



**FILE AREA
NETWORK**

Establishing a New Paradigm in File System Management

Brocade StorageX Global Namespace Provides
Many Advantages to Today's Enterprises.

BROCADE

A Global Namespace is the key to effective, efficient management of distributed file storage—it does for file storage what DNS does for networking. A namespace allows clients to access files without knowing their location, just as they access Web sites without knowing their IP addresses. A namespace also enables administrators to aggregate file storage across heterogeneous, geographically distributed storage devices and to view and manage it as a single file system.

Brocade® StorageX® is a comprehensive network data management platform that makes it easy to create and manage Global Namespaces of any size. A Brocade StorageX Global Namespace provides an ideal platform on which to build business-critical storage management solutions—including heterogeneous network data management, data migration and consolidation, business continuity, storage optimization, data lifecycle management, remote site data management, and data classification and reporting—that can increase data availability while reducing the cost of storage.

INTRODUCTION

IT administrators spend a great deal of time on file management tasks such as adding users, adding file servers, rebalancing storage, and setting up failover, as well as data movement tasks such as replication, migration, consolidation, and data distribution. These tasks are tedious and time-consuming for administrators, disruptive to users, and expensive for enterprises. As a result, enterprises are looking for better ways to scale and manage their file systems. A Global Namespace provides the answer.

Global Namespace is a logical layer that resides between clients and file systems for the purposes of aggregating multiple heterogeneous file systems and presenting file information to users and applications in a single, logical view. The benefits of a Global Namespace are clear and compelling:

- Users (and applications) are shielded from physical storage complexities
- Administrators can add, move, rebalance, and reconfigure physical storage without affecting how users view and access it
- Global Namespace provides a platform for developing value-added functions such as data migration, server consolidation, and business continuity applications

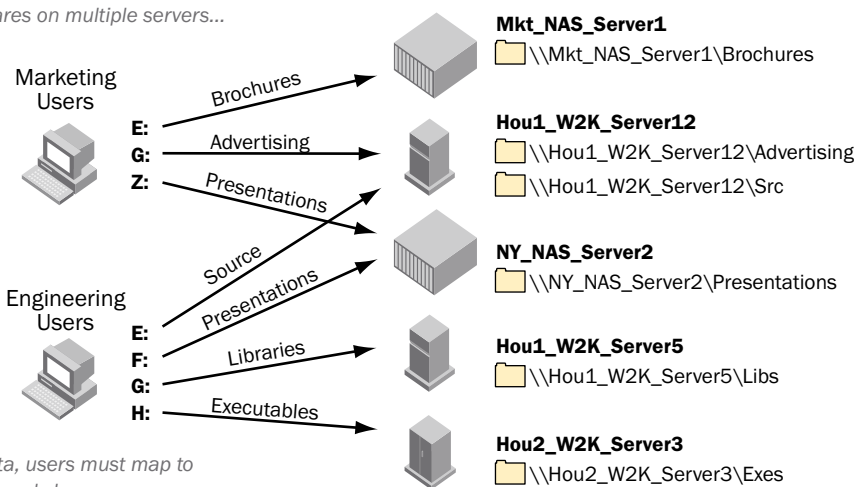
With a Global Namespace, the administrator can perform data management and data movement tasks in less time, without disrupting user access to files. When files are moved, links in the namespace are automatically updated, which reduces manual administration and ensures continuous client access to data.

This paper describes how a Global Namespace simplifies file management, how to create and deploy a namespace, the solutions it enables in an enterprise environment, and how Brocade StorageX builds upon the Global Namespace foundation to deliver a comprehensive network data management platform.

THE PROBLEM: NETWORK DATA MANAGEMENT AND MOVEMENT

Consider the example of Stephens Company, which has 600 marketing and engineering users who are accessing files across five file servers shared by the two departments and located in Houston and New York City. Marketing users are accessing files via multiple drive letters that are mapped to two filers and a Windows server. Engineering users are accessing files on three servers and one filer.

Typically data that departmental groups need is spread across multiple shares on multiple servers...



To get to data, users must map to each server and share...

Users see no logical organization to the data and must know the name of each server and share being accessed

Figure 1.
Current file system environment.

