

# Samba

just a quick look

Rick Troth <[rtroth@bmc.com](mailto:rtroth@bmc.com)>  
BMC Software  
Neale Ferguson - Software AG

# Trademarks and Credits



- Linux is a trademark of Linus Torvalds.
- VM/ESA, z/VM, MVS, OS/390, z/OS, VSE, S/390, z/Series ... are trademarks of IBM.
- UNIX is a trademark licensed thru X/Open.
- Samba is GPLed.
- Windows, NT, etc. trademarks of MS.
- Christopher R. Hertel - <http://www.linux-mag.com/cgi-bin/printer.pl?issue=2001-05&article=smb>
- Thank you, Oscar Schultz!

# Outline



- What is SAMBA?
- What's required for SAMBA?
- Installation
- Defining shares
- Common Problems
- References and Examples

# What is SAMBA



- "Samba is way cool"
- A suite of tools for sharing resources such as printers and files across a network
- Released under the GNU/GPL

# What does Samba Do?



- Samba uses the Server Message Block (SMB) protocol (endorsed jointly by Microsoft and IBM) to pass low-level data between Windows clients and Unix servers.
- SMB is native to Windows, unlike NFS

# What does Samba Do?



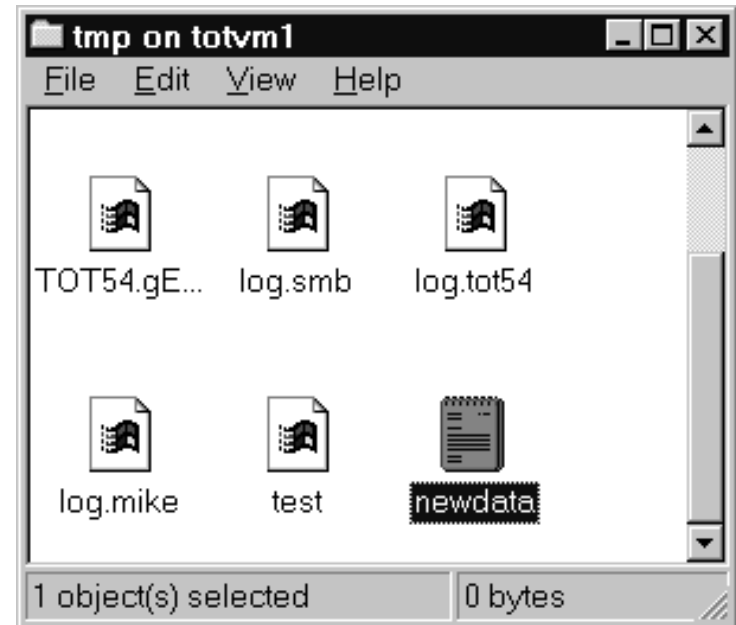
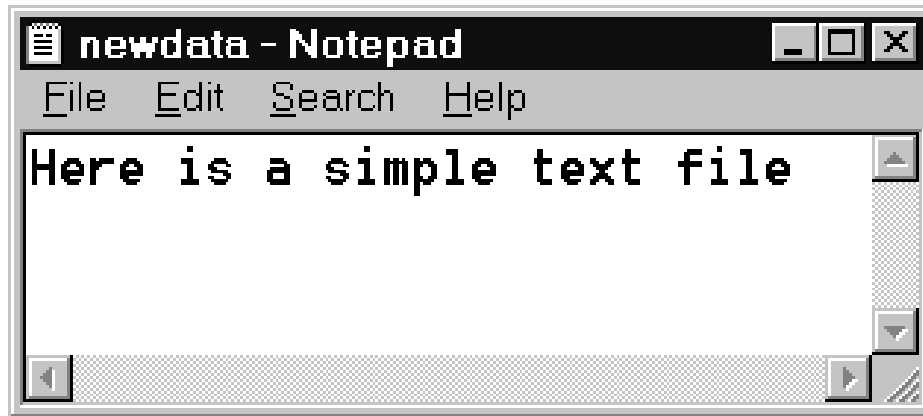
- Samba can divorce the user (and management) from where the data is stored while retaining the MS environment most users/managers expect
- Interoperability is more important than compatibility
- ...and SAMBA does that!

# Why Samba



- Server Consolidation
- Integrate Microsoft or IBM style desktop machines with Enterprise servers
- Integrate Microsoft servers with Enterprise servers
- Replace multiple protocols (e.g. DecNet, Novell NCP)

# Samba in Action...



```
dir /tmp/newdata.txt
```

```
-rwxr--r--  1 default system    26 Apr 30 14:11 /tmp/newdata.txt
```



# Samba provided services



- Serve UNIX files to Windows clients
- Allow UNIX clients to access PC files
- Serve network printers to Windows clients
- Provide name services (broadcast & WINS)
- Allow browsing of network resources from windows clients
- Create windows workgroups or domains
- Enforce username and password authentication

# File Sharing



- UNIX files on Windows
- Windows files on UNIX
- 'mount' Windows shares to Linux

