

The greener side of middleware

By Gina M. Coughlin, MT(ASCP)

The recent buzz about middleware focuses primarily on the implementation of autoverification and the supporting role middleware plays. Laboratory staffing, workload, and productivity requirements emphasize the need for middleware for a higher level of autoverification not fully realized by laboratory information systems (LIS) alone. All the nuances of autoverification that the laboratory wants to achieve now can be fulfilled through the inclusion of middleware in the system. A review of the middleware survey in the February 2010 issue of *CAP Today*¹ illustrates a litany of features and their subsequent applications in the laboratory — reinforcing middleware's mission to fill gaps in the clinical laboratory environment.

In today's green economy, the mantra is reduce, reuse, recycle. Laboratorians have been utilizing middleware to increase efficiency and improve workflow but now it is being recognized for its environmentally-friendly augmentation. One of the emerging gaps for which laboratories are profiting with middleware is archiving results, including images, for regulatory compliance. Laboratories are required to maintain results from their instrumentation for a specified period of time. Some regulators have incorporated images produced by the instruments, such as histograms and scattergrams, in their definition of results and require those images as part of the results to be maintained. Laboratories must resort to storing paper copies of these images since their LIS cannot receive and archive this information. Some middleware systems are able to receive and store these images, along with the results and audit logs for the patient results, for years.

To provide a perspective of the cost of storing paper, the Minnesota Office of Environmental Assistance performed a study in 2005 which estimated the cost of archiving paper copies to be as much as 31 times the original purchase price of the paper, making a \$5 ream of paper actually cost more than \$150 to use and store. Using middleware to archive results, along with images, not only allows organizations to reduce archiving costs significantly and improve regulatory compliance without additional effort but also makes the retrieval and use of this information easier, faster, and simpler.

Maintenance procedures and the associated documentation of their performance also generate large volumes of paper. The traditional notebooks and clipboards floating around the laboratory have proven to be a crude method of addressing overall maintenance management in laboratories. Middleware allows electronic creation, scheduling, and documentation of maintenance tasks for all lab equipment.

Now, the electronic tracking system used for instrument maintenance is the same system used to track eye-wash and fire-extinguisher maintenance. These electronic tracking systems can alert technologists to maintenance that is due and allow them to document their performance of the scheduled and unscheduled events by storing electronic copies of service records and instrument printouts. Middleware-based

maintenance-management systems even provide repositories for procedure manuals, websites, training videos, and operator manuals for easy reference during task performance and for guidance when procedures do not perform as anticipated. For supervisory personnel, electronic maintenance-tracking systems furnish reports of performed tasks, as well as those requiring approval and reminders of overdue tasks, all from a secure, networkable, paperless system that ensures greater confidence during unannounced lab inspections.

*In today's green economy,
the mantra is reduce, reuse, recycle.*

Disruptive to laboratory productivity is LIS downtime — planned or unplanned — during which the lab regresses to paper consumption. Techs manually type requisitions into and collect paper printouts from all instruments, distribute chartable reports to critical-care areas, and try to keep track of events. With middleware, computers can be used for data entry and for printing downtime labels on demand. Samples placed on instruments are processed, with middleware supplying test instructions, just as if the LIS were in operation.

Once resulted, middleware also gives electronic access to test results for custom reporting while rules can be designed to automatically print results to critical-care areas. When the LIS is available, middleware eases the conversion and recovery processes with full audit logs for traceability — providing a greener alternative for timely, accurate actionable healthcare information when the LIS is unavailable.

Green initiatives are more enticing when the benefits go beyond saving our natural resources. Changing physician-ordering patterns has resulted in a marked increase in add-on tests to samples previously analyzed by the laboratory. Without a mechanism to quickly track and retrieve needed samples, laboratory productivity is reduced. Middleware systems offer sample-tracking systems to locate samples in the laboratory in under a minute, reducing the need for unnecessary redraws which, in turn, reduces medical waste and disposal. Labs also report better management of existing refrigerated storage space, thus lowering the requirement for added storage systems as testing volume increases.

Middleware cannot solve all the world's environmental issues; but by using middleware, a laboratory can effectively impact its community by making it a little greener while realizing some significant savings along the way. □

Gina M. Coughlin, MT(ASCP), is a middleware specialist at Data Innovations in South Burlington, VT.

Reference

1. Aller R, Weiner H. Middleware Systems Survey. *CAP Today*, 2010;24(2): 31-42.