



**FILE AREA
NETWORK**

The Brocade StorageX Global Namespace Advantage

Enabling Comprehensive Network Data
Management Services.

BROCADE

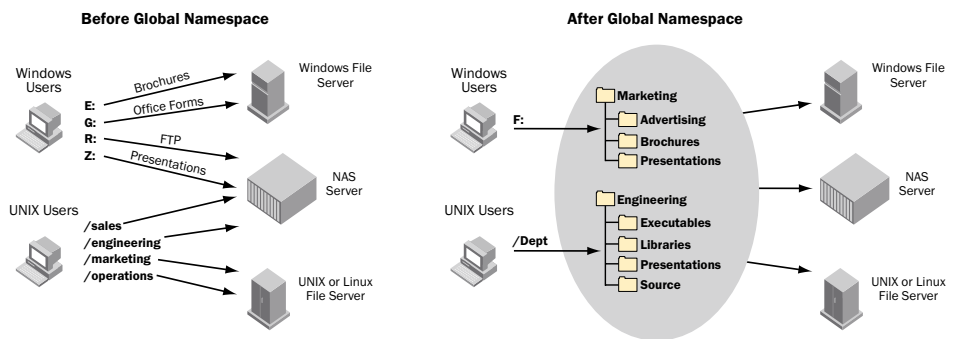
This document describes how the Brocade® StorageX® Global Namespace provides comprehensive network data management services for a wide range of deployment scenarios in enterprise storage environments.

THE CHALLENGE

Today's file systems were designed to take advantage of the storage architecture of the 1960s, which was far less distributed and characterized by static links between clients and storage volumes. Fast forward to today, and the file storage world has become networked and distributed, making file system management complex and costly. What is needed is a new approach to network data management—one that simplifies data management for both users and administrators. Some of the key challenges faced by administrators in today's highly distributed storage environments include:

- Efficiently managing storage across multiple devices, architectures, and locations
- Ensuring that all users who are physically mapped to a storage location are notified and remapped when data is migrated to a new location
- Keeping up with ever-changing demands, as new users and storage devices are added to the network and capacity limits are reached on existing storage devices
- Providing efficient network data management without disrupting user productivity

Figure 1.
Before-and-after snapshot
of Global Namespace.



THE SOLUTION

Brocade® StorageX® Global Namespace does for files what DNS does for networking—it provides a directory service. This directory service can deliver location-independent services to users and applications across multiple, heterogeneous, distributed file systems. Once implemented, a Global Namespace enables users to access files in a logical, location-independent way, much like one accesses Web pages on the Internet.

For example, when one types in www.yahoo.com, he does not know the IP address for Yahoo, nor does he care. Similarly, with a Global Namespace in place, the user accesses information

using Windows Explorer and the location of files is transparent. There are many other similarities between the Internet and a Brocade StorageX Global Namespace, as shown in Table 1.

GLOBAL NAMESPACE BENEFITS

| | Internet | Global Namespace |
|--------------------------|---|---|
| User View | Logical Web Page | Logical Internet Explorer |
| Physical Location | Transparent to links | Transparent to users |
| Navigation | Hyperlinks (location to location) | Folder-based (subsystem to subsystem) |
| Scalability | Millions of nodes | Infinite Global Namespace and file system |
| Hardware Platform | Windows, Linux, UNIX | Windows, Linux, UNIX, NAS, DAS, SAN |
| Ease of Use | Users access Web sites through logical addresses, rather than physical IP addresses | Users access data through a logical Universal Naming Convention (UNC) pathname, rather than physical file locations |

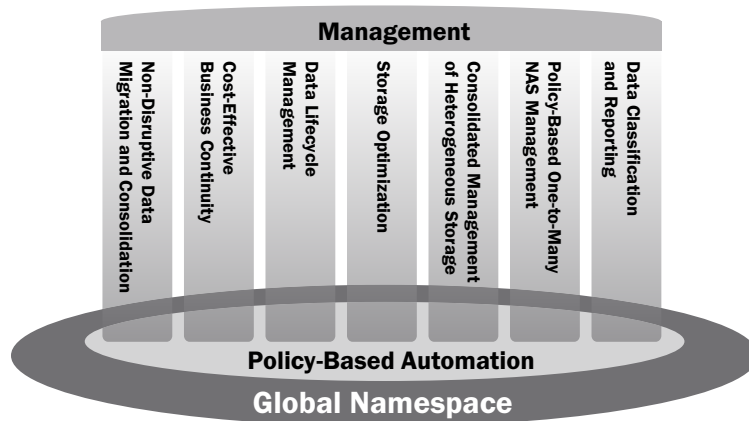
Table 1.
Global Namespace comparison to the Internet.

Brocade StorageX Global Namespace provides a wide range of business benefits:

- 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

BROCADE STORAGEX USES GLOBAL NAMESPACE TO DELIVER A COMPLETE 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 2). 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 tasks with no disruption or downtime to users.



WHAT IS UNIQUE ABOUT THE BROCADE STORAGEX GLOBAL NAMESPACE?

Brocade StorageX Global Namespace provides many advantages over other solutions, as described in the following sections.

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.

Out-of-Band, Software-Based Solution

Similar to the way DNS provides the physical-to-logical translation for Web addresses, enabling clients to talk directly to the Web site, the Brocade StorageX Global Namespace facilitates the physical-to-logical translation for storage. Since Brocade StorageX does not reside in the data path, it doesn't introduce any performance or latency issues when used to deploy a Global Namespace. Unlike hardware-based network data management solutions, Brocade StorageX does not require administrators to install and manage any new devices.

In addition, high availability of the Global Namespace can be achieved in a cost-effective way, as there is not a requirement to purchase additional hardware to fail over the namespace. Finally, Brocade StorageX delivers comprehensive data classification and reporting capabilities that are integrated with its other data management applications, such as consolidation and business continuity.

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.

GLOBAL NAMESPACE USAGE SCENARIOS

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 Brocade StorageX Global Namespace should be deployed.

Remote Site Data Management

Managing data across multiple remote or branch offices presents IT administrators with the challenge of finding ways to maintain data availability while keeping administrative costs down. In addition, the cost of replicating data for disaster recovery purposes can be quite high if an organization has many locations. Maintaining a tape backup infrastructure at each remote site is inefficient and costly, and replicating data across a WAN for centralized backup is difficult and time-consuming.

Unlike in-band Global Namespace solutions that are only able to make storage transparent for the devices they are placed in front of, the out-of-band Brocade StorageX Global Namespace provides a cost-effective, scalable solution for spanning file data distributed across an entire enterprise. The Brocade StorageX Global Namespace enables heterogeneous file storage transparency for branch office, remote office, data center, and campus file data. With a Brocade StorageX Global Namespace, administrators have a single, unified view of data across all locations and can manage distributed data as a single entity. Data can also be replicated to a central location for backup, thereby eliminating the need for a tape backup infrastructure at each location.

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.

CONCLUSION

The Brocade StorageX Global Namespace is a new paradigm in network data management that enables the creation of a scalable, reliable storage infrastructure. It is a long-term strategic technology that, when implemented in an enterprise, can decrease storage management and acquisition costs by increasing storage capacity utilization.

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