File Sharing

By

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Notes:

Presentation Overview

- What is Samba
- What is SMB
- What is CIFS
- Samba Parts
- Trouble Shooting
- Discussion of MBT Setup

Notes:

In general we intend to quickly walk through descriptions of what makes up the components of Samba and the protocols used in it. Next we will discuss some configuration problems and issues. Last we will provide an overview of our set up at MBT.

What is Samba

- Software that provides Server Message Block (SMB) protocol to a UNIX system.
- Provides File Sharing Services to and from MS-DOS based clients (IBM, ICL, Microsoft, etc.)
- Provides Printer Sharing to and from MS-DOS based clients
- Most important -- it is FREE

Notes:

Samba is Server Message Block (SMB) file and printer server software for computers running under Unix or another Unix-like operating systems with standard TCP/IP available. Samba, is based on UNIX file structure, permissions, system calls and services. SMB is a "native" networking protocol used by MS-DOS based clients (IBM, ICL, Microsoft and even one particular Novell product). For this talk we are mostly interested in "Windows for Workgroups", "Windows 95/98" and "Windows NT" clients.

SMB is becoming very popular, mainly owing to these factors:

- Windows 95 has dial-up access to PPP servers with an included service, and this service allows one to "browse" to public shares on the Internet.
- Samba is "free" and this is a lot less expensive than Novell! (friendlier too!)
- With Samba, Unix servers, well connected to a global network, can speak in a "native" protocol of clients. It is much simpler to maintain one more protocol on a capable server than teach new tricks to multiple clients which were never meant to do something else.
- There is an established, well tested way of doing SMB over TCP/IP described in publicly availsble RFC 1001 and RFC 1002 documents.
- This means that SMB has a head start when it comes to Internet integration.

Where to get Samba

The Main site is at

- ftp://nimbus.anu.edu.au/pub/tridge/samba/ .

Many mirror sites abound:

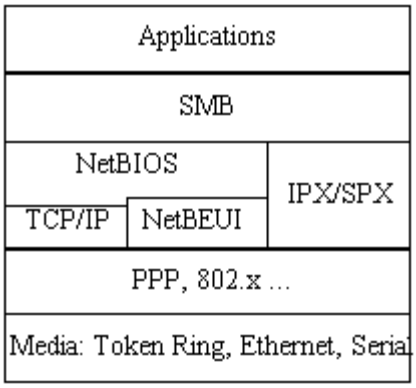
- ftp://src.doc.ic.ac.uk/packages/samba
- ftp://ftp.demon.co.uk/pub/unix/samba
- ftp://sunsite.unc.edu/pub/Linux/system/Network/Samba/
- ftp://choc.satech.net.au/pub/samba

Notes:

Samba software is freely available "on the net". It was created, and is still actively developed, by Andrew Tridgell, Andrew.Tridgell@anu.edu.au.

He really likes Pizza... (Check out any Samba sites for details).

What is SMB?



- Originally named Microsoft Networks/OpenNET-FILE SHARING PROTOCOL
- Protocol for sharing files, printers, serial ports, and communications objects between computers.
- Designed to operate over the network protocols.

Notes:

SMB was introduced in 1987 by Microsoft and Intel and was called Microsoft Networks/OpenNET-FILE SHARING PROTOCOL. It has since been developed further by Microsoft and others. Many of the documents that define the SMB protocol(s) are available at the Microsoft SMB documentation area ftp://ftp.microsoft.com/developr/drg/CIFS/.

SMB is a client server, request-response protocol.

SMB will work over "TCP/IP, NetBEUI and IPX/SPX. If TCP/IP or NetBEUI are in use, the NetBIOS API is being used. NetBIOS over TCP/IP seems to be referred to by many names. Microsoft refers to it as NBT in some places and NetBT in others (specifically in their Windows NT documentation and in the Windows NT registry). Others refer to it as RFCNB. NetBEUI is sometimes refered to as NBF (NetBIOS Frame Format?) by Microsoft."

More SMB Information

- A small gotcha is NetBIOS names need to be all UPPER CASE and less then 15 characters long.
- "Just What is SMB?" http://samba.anu.edu.au/cifs/docs/what-is-smb.html

Notes:

SMB on TCP/IP or NetBEUI requires that server names be used in a number of cases. Interestingly NetBIOS names are up to 15 characers long, and are usually the name of the computer that is running NetBIOS. Microsoft, and some other implementors, insist that NetBIOS names be in upper case, especially when presented to servers as the CALLED NAME.

For a very nice discussion of SMB I highly recommend a paper by Richard Sharpe entitled "Just What is SMB?" http://samba.anu.edu.au/cifs/docs/what-is-smb.html

What is CIFS?

- CIFS is SMB renamed and "enhanced"
- The paper on SMB covers CIFS
- Microsoft has a nice information site at:
  - http://www.microsoft.com/workshop/networking/cifs/default.asp

"Microsoft is making sure that CIFS technology is open, published, and widely available for all computer users."

Notes:

Microsoft has submitted the CIFS 1.0 protocol specification to the Internet Engineering Task Force (IETF) as an Internet-Draft document and is working with interested parties for CIFS to be published as an Informational RFC. CIFS (SMB) has been an Open Group (formerly X/Open) standard for PC and UNIX interoperability since 1992 (X/Open CAE Specification C209).

Samba Parts

Samba is made of several key parts. Each part has a solid manual page describing it in detail (can you say RTFM?) The core parts are:

- smbd - file & printer SMB daemon
- nmbd - Netbios nameserving & browsing
- smbclient - ftp-like SMB client for UNIX
- testparm - configuration tester
- smbstatus - tells all about the currently running (or not smbd)

Notes:

From the manual pages:

The smbd(8) daemon provides the file and print services to SMB clients, such as Windows for Workgroups, Windows NT or LanManager. The configuration file for this daemon is described in smb.conf(5).

