



Integrating Macs® with Microsoft® DFS

A Technical Best Practices Whitepaper

Microsoft DFS Background

DFS is a powerful set of technologies used to present a single virtual namespace to a collection of file servers and manage replication of data between those servers. Microsoft® DFS consists of two technologies:

- DFS Replication (DFS-R): which provides facilities for replicating file server data between locations and servers.
- DFS Namespaces (DFS-N): which allows administrators to group file server shares on disparate machines into a single virtual namespace so end users can access files without needing to know exactly where the files are located.

In addition to providing end users with a simplified, single view of the file sharing namespace, the key business benefits of using DFS are:

- **Flexible Provisioning:** DFS provides administrators the ability to relocate a share-point to another server without having to change the network path used by clients to connect to the share. This provides IT staff flexibility to optimize server configuration and re-provision storage without having change user's workflows.
- **High Availability:** Uptime guarantees and Service Level Agreements (SLAs) can be achieved using DFS when combined with file system replication (DFS-R). If one file server goes down, then DFS can redirect users to an alternative target file server with minimal interruption.
- **Optimized WAN Performance:** When file shares are replicated between servers in different locations, DFS site costing allows users to be directed to the file server closest to them. This prevents excessive traffic from going over the corporate WAN, and improves user productivity by giving them fast access times since the data is local.

Challenges of Integrating Macs with DFS

ExtremeZ-IP® has always been compatible with DFS Replication (DFS-R), but prior to ExtremeZ-IP 6.0 there were only two ways to present the DFS Namespace (DFS-N) to a Mac® client.

The first method was to manually setup Mac alias files that represented DFS links and share them out with ExtremeZ-IP. While this approach worked for fairly static and simple namespaces, it really only simulated the DFS namespace, with no support for DFS high availability, site costing, or home directories.

Another method to integrate Macs with DFS was to use a 3rd party software package that installed a complete kernel-level replacement file system for the SMB protocol on Mac OS X®. In addition to the compatibility challenges of this solution, by using SMB, organizations could not get the benefit of using the native Mac file sharing protocol (AFP) against their Windows® servers when they had a DFS environment. AFP brings support for things such as file name policies, no “._ files” (dot underscore), content searching using Network Spotlight, full support for the Mac file system, and the performance benefits of using AFP vs. SMB.

A final option is the DFS support built into the SMB client included with Mac OS X 10.7 “Lion”. Again, this solution brings with it all of the performance and reliability disadvantages of the SMB protocol. It also requires that all Macs in your environment are upgraded to Lion before they can gain access. This may be impractical or impossible, depending on who owns and is responsible for the Macs connecting to your network and the policies governing the versions of the Mac OS they use.

How ExtremeZ-IP® Supports DFS

ExtremeZ-IP® provides support for integrating Macs running OS X 10.4 or later with DFS, including taking advantage of the benefits of flexible provisioning, high availability, and the WAN performance optimizations of site costing. There are three different options for how ExtremeZ-IP supports DFS, and the sections below outline the user experience and applicability of each option.

Option 1: DFS Browsing Using the ExtremeZ-IP Zidget®

The ExtremeZ-IP Zidget® is a user-friendly service discovery tool that is deployed as a Mac OS X Dashboard Widget or simple web page.

In ExtremeZ-IP, the Zidget has been enhanced to present the user with one or more DFS namespaces.

Using the Zidget, users can navigate the full DFS namespace and directly mount any DFS target. In selecting a target, the Zidget works with the ExtremeZ-IP DFS Server to handle site costing and target selection so that the Mac user is directed to the optimal share.

Using the Zidget for connecting to DFS provides the broadest potential compatibility, with support for both Mac OS X 10.4 (Tiger) as well as 10.7 (Leopard), no requirement that Macs be bound to Active Directory, and the ability to search targets once mounted.

