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Case Study: Middleware

Implementing Middleware Increases Revenue Satisfaction

By Mark Ballard

Nine years ago, Mid America Clinical Laboratories (MACL) was formed as a joint venture between two Indianapolis-area hospitals, a pathology group and a national reference laboratory.

Today, the facility services 10 healthcare facilities with rapid response labs in seven locations and performs outreach testing for thousands of area physicians from its central reference lab.

Testing volume and revenues have doubled since the lab was formed. One of the key factors making this growth possible was the decision to implement a middleware package from Data Innovations (DI).

Pieces of the Puzzle

MACL started with three different laboratory information systems (LIS), and after an initial product assessment, hospital testing was standardized on the Misys Flexilab LIS. At the time, Misys did not offer a product for outreach testing. To meet this need, MACL adopted the information system used by the reference lab partner.

Because two information systems were running side-by-side, outreach samples had to be manually relabeled for instrument processing through Misys to run both routine hospital and outreach samples through the lab. This increased the amount of labor necessary for each sample and slowed the testing process down, eventually resulting in dropped client satisfaction levels.

MACL needed a vendor-neutral solution that could reduce turnaround time (TAT) and labor and improve efficiency of specimen processing. We evaluated multiple middleware vendors, but Instrument Manager from DI had sophisticated rules that handled unique sample identifications from multiple information systems (in this case, Misys and our outreach LIS). Samples bar coded from both systems could be placed concurrently on the instruments, tested, then reported back to their respective LIS for accurate billing and physician reporting, all based on the specimen ID.

MACL had to convert 15 analyzers from multiple manufacturers simultaneously for implementation to be successful. Our IT team worked with DI to make sure that all the necessary drivers were available and operational.

When the launch date arrived four months later, everything went as planned. Some significant benefits were immediate reduction of seven full-time specimen processing positions by removing the "receive and relabel" step; significant increase of capacity for specimen processing without having to expand labor force beyond normal order entry requirements; immediate decrease of TAT by almost five hours; reduced errors and simplified processing, shifting workload three hours earlier, thus avoiding the rush hours for hospital processing; and savings of over \$200,000 in instrument licensing fees over the past five years.

Building Stat Testing for Outreach

A second opportunity to improve operations came from the rapid response labs. The first middleware installation affected only routine outreach testing and required connecting instruments located at the main reference lab site. However, customer demand for stat outreach testing was increasing.

Many physicians were asking for patients to have specimens drawn and tested at the rapid response labs so they could get results back immediately and speed up treatment when necessary.

To accommodate these requests, some immediate manual processes were patched together to deal with billing and reporting issues. However, these manual processes increased the opportunities for errors and weren't satisfactory to

physicians. Billing confusion also led to patient dissatisfaction.

The solution was to route all of the individual rapid response lab instruments through the DI Instrument Manager. In doing so, individual specimens are ordered within the appropriate information system and labeled with the appropriate LIS labels at the time of collection. As the tests are processed, the results are routed automatically to the appropriate LIS for reporting and billing.

Hospitals could be converted one at a time and MACL soon saw benefits such as eliminated labor, reduced billing and reporting errors (60 percent for stats) and increased customer satisfaction with automatic, standardized reports for patient results delivered to the client.

Autoverification Benefits

Another customer service issue drove the third implementation for DI middleware. To improve service levels and patient satisfaction in a highly competitive market, hospital customers wanted to reduce TAT for specific critical care tests in the emergency departments. The average TAT was approximately 60 minutes. The new initiative defined a TAT of 45 minutes.

A review of the testing process pointed to result verification as a major time component. The autoverification capabilities of DI middleware allows a medical director, medical technologist and IT specialist to develop a series of rules that are entered into DI's Instrument Manager software. As a sample is being processed, the results are compared with the defined rule set. Failed results—those that do not match the rules—are held in the Instrument Manager and displayed for technologist review with comments automatically appended indicating why it failed.

When results fail to pass the rules, the technologist can either release the results or take appropriate action, such as rerun the sample. Only those test results that do not fit the criteria go through a manual verification process (review by exception). All others results automatically pass to the LIS with comments automatically attached, when appropriate. For regulatory purposes, the system also captures and stores the operator ID for all manually verified results along with the date and time of the testing. Information is easily retrieved during CAP or JCAHO reviews.

With autoverification, TAT was reduced by 20 minutes, 12 medical technologist positions were converted to lab assistant positions (across eight facilities) and staff satisfaction was increased.

An Effective Solution

"Mid America's situation truly defines middleware," says Hunter Bagwell, implementation consulting services manager for DI. "This is a system that resides in the middle of your operations and has the depth and breadth to change with your business."

Mark Ballard is chief information officer at MACL, Indianapolis.