There are several issues with Stephens Company's current file system environment:

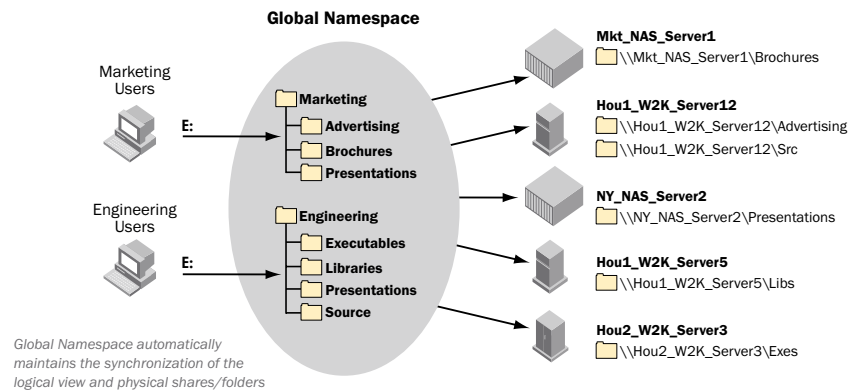
- Users find it difficult to locate and access files via multiple drive letters, which are increasing.
- File server Hou1_W2K_Server12 is at 90 percent capacity, while NY_NAS_Server2 is at 20 percent. This means users are beginning to receive errors as they try to save large graphic files to Server12.
- To migrate files and rebalance storage between Hou1_W2K_Server12 and NY_NAS_Server2, the administrator must disable user access to the files that are to be moved, move the files to the NY filer, reboot, bring both devices back online, revise all marketing and engineering user login scripts, and inform users that the files have a new location so their PCs can be reconfigured to access them. This will require at least 12 hours of downtime and manual reconfiguration of every desktop and application that accesses the migrated files.

THE SOLUTION: GLOBAL NAMESPACE

There is a simple, long-term solution to Stephens Company's data management and data movement issues. Deploying a Global Namespace will simplify data management and enable transparent data movement.

Figure 2 shows the new configuration, in which a Global Namespace has been inserted between users and physical storage. Users now access their files through shares called `\\namespace\users\marketing` and `\\namespace\users\engineering`. This was a non-disruptive installation, as the namespace was installed on top of the existing infrastructure. Users continue to access files in the same manner as before, with no retraining needed.

Figure 2.
File system environment
with a Global Namespace.



Note how the file system environment is changed by the introduction of a Global Namespace:

- Administrators can expand, move, rebalance, and reconfigure storage without affecting how users view and access it, and without downtime
- Data management and data movement require far less physical administration and are performed in less than 50 percent of the time it took before
- Administrators can manage data on heterogeneous, geographically distributed storage devices through a single console
- A Global Namespace provides a platform for unlimited storage scalability—administrators can use a Global Namespace to aggregate multiple file systems and manage them collectively
- Data changes are automatically updated in the namespace, and require no client reconfiguration or downtime
- Data management and data movement are performed “behind the veil” of the namespace, and are transparent to users
- Data can be organized and presented to users in a way that makes sense to them, regardless of how or where the data is stored
- Users access all their files through a single drive letter—this will not grow, and allows them to continue accessing files in a familiar way
- IT managers can accommodate the changing needs of an organization while reducing storage costs

HOW THE GLOBAL NAMESPACE WORKS

The Global Namespace does for files what DNS does for networking. It provides a directory service. A Global Namespace resides on a namespace server, which can be any Windows 2000 or Windows 2003 server within the namespace configuration. Clients (users and applications) view and access files through the namespace.

When users select a file from the namespace, a request is sent from the client machine to the namespace server. The namespace server receives the request, provides file location information back to the client machine, and redirects the client to the file in its physical location. The entire process occurs instantaneously and is transparent to clients.

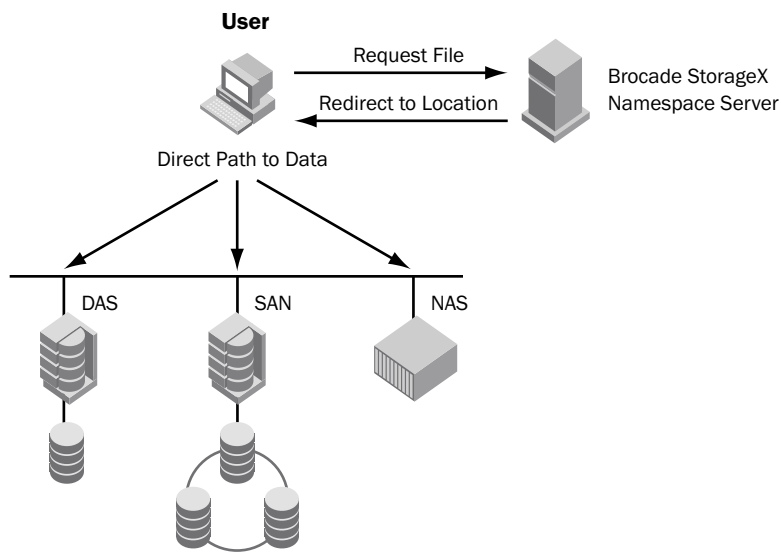


Figure 3.
Global Namespace
architecture.

