

Encapsulating n-tier PeopleSoft Applications for Legacy Deployments

By D.L. Daniels

As the marketing aura surrounding Oracle's Project Fusion begins to resemble Project Fiction, many PeopleSoft customers are looking to a simpler solution – GOING LEGACY. In the mainframe era, this was a common tactic of cutting costs and extracting maximum value from de-supported IT investments. For organizations with stable implementations and happy with current functionality, such a strategy represents one common sense alternative.

As with so many trends in our industry, we can look to the past for guidance. When IT investment shifted in the 1980's from mainframe and mini computers to client-server deployments, many shops chose to encapsulate their existing systems. Organizations wrapped their applications in a 'digital bubble' that minimized change and maximized stability.

In this article, we examine the issues involved in a modern n-tier application encapsulation of PeopleSoft Enterprise.

Why Encapsulate: The Future is Off-Premise

Whether described as *hosted*, *ASP*, *on-demand*, or *utility computing*, most pundits agree that these off-premise computing delivery models will eventually overtake in-house IT deployments. The reason is simple – the current on-site, on-premise ERP delivery model is just too costly.

Admittedly the off-site model has been slow to emerge. But just as large firms once provided in-house electricity generation, such network centric activities like ERP are usually cheaper, faster, and better performed at some end point upstream. This leaves you to focus on the core business at hand. Indeed, history has shown that ever since client-server architectures were fraught with client side complexity we've been steadily moving toward increased IT simplification through centralization. The consumer software markets are ahead of Corporate IT in this realm, where a consumer's entire digital existence can already be housed in cyberspace.

Thus the argument behind yet another in-house upgrade or migration to a new ERP platform (i.e. Fusion) is superseded by the rapidly emerging off-premise delivery model. Such a trend begs the question: Why invest in a costly upgrade or migration NOW, when it is certain that we will be faced with a major investment to move our ERP off-site in the next decade?

Instead, for many cost-conscious PeopleSoft shops, it's decidedly better to rest on the sidelines with a stable application while the off-premise model matures over the next decade. Application encapsulation of the existing deployed product set provides time for the market to play itself out, and a clear future computing model to emerge.

Encapsulation re-Visited

Most subject matter on encapsulation focuses at the software component or transaction layer. Primarily this research has produced wrapper technology, such as CORBA, that allows external clients access to the needed encapsulated functionality. We have broadened the definition of encapsulation to be successful in encapsulating a PeopleSoft n-tier environment.

We define Application Encapsulation as:

“the process of flexible version freeze achieved by placing the entire application stack in a secure physical, logical, and virtual wrapper that prevents access or changes to data or program structures yet allows specified business processes and tax/regulatory updates into and out of the system.”

It's simple enough on the surface – freeze your stable PeopleSoft application as it is today in order to extract maximum value while the software industry and market forces flesh out the future. However, due to PeopleSoft 8's multi-tier complexity, we must re-visit encapsulation in terms of the modern n-tier environment. Because we are dealing with not the monolithic AS/400 systems of the 1970's, but rather a complete technology stack of interacting technology components, we must look to a new encapsulation approach. That is, how do we freeze the supporting PeopleSoft application software stack components such as Operating Systems, Databases, Application Servers, etc. Furthermore, we must contend with tax and regulatory changes that impact the business processes contained within that environment; since, to be useful, the encapsulated environment must continue to maintain correct tax and regulatory values.

Encapsulation through Virtualization

Since any change to the underlying software stack can have undesirable results on the stable application, the encapsulated software stack can no longer be explicitly upgraded or changed as the application moves through time. To achieve lasting longevity of the application, we must encapsulate these software stack components as well as the PeopleSoft application code itself.

One way to achieve software stack version freeze is using modern virtualization technology such as provided by the vendor VMware or the open-source Xen project. Such virtualization software is ideal for legacy environments as it allows one to support de-supported software versions well into the future. By creating virtual PeopleSoft hardware machines on a host platform, older OS, RDBMS, and middle-tier technologies can continue on their merry way even after their underlying hardware-software platforms have long vanished from the data center.

Virtual machines loaded with the current, stable version images of your PeopleSoft software stack provide a safe longevity path. For example, assume your shop is running the WebLogic middle-tier software on a Windows NT platform, an OS which is de-supported by Microsoft. Assume that you would like to run this middle tier in perpetuity.

Using virtualization technology, you can re-host the machine in a secure virtual guest operating system environment which has built-in support for all Windows versions starting with 3.1. (See Figure 1) As time marches on, you can upgrade the virtualization software and host operating system while the legacy WebLogic components will continue to run inside the Windows NT virtual environment despite vendor de-support dates or other changing external hardware-software platform factors. Applying this same principle to the remaining Database, Web Server and other components of the PeopleSoft stack, shops can achieve version freeze of the complete PeopleSoft application stack.