Option 2: Finder-integrated Browsing using ExtremeZ-IP Virtual Root Emulator

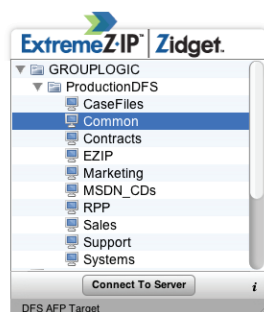
The second option leverages the built-in “autofs” file system technology that is available in Mac OS X 10.5 and later. When Mac users connect to the ExtremeZ-IP DFS server, they are presented with the DFS namespace directly in the Mac OS X Finder and are able to navigate to their target file share directly. The selection of the target share is done dynamically by ExtremeZ-IP, taking into account site costing as well as target availability. Since the Mac is bound to Active Directory and using Kerberos, the user experience is seamless as the targets are mounted directly into the DFS namespace. A lightweight client is installed on the Mac to make the necessary configuration changes. This can also be pushed to Mac desktops using standard client management tools, or included in standard deployment images.

NOTE: While the user experience is similar to Windows, in that the DFS namespace is integrated directly with the Finder, there are some limitations with this option. Whether those limitations apply depend on an organization’s particular workflow, and the Zidget option above may be more appropriate in some instances. Specifically, because of the way the autofs technology works, searching in the Finder is not available against file shares mounted through DFS. Additionally, Finder integrated browsing is only available in Mac OS X 10.5 and later and for Macs that are bound to Active Directory.

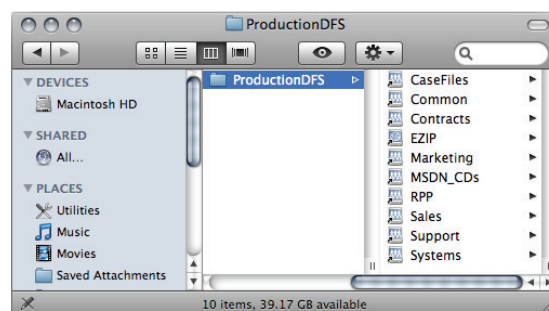
Option 3: DFS Home Directories

Many organizations that use home directories leverage DFS to provide a single virtual file server namespace that includes all users’ Active Directory home profiles. The specific location of individual home directories can be partitioned and reconfigured without needing to change the Active Directory configuration. However, for Mac clients, the UNC paths stored in the user’s profile are not recognized as file shares because they are DFS UNC’s. In this case, ExtremeZ-IP provides a home directory capability as a client installer that integrates directly to the Mac OS X login process to resolve and mount the appropriate file share. At login, the Mac client talks to the ExtremeZ-IP DFS server to resolve the DFS UNC path, taking into account site costing and target availability. The Mac then mounts the file share directly. This option works for both network and portable home directories. Because of how the DFS share is mounted, share searching works against home directories.

Please Note - Due to changes made in Mac OS X 10.7 “Lion”, DFS home directories are not supported by ExtremeZ-IP as of OS X 10.7.0. A fix for this issue is currently under investigation.



DFS Namespace Browsing
Using ExtremeZ-IP Zidget



Finder-integrated DFS Namespace Browsing

Comparing DFS Options

Below is a more detailed description of the configuration of each of the servers in this example. This section also describes how the components work to enable DFS support in the Mac.

	Zidget Browsing	Finder-integrated Virtual Root	DFS Home Directories
Supported Mac OS X Platforms	10.4 or later	10.5 or later	10.5 or 10.6 **
Macs bound to Active Directory?	Not required	Required	Required
Supports Searching?	Yes	No	Yes
Seamless Finder Integration?	Partial	Yes	Yes
Maintains pre-DFS target paths? *	Yes	No	Yes

(*) Some applications, particularly graphic design applications, track related files using absolute paths. In the case where an organization has a large amount of legacy content with linked files, migrating to DFS may cause those path linkages to break. If the Zidget is used to handle DFS Browsing, the paths will be consistent with the pre-DFS migration paths.

(**) Due to changes made in Mac OS X 10.7 “Lion”, DFS home directories are not supported by ExtremeZ-IP as of OS X 10.7.0. A fix for this issue is currently under investigation.

Conclusion

ExtremeZ-IP™ provides three different options to integrate Macs with Microsoft DFS infrastructure. DFS is an important file server infrastructure technology that enables organizations to reduce IT costs and improve user productivity by providing flexible storage provisioning, high availability and WAN optimized performance. Now administrators can take advantage of these benefits by deploying DFS for their Mac users, while continuing to maintain compatibility without compromise of using the native Mac AFP protocol for optimal Mac / Windows file sharing.

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