The nmbd(8) daemon provides Netbios nameserving and browsing support. It can also be run interactively to query other name service daemons.

The smbclient(1) program implements a simple ftp-like client. This is useful for accessing SMB shares on other compatible servers (such as WfWg), and can also be used to allow a UNIX box to print to a printer attached to any SMB server (such as a PC running WfWg).

The testparm(1) utility allows you to test your smb.conf(5) configuration file.

The smbstatus(1) utility allows you to tell who is currently using the smbd(8) server.

SMBD

This is the main server for most SMB services.
This provides:

- file sharing
- file locking
- printer services

SMBD is compatible with: LanManager protocol including MSCLIENT 3.0 for DOS, Windows for Workgroups, Windows 95, Windows NT, OS/2, DAVE for Macintosh, and smbfs for Linux.

Notes:

The smbd daemon is the main server providing most SMB services. The server provides filespace and printer services to clients using the SMB protocol.

The list of services and configurations is impressive. A complete description of the configurations for the smbd server is given in the man page for the configuration file controlling the attributes of those services (see smb.conf(5)).

There are significant security implications to running smbd and reading the smb.conf(5) man page shoud be mandatory.

A smbd session is created whenever a client requests one. Each client gets a copy of the server for each session. This copy then services all connections made by the client during that session. When all connections from its client are are closed, the copy of the server for that client terminates.

The configuration file, and any files that it includes, are automatically reloaded every minute, if they change. You can force a reload by sending a SIGHUP to the server. Reloading the configuration file will not affect connections to any service that is already established. Either the user will have to disconnect from the service, or smbd killed and restarted.

NMBD

- Provides LanManager NetBIOS name services
- Provides network browsing information
- Can provide Windows Internet Name Server services (WINS)
- Speeds up network knowledgable boots (really)

Notes:

The nmbd deamon is a server that understands and can reply to netbios name service requests, like those produced by LanManager clients. It also controls browsing of resources.

LanManager clients, when they start up, may wish to locate a LanManager server. That is, they wish to know what IP number a specified host is using.

Nmbd listens for LanManager client requests for the LanManager server. If the nmbd system's name is specified nmbd will respond with the IP number of the host it is running on. Its "own name" is by default the name of the host it is running on, but this can be overriden with the -n option.

Nmbd can also be used as a WINS (Windows Internet Name Server) server. Nmbd will respond to all name requests that it receives that are not broadcasts, as long as it can resolve the name. Resolvable names include all names in the netbios hosts file (if any, see the -H option), its own name, and any other names that it may have learned about from other browsers on the network. A change to previous versions is that nmbd will now no longer do this automatically by default.

SMBCLIENT

- A user program that talks LanManager NetBIOS.
- Operations similiar to ftp.
- Allows for intersharing of files (backups) from PCs from the UNIX end.

Notes:

smbclient is a client that can 'talk' to a Lan Manager server. It offers an interface similar to that of the ftp program (see ftp(1)). Operations include things like getting files from the server to the local machine, putting files from the local machine to the server, retrieving directory information from the server and so on.

TESTPARM

- Your best friend
- A very simple test program.
- Will load your configuration file and check it
- Can also produce another configuration file WITH
  ALL THE OPTIONS LISTED

Notes:

testparm is a very simple test program to check an smbd configuration file for internal correctness. If this program reports no problems, you can use the configuration file with confidence that smbd will successfully load the configuration file.

But, it may not do what you think. (Read the smb.conf manual page.) Even the manual page for testparm states: **Note that this is NOT a guarantee that the services specified in the configuration file will be available or will operate as expected**.

SMBSTATUS

- Lists the current Samba connections

Notes:

What more can be said?

smb.conf

- 80 page manual page
- Everything you ever wanted to try
- read the manual

Notes:

I thought about including the printout of the manual page. But, then after it finished printing I decided I didn’t want to make that many copies. It is available on the web and in the distribution. Have fun!

Trouble Shooting

- There is a great paper called "DIAGNOSING YOUR SAMBA SERVER" by Andrew Tridgell try it.
- If that doesn’t fix you up you might have:
- An encryption problem: Service Pak 3
- Client OS installation problem (joy)
- Badly installed UNIX system (it happens)
- Bug
- Try the Samba web pages

Notes:

We have had the gambit of problems here.

The most unusual were the magic vanishing files (zeros in the first 10 or so characters and Samba ignored them) which was a Samba bug and was patched.

The impossible to open files, a Microsoft file locking issue that is mostly resolved (Op locks).

Then of course the patch and die for Microsoft updates. Microsoft makes sweeping changes any time they want. By installing various patches (or one in particular) you can break your connection to the server. Most netorious of these is the encrypted hand shake change in service pak 3. See the included pages for how to fix this problem.

The MBT Servers

MBT is currently running a large central Digital Alpha based server. Providing access to just over 600 GB of storage for the entire department.
Cellworks is running 3 Samba servers (Solaris 2.5, Solaris 2.6 and SGI IRIX) providing development access and special printing services for itself.
All of these systems are the standard (same actually) source distribution with various configurations (smb.conf).

Notes:
See the hand outs for the MBT central server smb.conf and the smallest Cellworks Project smb.conf.

Summary

- Samba provides CIFS (SMB) file, printing and object sharing
- It comes with very good documentation and tools
- It is Free
- Nothing is Free
- Questions?

Notes:

We hoped this helped!