Moreover, since we are dealing with machine hardware images, virtualization provides us with instant recovery and roll-back in the event of critical failure. For example, say we introduce a performance tweak into our WebLogic production legacy environment. Using the virtualization software, we can readily clone the existing, stable hardware image and test our performance tuning in iterative cloned environments until we achieve the desired result. If we later discover that this performance tweak caused inadvertent results, we can merely roll back to the previous production environment by reverting to the saved hardware image. (See Figure 2) In this way, by taking regular clones and snapshots of our legacy environment, and backing up these hardware images to a secure location, we are certain to have a complete stable hardware image to revert to in time of critical need.

Virtualization thus provides a method for freezing and extending the n-tier PeopleSoft software stack well into the future. By providing a production-grade virtual machine architecture by which stable environments can be encapsulated, virtualization enables the PeopleSoft guest environment to run in a secure host assured of perpetual longevity. Only lately has the rapid progress in virtualization software allowed production applications to run on a virtual host. By leveraging the progress in this field, it is now possible to achieve lasting legacy deployments of n-tier environments.

Inputting Tax and Regulatory Updates

Business logic values and lookups cannot be frozen entirely. The application must pay heed to the ever changing labyrinth of laws, regulation, and tax codes that impact it. Unlike older ERP systems in which tax refreshes were decoupled from the application, modern ERP systems such as PeopleSoft embed regulatory updates inside manufacturer-delivered patches, updates, and fixes which in turn update the underlying table values.

Since the legacy environment no longer consumes manufacturer delivered updates, alternative tax and regulatory values are required to enter the system. Most of these values can be found at government web sites for download or acquired from third parties. However, certain business processes are more amenable to consuming outside values than others, and thus each core business process in the encapsulated environment should be examined for update feasibility.

For example, since GAAP rules (Generally Accepted Accounting Principles) seldom change and are well understood, many core business processes relying on GAAP rules

contain calculation logic that rarely if ever changes. Payroll and invoice generation are two business processes that come to mind. The values for payroll generation, such as FICA, Federal Income Tax (FIT), State Income Tax (SIT), etc. are all well known, easily acquired and reside in tables well known to savvy PeopleSoft developers. Likewise, the invoice generation business process can easily consume sales tax updates inserted by staff directly into the TAX AUTHORITY or CUSTOMER tables. Upon successful insertion, the business process executes with the new values precisely as if they were delivered by the manufacturer.

Other business processes such as Benefits Administration may prove more difficult since these processes consume values that are often buried inside changing legislation. Asking IT staff to download and map values is one thing, asking them to research government legislation is quite another. Since US benefit law is in a state of flux, the underlying computational formulas for these business processes are still changing and have not yet stabilized like more mature processes such as payroll. Changes in FMLA (Family Medical Leave Act), COBRA (Consolidated Omnibus Budget Reconciliation Act) and 401(k) savings legislation present challenges even to full time observers. In such business processes where tax and regulatory values are a moving target, either the business process is not a candidate for encapsulation in your organization or third party assistance in the form of a domain expert may be required.

Again, it is critical to identify the core, stable business processes which are true candidates for legacy encapsulation – for many mature business processes the tax and regulatory updates are readily available and easily applied to the encapsulated environment.

Conclusions

Application Encapsulation should always take place in context of your overall legacy strategy. A complete encapsulation needs multiple physical, logical and virtual wrappers as well as mature IT processes surrounding the deployment to be a success. (See Diagram 1).

Certainly there are risks to encapsulation such as the outbreak of a virulent security issue that targets your legacy system. Obviously, security considerations must be taken into account and the virtual and host machines need to be hardened and equipped with dedicated firewall support. Encapsulating Unix and Linux variants is easier and more secure than Windows-based components. However, production-grade virtualization software does provide an array of security support measures for legacy environments including virtual LAN segmentation, providing secure component messaging between the interacting software stack components, which allows even further encapsulation of the stack. And since PeopleSoft 8.x is capable of HTTP/S-only transactions, we can lock down all access paths except the HTTP/S transport. It is important to remember that only stable, reliable environments are candidates for encapsulation.

Modern virtualization software provides the ideal environment to encapsulate n-tier legacy applications and introducing virtualization into your environment may very well open up new and exciting alternatives in realms even outside of PeopleSoft. Once staff is comfortable with a production application running inside a virtualized environment, the cost savings and simplicity will likely cascade to other legacy applications spawning an entirely new way to manage and maintain your legacy portfolio.

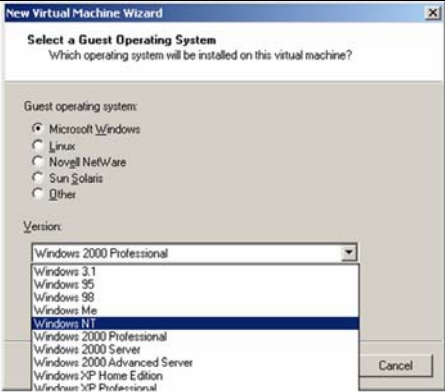
Concern about IT job displacement should not be overlooked. An entire industry has been built around PeopleSoft and the inevitable wind-down will be problematic for some. But, just as in the mainframe era, this cadre of ‘old-timer’ experts now in the marketplace, combined with pragmatic application encapsulation, will allow organizations to maintain existing PeopleSoft systems for years to come.