This architecture provides several significant advantages over other file system aggregation approaches:

- There is nothing in the path between clients and the data, which is important for two reasons: performance is not impeded and there is no single point of failure.
- The namespace server can be clustered to provide high availability.
- There is no client installation, which simplifies namespace deployment and management.
- It takes only minutes to install the namespace software and less than an hour to create and populate the namespace—an administrator can deploy a namespace and begin receiving benefits in a single day.
- Physical desktop and server management is significantly reduced, as data movement and management are simplified and no client reconfiguration is required.

CREATING AND DEPLOYING A NAMESPACE

There are several key requirements to the effective use of a namespace. The Global Namespace solution available today that meets these requirements is Brocade StorageX, as shown in Table 1.

Table 1.
How Brocade StorageX addresses key business requirements.

Requirement	Brocade StorageX Value
Tools for namespace creation and population	Discover shares and automatically construct a namespace that the administrator can modify as needed
Ability to synchronize the namespace with the underlying physical storage	Automatically update the namespace when storage is added, moved, changed, or reconfigured
Namespace monitoring and management	Provide distributed file system and namespace monitoring and management from a single console
High availability of the namespace	The namespace can be clustered for high availability and to eliminate any single points of failure
Easy to change or reconfigure the namespace when needed	Provide simple processes for non-disruptive namespace reconfiguration

USING GLOBAL NAMESPACES IN THE ENTERPRISE

The Global Namespace is a powerful new paradigm that solves numerous challenges faced by IT administrators today. The following sections describe some of the scenarios in which a Global Namespace should be deployed.

Managing User Home Directories

In Windows environments, users are typically given access to their home directory through a user profile and/or login script. During login, users' computers are physically mapped to the storage devices that contain their data. This method requires a great deal of administrator intervention when data and directories are moved from one device to another.

First the administrator must notify all users that the data is being migrated, and then all of the users must log off in order for the migration to be successful. Once the data is migrated, the administrator has to deal with the error-prone task of modifying the login scripts of all users. If all goes well, this process might take a few hours. However, in many cases users are unable to connect to their relocated directories without requiring administrator support. This process is problematic in an environment with 1,000 users and ten file servers, but becomes exponentially more complex as the number of users and devices increases.

A Brocade StorageX Global Namespace significantly reduces the time and effort required to manage user home directories. Using a Global Namespace, administrators can move home directories across devices without having to modify login scripts or user profiles. Users also benefit because they are not required to log out and log back in when their data is migrated. With a Global Namespace, a single administrator is able to easily manage thousands of users and multiple devices, which provides for a substantial decrease in the cost of managing storage.

Sharing Data across Multiple Departments

Most corporate network users are mapped to a drive letter that connects them to the data for their department, but need to access data that is “owned” by other groups. For example, a marketing manager needs access not only to the marketing data on the network (brochures, presentations, collateral), but also to the engineering department’s roadmaps and project information.

In order to connect to the engineering file shares the user is required to physically map a drive letter to the specific server name where the engineering file share is located. In this scenario, it is very cumbersome to share data across multiple groups as the process of physically mapping drive letters to servers is not seamless for users. Additionally, users are required to know distinct, often cryptic server names in order to access data, and they might eventually run out of drive letters.

A Brocade StorageX Global Namespace makes it simple and seamless for users to share data across departments. The Global Namespace presents users with a logical view of all of the shares they can access. Users are no longer required to know where data is physically stored, nor are they required to know and map to specific server names. In the above example, the marketing manager connects to a single drive letter that provides a logical view of both the marketing information and the engineering information through a single namespace.

Optimizing Microsoft Exchange Usage

Since file sharing without a Global Namespace is cumbersome and inefficient, many corporate users attach documents and presentations to e-mails for distribution to other users. This practice has led to a data explosion, as most e-mail recipients tend to save the files, either locally or on a network drive. If 25 users are e-mailed a document, then there are typically 26 copies of the same document being stored somewhere on the corporate network. It also consumes valuable network bandwidth, especially when the file being e-mailed is several megabytes in size.

