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COMPUTERWORLD
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Romanettes (i)-(iv) are added.
Other page numbers are original.

Datanet Exhibit 2003
Dropbox, Inc. and Microsoft Corp. v. Datanet LLC
IPR2024-00080



Building Storage Networks

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Osborne/McGraw-Hill

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Auckland Bogotá Hamburg London Madrid
Mexico City Milan Montreal New Delhi Panama City
Paris São Paulo Singapore Sydney
Tokyo Toronto

Osborne/McGraw-Hill
2600 Tenth Street
Berkeley, California 94710
U.S.A.

For information on translations or book distributors outside the U.S.A., or to arrange bulk purchase discounts for sales promotions, premiums, or fund-raisers, please contact Osborne/McGraw-Hill at the above address.

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4567890 DOC DOC 019876543210

ISBN 0-07-212050-9

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and management of the logical components of backup systems such as consolidated media and database management and maintenance. Several such management systems are under development by Veritas, Legato, and others.

The sections that follow contain several examples of common network backup systems that can be built from the components discussed in the previous sections.

Typical Network Backup

The most common network backup system used today is similar to the one shown in Figure 7-4. It is a client/server backup model where the backup engine establishes network connections directly to an agent on source systems and manages backup operations through those links. This is typically done over a TCP/IP network, but it can also be done using IPX/SPX for NetWare environments.

Direct network backup can quickly saturate an ordinary client/server network due to the heavy traffic loads generated. 10BaseT ethernet links are not adequate for most server backup operations. 100Mb links through either 100BaseT or FDDI will deliver much better results. It is important to remember that other network traffic can be adversely affected while backups are running. Two backup sessions can take most of the usable bandwidth of a 100baseT connection.

The source system typically has a *backup agent* running on it that responds to commands and inquiries from the backup engine. This backup agent works with the unique environment of the source system and interacts with any backup interfaces and processes on that system. Most often, this agent functions as a remote procedure of the engine's software. In other words, it runs as part of the engine's operations, but on the source system.

When the engine begins backing up the source system it communicates to the agent and begins accessing the file system or database using the programming interfaces they provide. The results of the scan determine what data needs to be backed up on the source. This information is transmitted back to the engine, where it is given to the data mover to start transferring data. The data mover copies the files over the network and hands it off to the backup device control system and it is eventually written to a tape in a tape drive. When the data is completely written to tape, the database can be updated to reflect its successful backup. Figure 7-5 shows the data transfer through the backup engine system starting at the networks interface card all the way to the backup device(s).

This diagram is similar to Figure 3-14 (see Chapter 3), which shows the data path for a client accessing a file on a server over the network. In that drawing, the backup engine would assume the role of the server and the source system would assume the role of the network client. When one sees the whole picture laid out like this, it's not hard to see why backup over a network is slower than backup over an I/O bus. For starters, a 100Mb (10MB) network has a theoretical performance maximum equal to a fairly slow and outdated I/O channel. This not only makes it difficult to get the job done within the allotted time, but also compounds matters by not delivering data fast enough to stream tape