Ultimately, for many organizations, application encapsulation means dramatically increasing the life span of the existing, stable PeopleSoft 8.x application, while providing time for the new off-premise computing model to emerge.

About the Author

DL Daniels is founder of LegacyMode.com and a public advocate of modern legacy deployments. Daniels spent the summer looking for trout in the Cascade-Sierra volcanic transition zone of Plumas County, Calif.

Figures and Diagrams:

	
<p>Figure 1: Modern virtualization software provides the means to encapsulate and support n-tier environments in perpetuity.</p>	

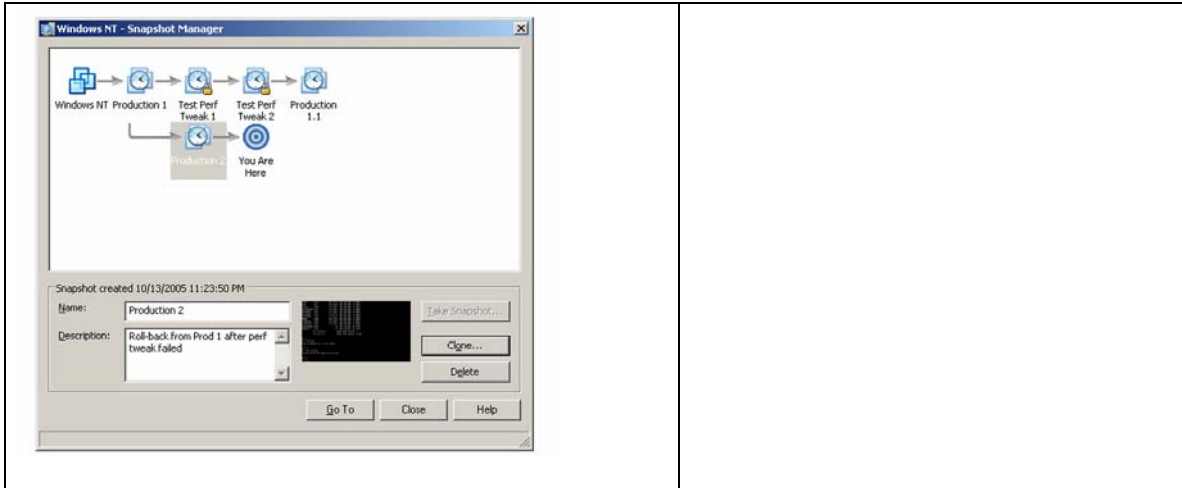


Figure 2: Virtualization allows easy cloning and manipulation of hardware images for image recovery and rollback.

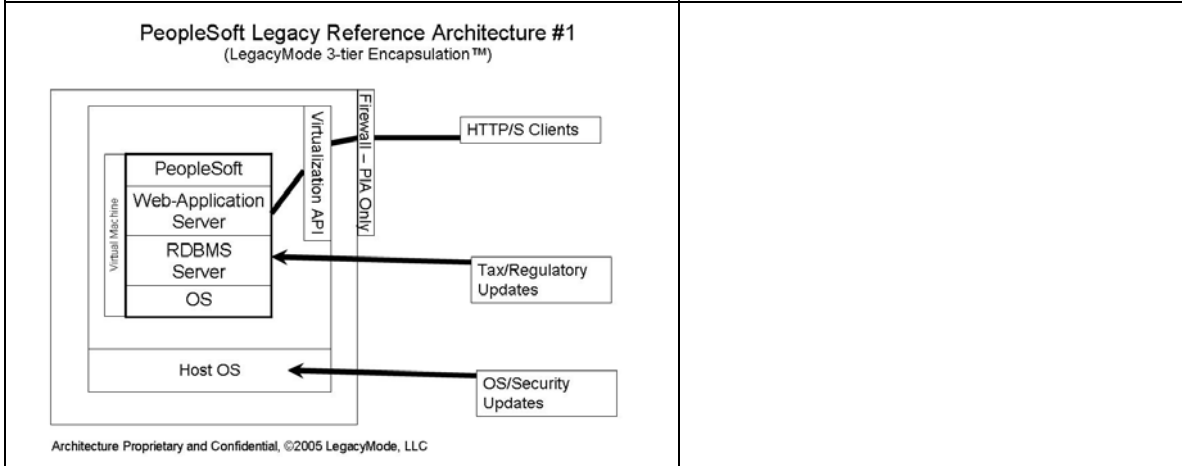


Diagram 1: A complete encapsulated environment would include physical, logical and virtual wrappers to secure and freeze the software stack.