The Brocade StorageX Global Namespace provides an efficient means of sharing files among users. Instead of e-mailing files as an attachment, users are able to send a link that points to the location of the file. This not only saves network bandwidth, but it also provides version control during the document review process, as multiple users can make revisions and track their changes in a single document.

Lifecycle Management of Reference Data

Reference data is information that is fixed, but needs to be kept available either for regulatory, informational, or business purposes. Some examples of reference data include historical financial statements and patients' medical imaging files that are generated by an X-ray or MRI system. This type of data produces very large file sizes. For example, a single MRI scan generates 20,000 individual files. These files are required to be online and available at all times, which can be costly to maintain on primary, high-performance storage systems.

Implementing a tiered storage architecture is a highly efficient approach to meeting reference data storage needs. A Brocade StorageX Global Namespace enables the implementation of a tiered storage architecture by transparently facilitating the movement of reference data from expensive primary storage onto less-expensive secondary storage based on administrator-defined criteria.

In the above example of medical imaging files, the hospital IT administrator could use the Brocade StorageX Global Namespace to automatically and transparently migrate medical imaging files to secondary storage 30 days after the patient's visit. Moving data to secondary storage not only saves hardware acquisition costs, but also enables administrators to match backup policies and investment with the business value of data.

Managing Web Site Data

A typical Web site consists of thousands of files and hundreds of directories. To add to this complexity, each Web page often contains dozens of URLs that link to specific directories on specific servers. Any changes in the physical devices hosting a Web site can affect numerous pages/files, and can also result in a malfunctioning Web site.

Using a Brocade StorageX Global Namespace to manage Web site data can yield significant benefits to both developers and administrators. Web site files that are stored on multiple devices can be pooled together into a single logical namespace, and managed as a single entity. Administrators can move files around "behind the veil" of the namespace without breaking links, and multiple Web sites can be hosted transparently on one server. With a Brocade StorageX Global Namespace, the transition from test to production servers is fast and seamless. With the click of a mouse button, administrators can push out multiple Web pages simultaneously.

Brocade StorageX Uses Global Namespace to Deliver a Complete Network Data Management Platform

As the industry's leading network data management platform, Brocade StorageX offers an integrated set of applications that logically aggregate distributed file storage. Brocade StorageX provides administrators with policies that automate data and storage services, such as: consolidated network data management, data migration and consolidation, business continuity, storage optimization, data lifecycle management, remote site data management, and data classification and reporting (see Figure 4).

At the core of Brocade StorageX is the Global Namespace, a logical representation of file system and storage devices that creates a unified view of data distributed across heterogeneous storage platforms. The combination of Brocade StorageX policies with the Global Namespace provides administrators with the ability to perform storage management

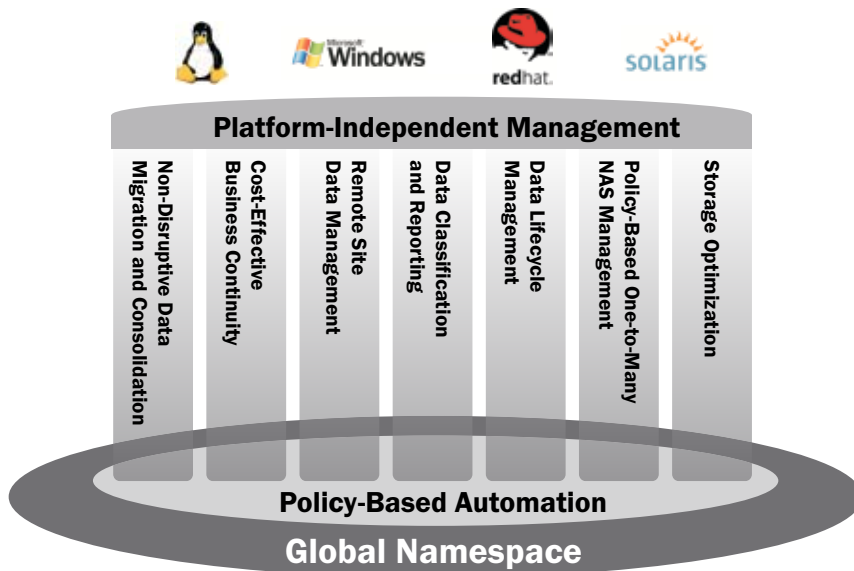


Figure 4.
The Brocade StorageX
Global Namespace
overview.

tasks with no disruption or downtime to users. Users also benefit from simplified access to their data as the Brocade StorageX Global Namespace delivers a unified, logical view of data distributed across heterogeneous storage platforms.

