

associated staging ID for the file and release the file's magnetic blocks.

#### Conclusions

It will thus be seen that the invention efficiently attains the objects set forth above, among those made apparent from the preceding description. In particular, filesystems on client workstations and file servers managed by the migration server do not fill to capacity. This permits users to place files onto systems where they will be used most often, without regard to the storage limitations of those systems. The filesystem's directory name space is maintained on the client system, so that the user need not be aware of whether files have been staged to the migration server.

In addition, frequently used files are stored on local disks for fast access. The server utilizes a least recently used procedure to determine which files should be staged-out. As a result, active files stay local, so that their access requires no server interaction or network traffic. Filesystems that are not full are less fragmented and provide enhanced performance.

The invention also provides lower cost storage. In most networks, a large percentage of all storage has not been accessed recently. The migration server automatically migrates these inactive files to lower cost archival storage on the migration server. The files remain online, but their cost of storage is less.

The migration server also provides distributed network storage with centralized administration. Using the invention, networks can be constructed with distributed storage to improve performance and eliminate a single fileserver point of failure, while the entire network's storage is centrally managed and administered. File migration and archiving of inactive data occurs automatically.

It will be understood that changes may be made in the above construction and in the foregoing sequences of operation without departing from the scope of the invention. It is accordingly intended that all matter contained in the above description or shown in the accompanying drawings be interpreted as illustrative rather than in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention as described herein, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

What is claimed is:

1. A networked digital data processing system comprising

A. two or more client devices,

B. a network comprising a set of interconnections coupled to said client devices for transferring information therebetween,

C. at least a selected one of the client devices having a local data file storage element for locally storing and providing access to digital data files arranged in one or more client filesystems,

said local data file storage element including, for each such filesystem, at least one file directory containing an entry for each data file stored in that filesystem,

D. a migration file server, coupled to client devices through said network, including

(i) migration storage means, coupled to said network, for storing at least data portions of data files from said selected client device,

(ii) storage level detection means, coupled to said local data file storage element, for detecting a storage utilization level therein,

(iii) level-responsive transfer means, coupled to the storage level detection means and with said migration storage means and with said local data file storage element, for

responding to storage utilization level exceeding a selected high watermark level for transferring data portions of one or more data files from such local data file storage element to the migration storage means, and

(iv) said level-responsive transfer means further including means for effecting release, by said local data file storage element, of storage space previously occupied in that local data file storage element by those one or more data files.

2. A networked digital data processing system according to claim 1, wherein the migration file server includes dump means for generating a local backup copy of data file, or data portions thereof, stored in any of said local data storage element and said the migration storage means.

3. A networked digital data processing system according to claim 2, wherein the dump means includes means for

(i) determining whether a given data file has been transferred to the migration storage means, and responding to a negative such determination for generating a local backup copy of that data file, and

(ii) determining, for each data file transferred to the migration storage means, whether the migration file server has already generated a backup copy and responding to an affirmative such determination for omitting that data file from a subsequent local backup copy, while responding to a negative such determination for including the file in the local backup copy.

4. A networked digital data processing system according to claim 3, wherein the migration file server includes restore means for restoring a data file to the client filesystem from a backup copy.

5. A networked digital data processing system according to claim 4, wherein the restore means comprises locating means for determining (i) whether the data portion of a given file to be restored has been transferred to the migration storage means, and (ii) whether the data are present in the migration storage means, and link means for responding to the data portion of a given data file being present in the migration storage means, for restoring a logical link between a directory portion of that data file in the client filesystem and the data portion of that same data file in the migration storage means.

6. A networked digital data processing system according to claim 5, wherein the restore means further comprises means

(i) responding to the locating means determining that the data portion of a data file was previously transferred to, but not currently stored in, the migration storage means for

(a) retrieving the data portion of that data file to be restored from the backup copy maintained by the migration file server,

(b) transferring the data to the migration storage means, and

(ii) enabling the link means to restore the logical link between the directory portion of the given data file