# Reviving Hardware - Bringing New Life to Old Hardware

*by Glenn Palmiere*

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**Here's how you can come to the rescue by making the most of what you have and shattering accessibility barriers.**

As the era of the mainframe began its demise, hospitals — like all big businesses with a constant eye on the bottom line — started to purchase PC hardware. Since it could generally be acquired and deployed on an as-needed basis, rather than necessitating a system-wide overhaul, PC hardware was a less expensive solution than the resource-intensive mainframe systems of the past. However, as a result of this new technology agenda, hospital staffs now almost invariably find themselves faced with a network of mismatched PCs - a variety of machines, from 286s to the latest Pentium models, running a host of operating systems.

While the as-needed purchases and upgrades have definitely saved countless IT dollars over the years, and have provided more system flexibility and numerous opportunities for development, any commonality that once existed in systems during the era of the mainframe is now gone. In the absence of network commonality, parallel applications evolve in order to satisfy the varying operating systems of the varying computers ... and with them comes increased training time and more potential for confusion.

The easiest way to solve this problem is simply a full-scale, system-wide hardware upgrade. However, this is seldom the chosen path; not only does it leave the system in need of the same type of treatment on a cyclical basis, but it defeats the purpose of buying the lower-cost PC hardware. And so, with the sometimes opposing forces of budgetary demands and standards of care being pushed harder than ever, hospitals must increasingly rely on other innovative IT initiatives. In fact, IT is now a primary weapon in the fight to meet and exceed patient needs within tight fiscal constraints.

Arcadia, Fla.-based G. Pierce Wood Memorial Hospital, one of four state civil mental hospitals in Florida, has long been faced with these challenges. G. Pierce Wood serves approximately 450 severely mentally ill clients, many of whom are incapable of performing the simplest functions for themselves. The facility was saddled with a system that required convoluted training processes and prohibited the sharing of data with its sister facilities, due to the evolution of the system to include a variety of hardware and operating system solutions. Plus, the needs of G. Pierce Wood's clients — combined with the wide variety of administrators, clinicians and even non-health-care professionals who work with them — dictate the sourcing of better ways to serve the facility's population despite limited resources. A new Web-based admissions, discharge and transfer (ADT) application built on InterSystems' Caché post-relational database is helping ease the administrative burden on staff and the barriers to system access, all without the purchase of any new hardware.

## Choosing a critical path

The migration of the ADT application system to the Web is the first step in an ongoing Internet initiative spurred by three factors. First, it is important to leverage the benefits of having a standard browser and interface for all of the hundreds of clinicians, administrators and clerical personnel who need to access client data. With users tied to a variety of Windows-based operating systems, a browser-based interface provides some much-needed commonality, reducing training time and helping staff utilize the information from any seat in the system — or remotely. Secondly, a Web-based system offers the potential of greater speed than its predecessor. Since it doesn't have the overhead associated with traditionally programmed applications, an HTML-based system can reduce processing time by as much as 20 to 25 percent. This enables users to get to the information they need faster, freeing up time for client care

and removing one obstacle to accurate record-keeping. Finally, the Web-oriented nature of this system makes it possible to share data with G. Pierce Wood's sister mental health facilities in the state of Florida.

With this focus on the Web clearly established, ADT was chosen to be the first application moved because the information within the module is at the core of all record-keeping and demographics associated with the facility. Naturally, ADT supplies data to all other applications, such as the risk management and dietary modules, making it necessary to tackle ADT first in order to establish the backbone of the system.

Moving forward, it was decided to take an object-oriented development approach to building this Web-based system due to the inherent object nature of Web development and to the concrete benefits that object technology delivers. Although the IS staff had to overcome an initial learning curve while undertaking object-oriented development, the up-front investment was projected to result in cost and time savings for the IS group and for all users of the system over the long haul. For example, the re-usability of objects makes continued expansion and updating faster and easier, reducing the time spent on maintaining the system and freeing up staff for other tasks.