WHAT IS UNIQUE ABOUT THE BROCADE STORAGEX GLOBAL NAMESPACE?

There are a number of products on the market today that tout Global Namespace capability. However, there are key elements to the Brocade StorageX Global Namespace implementation that deliver a compelling, unique value proposition to enterprises.

Data Directory Services

Similar to the way LDAP delivers user authentication services and DNS delivers network-related information services, a Global Namespace provides directory services for networked storage. The Brocade StorageX Global Namespace is a central repository for storage-related information and functions, and provides administrators with a single location to manage network data. One way to conceptualize the data directory services provided by a Global Namespace is to think about the Yellow Pages.

Like the Yellow Pages, a Global Namespace is a directory. In the same way that a listing can appear in multiple sections of the Yellow Pages, a Brocade StorageX Global Namespace can provide multiple, customized views of the same data set. The Global Namespace concept is often used within the context of clustered file systems. However, a Global Namespace delivered via a clustered file system is like the White Pages. Only one listing can appear for a particular entry in the White Pages, and in clustered file systems, only one view can be provided for a given data set.

Standards-Based Platform

Brocade StorageX is an open, standards-based software platform that can be seamlessly and non-disruptively introduced into an IT infrastructure. The software runs on any industry-standard server running Microsoft Windows 2000 or later, and does not require the deployment of a new hardware device. Because it is not in the data path, Brocade StorageX does not introduce any performance or latency issues when used to create and manage the Global Namespace. It uses the existing file system, which means that administrators aren't required to change their network operating procedures.

It also integrates with the existing network security framework, and administrators can even utilize security settings such as group permissions to automatically create and populate a Global Namespace. No software or agents are required to be installed on the client machines accessing the namespace. Unlike many Global Namespace solutions, Brocade StorageX does not require the introduction of a new protocol on the network.

Simple to Install and Use

Deploying a Global Namespace using Brocade StorageX is a simple process. It takes only minutes to install the software, and less than an hour to create and populate a Global Namespace. Using Brocade StorageX, an administrator can deploy a namespace and begin receiving its benefits the same day. Administrators can even use permissions established via Active Directory to automatically create and manage Global Namespaces, thereby applying the established network security framework to the new namespace.

Not a Proprietary File System

Using Brocade StorageX to implement a Global Namespace does not require any modifications to the existing network infrastructure because it simply resides on top of the existing file system. Therefore, enterprises can continue to benefit from the advantages inherent in their existing file systems (WAFL, NTFS, VxFS, DART) such as performance, journalizing, point-in-time recovery, encryption, compression, and security.

Brocade StorageX does not require any changes to network operations, such as snapshot and backup processes. It utilizes time-tested CIFS and NFS network protocols that are offered by existing file system vendors (Microsoft, EMC, and Network Appliance), which is a major advantage over solutions that require the introduction of a new protocol. Utilizing the underlying file system enables the Brocade StorageX Global Namespace to deliver significant benefits over aggregation solutions using a proprietary file system.

Complete Namespace Manageability

Brocade StorageX provides administrators with a comprehensive tool for Global Namespace creation and management. It enables administrators to create and manage multiple namespaces through a single, intuitive console and provides a means to manage both the namespace and the underlying file system from the same console. Brocade StorageX provides administrators with the ability to dynamically populate the Global Namespace based on existing shares/export naming conventions or based on security in the enterprise.

Brocade StorageX also provides administrators the ability to monitor, scale, increase availability, audit, back up, restore, and snapshot the Global Namespace. This set of features delivers complete manageability of the Global Namespace and enables administrators to scale their deployments from a simple Global Namespace to a complex group of functional, enterprise-wide namespaces.

Platform for Unlimited Scalability

There is no limit to the scalability of a Global Namespace implemented with Brocade StorageX. Administrators can use the Brocade StorageX Global Namespace to aggregate multiple file systems and manage them as a single entity. This enables administrators to overcome the scalability limitations of individual file systems and manage tens of thousands of directories and trees through a single namespace.

CONCLUSION

The Brocade StorageX Global Namespace technology delivers immediate, significant benefits to enterprises that are dealing with data management, data movement, and data availability challenges.

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