

Reducing Total Cost of Ownership for NetApp Filers with Folderscape

A White Paper By



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Executive Summary

Years ago, the terms “server” and “file server” were almost synonymous. Centralized storage of data in the form of user-accessible folders and files was the primary function of most servers.

Over time, servers have taken on a much wider set of roles—including such things as email servers, database servers, application servers, and more. As part of this transition, generalized operating systems for servers, such as Microsoft Windows, have had to be platforms for these varied tasks. As a result of taking on such a variety of tasks, such operating systems haven’t been able to focus on their original function: serving files.

Out of this weakness new types of devices have grown. Network Access Storage (NAS) and Storage Area Network (SAN) devices specialize in serving files and serving raw storage.

One of the leaders in the NAS/SAN marketplace is Network Appliance (NetApp). They produce high-quality devices which can improve a company’s storage infrastructure by providing higher reliability and a richer feature set than a generalized operating system can.

As with most computer devices, however, the cost of a NetApp storage system is more than just the direct cost of purchasing the equipment. Other costs, such as the labor required to manage the device, need to be taken into account. Only by considering these other costs can you determine the Total Cost of Ownership (TCO).

Beyond simply *determining* the TCO, however, IT management has an obligation to *reduce* TCO. This can often be accomplished through the use of software which makes a device less labor-intensive to operate and manage.

An example of this type of software is Folderscape from PAC Software, Inc. This software can supplement the utilities provided by Microsoft and NetApp to make a NetApp storage system easier to learn, understand, manage, and operate, thus reducing the TCO.

Goals

PAC Software, Inc. has extensive experience implementing new systems—both hardware and software—into existing organizations. Based on this experience, PAC Software has developed Folderscape, which simplifies the use of NetApp filers in the following areas:

- Reducing the learning curve for NetApp by IT organizations
- Reducing the time spent performing routine operational tasks
- Reducing the frequency of mistakes in performing management tasks for filers by clarifying the effects of changes to users
- Reducing the frequency of mistakes in performing operational tasks for filers by reducing the number of steps involved
- Making storage capacity more visible, making it easier to anticipate the need for additional hardware to meet increasing amounts of data

Folderscape's primary scope includes the following areas:

- Files
- Folders
- Q-Trees
- Volumes (both flexible volumes and traditional volumes)
- Aggregates
- Snapshots
- Quotas
- Users, groups, and roles

These areas have been chosen because they are areas in which members of the IT organization would be performing routine tasks. Other areas, in which tasks are performed infrequently, were not considered to be needed.

Existing NetApp Software

Traditionally, management of a filer is done using the following software tools:

FilerView

FilerView is a web-based application provided as part of the NetApp operating system (ONTAP). Its strength is that it provides a GUI interface that can be accessed through any web browser, so no additional software needs to be installed on the client workstation. Despite this strength, however, it suffers from the weaknesses of having a cumbersome interface and the lack of some key functions.

Windows Explorer

Because a NetApp filer can provide the CIFS interface, NAS storage can be accessed through Windows Explorer. This has the strength that it

provides a friendly GUI interface that Windows users will be very familiar with. However, it cannot work with any of the NetApp-specific entities such as aggregates and volumes.

Computer Management This MMC snap-in can be used to perform some NetApp management. However, it is limited by the somewhat cumbersome MMC interface, and it has only two frequently-used functions: the ability to work with shares and the ability to work with users and groups.

Telnet Users can connect to a filer through a Telnet interface. After logging in, they can enter commands to manage the filer. While this mechanism provides more functionality than either FilerView or Computer Management, its non-GUI interface is not very appealing to most Windows users.

Here is a functional summary of these four tools:

	FilerView	Windows Explorer	Computer Mgmt	Telnet
Work with files		Yes		
Work with folders		Yes		
Work with shares	Yes		Yes	Yes
Work with NTFS security		Yes		
Work with Q-Trees	Yes			Yes
Work with aggregates and volumes	Yes			Yes
Work with snapshot content		Yes		
Work with snapshots	Yes			Yes
Work with users, groups, and roles			Partial	Yes
Work with multiple filers		Yes		

This table does not include all management functions for a NetApp, but includes all the functions which are commonly-performed.

Figure 1

As you can see from this table, the functionality of these tools is spotty. None of the tools provides all of these important functions, requiring the user to jump from one tool to another while performing routine tasks. Further, learning the NetApp environment is made more difficult because of the necessity of learning so many tools and learning which one to use in a given situation.

Folderscape Foundation

Folderscape is built on a foundation of two key differences from the other operational interfaces provided for NetApp filers:

1. Folderscape provides *all* of the functions listed in Figure 1, not just a subset.
2. Folderscape uses a standard “tree and list” interface (see below), which will be both familiar and comfortable for Windows users.
3. Where practical, Folderscape reduces the number of steps required to perform common tasks.

The “tree and list” interface used by Folderscape is illustrated in Figure 2. The “tree” is a hierarchy of elements shown on the left side of the window. Elements of the tree can be “opened”, causing the elements below it in the hierarchy to become visible. When an element in the tree is selected (by clicking the mouse on it), the contents of that element are displayed in the “list”, which takes up the main portion of the window. This interface is very familiar to Windows users because the same interface is used in a number of common programs, including Windows Explorer.

