

Disk Management Case Study



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Like other hospitals, Sutter Solano is mandated by state laws to ensure that downtime is kept to a minimum and that the hospital can safely perform its duties. Ideally, regular maintenance would not require the hospital to shut down its AS/400. However, for some tasks, such as purging old files and reorganizing the existing ones to reclaim unused disk space, it almost always does. As one of the fastest growing retailers in

Sutter Health: Planning a Cure for Planned Downtime

Sutter Solano Medical Center is a 100-bed hospital that serves Vallejo, a city 30 miles northeast of San Francisco. The nonprofit medical center, a member of the Sutter Health network, is not large by today's hospital standards. The IT department prides itself on running its networks and AS/400 server in a lean and efficient manner. But when faced with the prospect of bringing down its AS/400 for 10 hours to do regular file maintenance, the hospital realized there had to be a better way.

The Scenario

Sutter Solano Medical Center uses the MedSeries4 application suite, originally developed in the 1980s by Intermountain Health Care, and now supported by Siemens AG. The hospital uses MedSeries4 to handle various financial aspects of its daily operations, such as admitting new patients and accounts receivable.

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The Old Way to do File Reorgs

Whenever Sutter Solano performed a file reorganization on its single-processor box, it normally required taking the MedSeries4 application offline for 8 to 10 hours, says Jim Barringham, special projects manager at Sutter Solano. During this time, none of the hospital's nursing or administrative staff was able to access the application. Since this length of downtime was unacceptable during the day, the hospital minimized the impact by breaking the file reorganization into multiple sessions, which Barringham ran during off-hours of the week.

The situation was compounded by the fact that the disk capacity in the hospital's iSeries was above 90 percent. IBM recommends that i shops keep their disk utilization below 80 percent to maximize application response time. Barringham did not have a good set of choices: reorganize the files and create downtime or spend a considerable sum to buy more disk from IBM. There had to be a better way.

How It Works

Reorganizing files is a regular part of system maintenance on an AS/400—or on any computer, for that matter. The process is crucial to reclaim disk space that is occupied by deleted files. IBM includes a command called Reorganize Physical File Members (RGZPFM) in OS/400 that just about every AS/400 and iSeries shop is (or should be) familiar with. But the downside of using RGZPFM is that it requires the application to be brought offline while the reorganization takes place. It also consumes so much of the iSeries processing power that running any other applications is practically impossible.

Reorganize While Active allows users to access the application and its files while a file reorganization is taking place. It consumes its share of batch resources, but at least users have access to the application and its underlying database during the reorganization.

Two Approaches – Mirroring & Reorg-In-Place

Approach 1: Mirroring creates a duplicate set of all the files involved in the reorganization. As the file records are being copied into a duplicate library, it separates those tagged for deletion, thereby regaining the lost disk space. But if that's all it did, the mirrored approach for RWA wouldn't be much more useful than RGZPFM. To allow users to continue to use the files while they're being reorganized, the utility keeps the files synchronized by matching the sets using relative record numbers. As changes are made to the original files in the production environment, the utility simultaneously makes the same changes to the files in the reorganization environment, a process that continues until the reorganization is completed with one final file swap.

Approach 2: Reorg-In-Place groups deleted records together, removes them and compresses the file, thus recovering deleted record space. This method is generally used with very large files.

Reorganizing in Action

Despite the encouraging reference from the UNLV Medical Center and the fact that his AS/400 was screaming for more open DASD—Barringham was still skeptical about the utility. Erring on the side of prudence, he decided to slowly roll out the utility and closely monitor its performance along the way.

He began running RWA on some of the smaller, less significant files at the hospital during a week in late November 2001.

If the software was going to crash his AS/400, he wasn't about to lose the file with five million records in it. As the week went by, he gradually started running the software against bigger and more complicated files, until he built up a comfort level with the product.

“The last file that I did was one that had triggers on it,” he said. “I didn’t want this file being rebuilt without my triggers. I was worried whether they had thought about that [supporting the triggers]. You never know when this code was done, and triggers are a relatively new thing. It was new to me.”

Results

As a result of the first reorganization completed with the utility, Barringham reclaimed about 20 percent of his disk space, putting him in the low-70-percent-DASD-utilization range. In terms of return on investment, Barringham said he recouped the hospital’s investment with that first file reorganization.

Barringham continues to use RWA on an as needed basis. RWA has saved the hospital many hours of system downtime.

Since installation, downtime as a result of system maintenance has become an even bigger issue at Sutter Solano. In January that year, the hospital implemented a new AS/400- based application that allows doctors to view the results of lab tests and radiological exams. Now, if the iSeries becomes inaccessible, it’s not merely an inconvenience to the doctors and the clerical workers; it could also affect patient care.

“Downtime is definitely more critical now” compared to when we originally purchased the software,” Barringham said. “If the interfaces are down, the doctors can’t look at their results from radiology or the lab.”

Reorganize While Active eventually overcame Barringham’s initial skepticism and proved itself to be a worthy member of his toolbox. “Bottom line, the dang thing worked,” he said.



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