Backups (7):
Open Files

by M. E. Kabay, PhD, CISSP
Associate Professor, Computer Information Systems
Norwich University, Northfield VT

This is the seventh in a series of short articles reviewing the theory and practice of making backups.

* * *

All backup systems have trouble with files that are currently in use by processes that have opened them with write access (i.e., which may be adding or changing data within the files). The danger in copying such files is that they may be in an _inconsistent state_ when the backup software copies their data. For example, a multi-phase transaction may have updated some records in a detail file but the corresponding master records may not yet have been posted to disk. Copying the data before the transaction completes will store a corrupt version of the files and lead to problems when they are later restored to disk.

Backup software usually generates a list of everything backed up and of all the files _not_ backed up; for the latter, there is usually an explanation or a code showing the reason for the failure. Operators must always verify that all required files have been backed up and must take corrective action if files have been omitted.

Some high-speed, high-capacity backup software packages provide a buffer mechanism to allow high-availability systems to continue processing while backups are in progress. In these systems, files are frozen in a consistent state so that backup can proceed and all changes are stored in buffers on disk for later entry into the production databases. However, even this approach cannot obviate the need for a minimum period of quiescence so that the databases can reach a consistent state. In addition, it is impossible for full functionality to continue if changes are being held back from the databases until a backup is complete; all _dependent_ transactions (those depending on the previously-changed values of records) must also be held up until the files are unlocked.

In the next article, we'll look at the fundamental types of backups.

* * *

M. E. Kabay, PhD, CISSP is Associate Professor in the Department of Computer Information Systems at Norwich University in Northfield, VT. Mich can be reached by e-mail at <m kabay@compuserve.com>. He invites inquiries about his information security and operations management courses and consulting services.

Copyright © 2001 M. E. Kabay. All rights reserved.

Permission is hereby granted to Network World to distribute this article at will, to post it without limit on any Web site, and to republish it in any way they see fit.