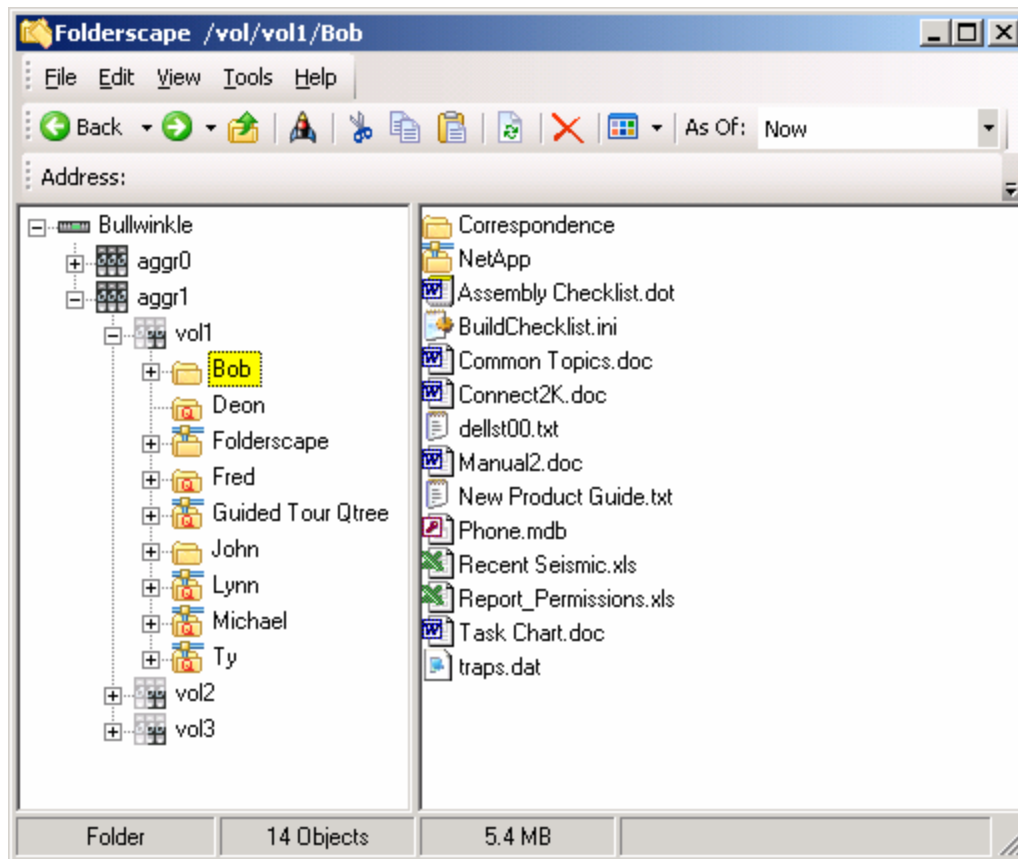


Figure 2

Through the three foundational elements of Folderscape, the work necessary to perform common tasks is reduced. This reduction is the result of performing

the common tasks in a single location in the software (rather than jumping around from place to place), and through having the number of steps required to perform common tasks reduced. Figure 3 compares the number of places in the software that must be visited and the number of steps that must be performed for some common tasks.

	Standard Software		Folderscape	
	Places to Visit	Steps to Perform	Places to Visit	Steps to Perform
Create a qtree, add a share, set permissions	3	3	1	2
Rename a shared folder	3	3	1	1
Delete a shared qtree	2	2	1	1
Set snapshot schedule for 10 volumes	1	10	1	1
Find share name, permissions, and volume for a folder	3	3	1	1
Resize a volume so it is 70% full	2	3	1	1
Find out which items in the root of a volume are qtrees, and which are folders	2	2	1	1
Change the size and snapshot reserve for a volume	2	2	1	1
Find the roles and users for a group	2	2	1	1

Figure 3

Security

One of the commonly-used interfaces for managing a NetApp filer is FilerView. FilerView suffers from a serious weakness in its security model. To use FilerView, a user must be granted “login-http-admin” authority. Unfortunately, once this authority is granted to a user, he or she will be able to perform *any* of the functions provided in FilerView. For example, the user will be able to delete all the aggregates on the filer. It is not possible to grant access to FilerView but still limit the functions within FilerView that can be performed.

This problem can be avoided by not granting “login-http-admin” authority to most of the members of the IT staff, which will prevent them from being able to use FilerView. Instead, they can use Folderscape. Unlike FilerView, Folderscape allows different users to be granted different authority. This is done through the standard NetApp security system implemented through group membership. Folderscape uses a set of standard groups, and a user’s authority can be controlled through these groups. For example, to prevent a user from being able to create or delete aggregates, you would not make them a member of the group named “Folderscape_ManageAggr_group”.

The areas in which authority can be granted or revoked for Folderscape are:

- Run Folderscape (without this authority, a user cannot use Folderscape at all)
- Manage aggregates
- Manage volumes
- Manage disks
- Manage qtrees
- Manage quotas
- Manage snapshots
- Manage users, groups, and roles

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