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## Primer on Samba

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The ability to share files and printers between multiple systems has become a requirement for many applications and systems. As datacenters become more complex, it's critical for data to reside in one location and be accessed from multiple servers without having to move the data around.

In other *eServer Magazine*, *IBM edition for UNIX* articles, I've discussed the implementation of Network File Server (NFS) v4 as a possible solution for data sharing. This article will provide an introduction to Samba—another file-sharing option. (Note: Look for a future article in *eServer Magazine*, *IBM edition for UNIX*, which will provide more detail on configuring Samba for security and performance.)

Samba is a set of programs that allows clients to access server file systems and printers using the Common Internet File System (CIFS) and the Server Message Block (SMB) protocols. Samba runs on most varieties of UNIX, Linux and many other platforms. It's available free of charge according to the rules of the GNU Public License and can be downloaded from the Samba Web site ([www.samba.org](http://www.samba.org)).

### Why Samba and Not NFS?

When sharing files via NFS between Windows and UNIX systems, or other disparate systems, both ends of the transaction must run NFS software. One end must run the server daemons, and the other must run the client daemons. In a Windows environment, this normally means purchasing software to install on the PC to act as a client. For large environments, this cost adds up very quickly. Since Samba is free and based on already-installed protocols such as Network Basic Input/Output System (NetBIOS) and SMB, this extra cost isn't an issue. Additionally, Samba allows you to control file and print services from one or more servers, whereas NFS controls only file services.

As previously mentioned, Samba uses the SMB and CIFS protocols. This allows clients and servers to exchange messages and data and enables UNIX systems to act as file and print servers for client systems. These clients can be Windows systems or other UNIX systems. The key is that the services provided appear as Windows file and print services. SMB client utilities are also provided for UNIX systems, and since Windows clients already support NetBIOS over TCP/IP, they don't require additional software beyond allowing NetBIOS access.

Samba is very reliable and provides good performance under a heavy load. It runs on multiple different flavors of UNIX and Linux. Of course, no client software is necessary because support is already part of Windows, and SMB clients for UNIX are provided with Samba free of charge.

### Features of Samba

A Samba server can provide many useful services and functions on the network. The primary feature is the ability to provide Windows-like SMB file and print servers. This can be done with good granularity in security through the configuration file, which is normally `/etc/samba/smb.conf`. Samba comes with both a Web-based configuration tool called SWAT and a set of command-line commands to help set up and control Samba.

Samba also provides some interesting additional features. These include:

1. The ability to act as a Primary Domain Controller to authenticate clients logging on to a Windows domain.
2. Participation in an existing domain (passthrough authentication).
3. Samba can be set as the domain or local master browser to provide network-browsing services to clients.
4. Samba can provide NetBIOS name-resolution services (similar to Microsoft WINS).
5. The ability to share one or more directories or file systems.

6. The ability to share printers installed on the server among Windows clients.
7. Command line SMB client (similar to FTP).
8. A tar extension for backing up client PCs.

These features make Samba a very popular and flexible option for sharing files and print services.

### Networking

To better understand Samba and where it may fit in your organization, it helps to understand some of the networking concepts it uses.

Samba uses the SMB protocol that runs on top of the NetBIOS over TCP/IP (NBT) protocol. NBT uses the following two TCP/IP ports so these must be accessible through any firewalls:

- Port 137 Name service—Provides NetBIOS browsing information and name resolution.
- Port 139 Session service—Provides file and print shares.

Samba is dependent on two network daemons: `smbd` and `nmbd`. `smbd` handles file and printer sharing, and provides authentication and authorization for SMB clients. `nmbd` supports NetBIOS Name Service and WINS. `nmbd` also assists with network browsing.

### Security

Samba also provides security that allows for fairly granular access control. Security can be set up based on user names or share level. Share-level access involves the client authenticating to the share. The client then has access to all files within that share. User-level security involves a user authenticating with a user name and password. Access to files within the share is then provided based on which files that user name has access to. The `smbusers` file is used to map Samba user IDs to UNIX user IDs on the system. If I map UNIX user name "jaqui" to Samba and user name "lynch," when I log in to the Share as "lynch" I'll get my access based on whether or not the UNIX user "jaqui" has access to those files.

Additionally, an `smbpasswd` file can be used to provide a list of Samba user names and passwords that are different to the UNIX ones. When defining the share in `smb.conf`, the valid user's parameter can be coded using user names (from the Samba users file) or with `@account`, which means to authenticate against the UNIX user names. Access is tested against the rules in the Samba configuration, and then against the UNIX permissions and any access control lists (ACLs) that may have been defined.

### Simple Sharing

As you can see, Samba is a free and useful tool to help simplify the task of sharing files and printers between UNIX and Windows systems. It uses already-installed protocols and clients, and allows for granular security as well as guest access.

For additional Samba information, check out the following resources.

IBM Redbooks and Redpieces ([www.redbooks.ibm.com](http://www.redbooks.ibm.com)):

- Samba Installation, Configuration, and Sizing Guide, SG24-6004-00
- Open Your Windows with Samba on Linux, REDP-3780-00

Books:

- Samba-3 by Example: Practical Exercises to Successful Deployment (Bruce Perens Open Source) by John H. Terpstra
- Using Samba, Second Edition by Jay T's, et al
- The Official Samba-3 HOWTO and Reference Guide (Bruce Perens Open Source) by John H. Terpstra, Jelmer R. Vernooij
- The Definitive Guide to Samba-3 by Roderick W. Smith

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