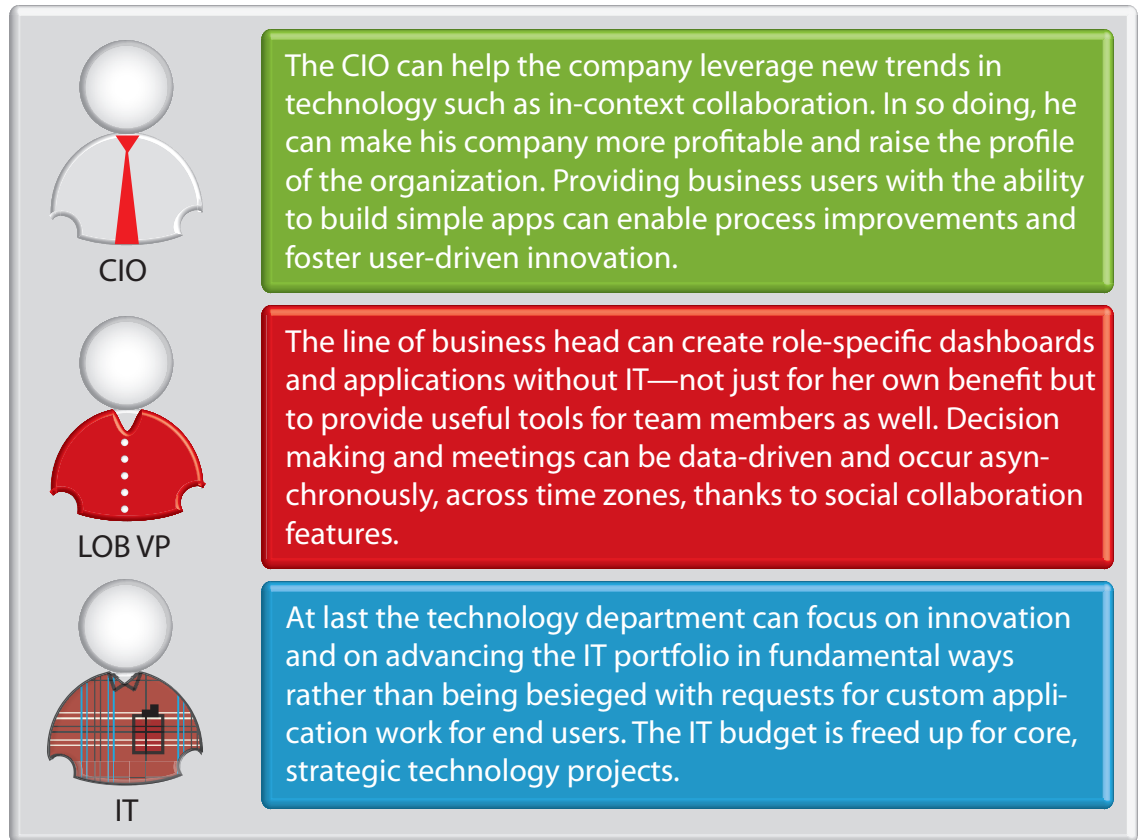
A small work group might need a composite application to really boost their efficiency. In the past, that application would never have made it to the IT development project meeting: no matter what the ROI for that small group, other IT projects would supercede it. Fast forward to Oracle WebCenter, which now allows this small workgroup to take matters into their own hands and develop a composite application that brings the company nearly immediate ROI. Replicate those small successes across the enterprise, and you have a game-changing ripple effect.

Add to that the increase in job satisfaction and decrease in frustration as users move from a world that forces them to jump between systems to handle their daily tasks to a flexible, interactive, and socially aware environment that brings computing power just to where it is needed: to speed and support daily work, instead of requiring frustrating (and inefficient) task switching.

You'll begin to see benefits like these:
- Quick and affordable application development
- Self-service for business users, breaking the IT bottleneck and customizing workflow to each individual
- A nimble business, whose employees can react immediately to market developments, using composites and mashups
- Holistic use of company data
- Social collaboration that leads the way in improving how business gets done

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CIO

The CIO can help the company leverage new trends in technology such as in-context collaboration. In so doing, he can make his company more profitable and raise the profile of the organization. Providing business users with the ability to build simple apps can enable process improvements and foster user-driven innovation.

LOB VP

The line of business head can create role-specific dashboards and applications without IT—not just for her own benefit but to provide useful tools for team members as well. Decision making and meetings can be data-driven and occur asynchronously, across time zones, thanks to social collaboration features.

IT

At last the technology department can focus on innovation and on advancing the IT portfolio in fundamental ways rather than being besieged with requests for custom application work for end users. The IT budget is freed up for core, strategic technology projects.

Figure 4. How Oracle WebCenter Changes Your Day

Composites may have seemed elusive, abandoned by some as too good to be true. Now composites are not just possible, but essential. This CITO Research paper has shown how Oracle WebCenter Portal can enable your firm to take its current set of applications and rapidly create composites that become ever more powerful as social collaboration recreates those applications to serve better ways of doing business.

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CITO Research is a source of news, analysis, research, and knowledge for CIOs, CTOs, and other IT and business professionals. CITO Research engages in a dialogue with its audience to capture technology trends that are harvested, analyzed and communicated in a sophisticated way to help practitioners solve difficult business problems.

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