The specific system selected by our hospital provided the IS team with a unique combination of attributes without which the development of the Web-based ADT system would have been extremely difficult. The system combines a full object technology feature set with an Intersystems' Caché database engine optimized for high-performance transaction processing. And, the database architecture provides connectivity between the system and the hospital's Web servers for Web-based transaction processing applications such as the ADT system. This is the combination of functionality and speed necessary to build a system that frees up time for patient care and paves the way for quick, informed decision-making.

## Implementation and payback

Development of the ADT application began in the third quarter of 1998, and the system went live in February 1999 — less than six months from the initial concept to full production implementation. Running on a Windows NT framework that includes the Caché data server and a Web server, the selected application produced significant payback in less than a month in terms of system commonality, overall user satisfaction and dramatically reduced training time.

For example, training sessions on the previous system could only be conducted on a one-on-one basis. With the new ADT module, users' innate familiarity with the browser and its basic commands means that system contents can be covered in a much shorter amount of time, with up to half a dozen people trained in one sitting. Finally, the system is now supported by just one set of manuals, as opposed to the four sets it previously required.

With respect to overall user satisfaction, the browser interface has been found to immediately put users at ease. Tangibly speaking, clinical and administrative staffs also find that the new system is actually much faster, in terms of processing time, than its predecessor.

The HTML-based system delivers on earlier projections that estimated the system would provide users access to the ADT information between 20 and 25 percent faster than they were getting it previously. Over the course of a day, this can add up to a significant amount of time — time now spent in patient care, rather than dealing with administrative tasks. Additionally, the system's help screens speed up data entry, and smart screens help eliminate data errors that otherwise inevitably creep into client records. Finally, the administrative staff saves time and is able to be more responsive to client needs thanks to the system's remote accessibility. When an administrator is on call and receives a request for help, he or she is capable of accessing the necessary Intranet-based client data from virtually any PC in almost any location.

Equally key, this system was launched without any kind of capital expenditure. For the 1998-99 fiscal year, G. Pierce Wood received no operating capital outlay, meaning the purchase of additional hardware was simply out of the question. By utilizing Caché and the new system to develop the ADT application for the Web, it was built on the cutting edge of technology without any requirement to purchase additional hardware. Object technology and the Web interface mean that continued expansion will be possible in the same mode — without the purchase of any new hardware. The cost-efficiency of the system has gained a great deal of attention, suggesting potential use on a more integrated basis statewide.

## Moving forward

At G. Pierce Wood, the Web-based ADT system has been so successful that the rollout of six additional modules is planned to take place by year's end, potentially

including the dietary system and the client money management (trust fund) system.

Additionally, the conversion from a closed intranet to a system that makes the information available to the facility's sister organizations is currently underway. This involves building in four layers of security to protect this highly sensitive data, protection that is possible without compromising accessibility only on the Web. The new system will combine a standard Internet protocol address check, two-way data encryption, password protection and a firewall, all working in synergy to ensure that only those who are qualified for access to the data receive it. However, even given those restrictions, client data will be more readily available than ever before, potentially producing significant cost savings system wide. And once the move to the secure Web implementation is complete, even non-healthcare professionals, such as those interested in the facility's clients from a legal or otherwise custodial aspect, will be able to easily access information, promoting speed in decision-making and delivery of client services.

This is particularly significant in view of the cost savings it will mean to G. Pierce Wood's sister mental health facilities. Not only will it be possible to share data among the group, thanks to the ODBC-compliant system and Web interface, but they can share the application as well. Parallel systems at these facilities can be ported over to the new Web-based framework and rolled out in a fraction of the time it took for original development, which in itself took just five months. As a result, initial development costs will be amortized over further system-wide implementation, leading to even greater cost efficiencies over time.

Now that the IS team at G. Pierce Wood has conquered the object technology learning curve, it will undoubtedly move even faster in developing Web-based applications. This increasing development pace means that new, Web-based systems will be available in shortened time frames, further enabling the facility's staff to be responsive and client-oriented in this era of increasing demands on health-care professionals.

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*Glenn Palmiere is CIO at Arcadia, Florida-based G. Pierce Wood Memorial Hospital. The facility is one of four state-run civil mental hospitals in Florida.*

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