# Printer Sharing



- UNIX printers on Windows
- Windows printers on UNIX

# Glossary



<b>CIFS</b>	Common Internet File System
<b>DMB</b>	Domain Master Browser
<b>DNS</b>	Domain Naming Service
<b>IPX/SPX</b>	Internetwork Packet Exchange/Sequenced Packet Exchange
<b>LMB</b>	Local Master Browser
<b>NBDD</b>	NetBIOS Datagram Distribution Server
<b>NBNS</b>	NetBIOS Name Server
<b>NBT</b>	NetBIOS over TCP/IP
<b>NetBIOS</b>	Network Basic Input/Output System
<b>SMB</b>	Server Message Block Protocol
<b>SNA</b>	Systems Network Architecture
<b>TCP/IP</b>	Transmission Control Protocol/Internet Protocol
<b>UDP</b>	User Datagram Protocol
<b>W2K</b>	Windows 2000
<b>WINS</b>	Windows Internet Name Service

# The Samba Suite



- NMBD - Name services
- SMBD - File and print services
- SWAT - Web-based administration tool
- Clients
- VFS driver - SMB as a native Linux file system

# Name Services



- Each NetBIOS name is a communications end-point, representing an application or daemon
- The Name Service keeps track of which names are in use at which IP addresses and runs on UDP port 137
- There are two kinds of names: group and unique. Group names can be shared so that datagrams can be multicast to all members of the group. In contrast, only one instance of a unique name may be registered at a time within a virtual PC-Network LAN.

# Name Services



- The Name Service has two modes of operation: broadcast and point-to-point. In broadcast mode, names are registered, queried, and eventually released by sending UDP broadcasts to port 137.
- Point-to-point mode is used to cross IP subnet boundaries. Microsoft's implementation of NBNS is called WINS (Windows Internet Name Service).

# NetBIOS over TCP/IP



- The purpose of NBT is to provide an emulated PC-Network LAN.
- If entities share the same NetBIOS name space, they are on the same virtual wire.
- The Name Service that is responsible for creating and maintaining the name space, so the Name Service defines the virtual LAN.
- The NetBIOS API is the gateway to that virtual LAN, but non-Windows systems typically craft the NBT packets and handle TCP and UDP transfers directly.



# Samba Install



- Standard ./configure, make, make install
- .. or via RPM -i
- Download from [www.samba.org](http://www.samba.org).
- Enable SWAT:

## /etc/services

```
swat          901/tcp
```

## /etc/inetd

```
swat stream tcp  nowait.400  root  /usr/local/samba/bin/swat  swat
```

# Important Files

- **Samba configuration**  
`/etc/smb.conf`
- **SuSE configuration**  
`/etc/rc.config`
- **Startup configuration** `/etc/rc.d/init.d/smb`  
`[start | stop]`

# smb.conf



- **[globals]**  
default parameters for all sections
- **[homes]**  
usually the user's home dir `/home/%u`
- **[printers]**  
shared printers or `/etc/printtab`
- **[...more...]**  
other directories to be shared

# Starting Samba

- Two components

**smbd** - file and print sharing

**nmbd** - services broadcasting

- Manual method

```
/usr/local/samba/bin/smbd -D
```

```
/usr/local/samba/bin/nmbd -D
```

**-or-**

```
/etc/rc.d/init.d/smb [ start | stop ]
```

# Windows Client Configuration



- Match Windows and Linux userids \*\*
- TCP/IP protocol support required
- MS Client for File and Printer sharing
- Windows files marked as shareable if a Samba *client* will access them
- NetBIOS and NetBEUI are not required

# Windows 95/98 Setup



- Install TCP/IP
- Install MS client for file and print sharing.
- Enable user names
- Hint - keep the user name on the 95/98/NT machines the same as on the Samba server (pre-version 2.2)

# Windows NT 4.0 Configuration



- Assign the machine a name
- Install the Workstation service
- Install the TCP/IP protocol
- Set the machine's name and IP address
- Configure the DNS and WINS, if needed
- Bind the protocol and service together

# Test it



- Network neighborhood
- Search for the Domain name or workgroup of your Samba service.
- Also check SAMBA client side:  
**smbclient -L ntserver**  
**smbclient //ntserver/ntshare**



# Common Problems



- Windows id != Linux/Samba id.
- Smbpasswd not run
- Browseable = no
- Encrypted passwords
  - Windows 3.1 & Windows 95 – no encryption.
  - Windows 98 & Windows NT – required.

# Common Problems



- `"EnablePlainTextPassword"=dword:00000001`
- `HKEY_LOCAL_MACHINE\  
SYSTEM\  
CurrentControlSet\  
Services\  
LanmanWorkstation\  
Parameters`

# Common Problems



- "EnablePlainTextPassword"=dword:00000001
- HKEY\_LOCAL\_MACHINE\  
SYSTEM\  
CurrentControlSet\  
Services\  
Rdr\  
Parameters

# Common Problems



- Case sensitive.
- “Guest ok = yes” – permits world access
- “writeable = yes” – permits write access
- DNS -vs- /etc/hosts
- Look at the logs

# Suggestions



- Use `hosts.allow` and `hosts.deny` parameters in `smb.conf` to limit access
- Use `interfaces =` to limit the interfaces Samba will respond to.
- Look at the logs!
- Buy the "Using Samba" book!
- Have fun

# Cool stuff



- Virtual servers
- Recover unused workstation disk space.
- Printer servers w/ autoload device drivers.
- Central Backup - Amanda + Samba + cron
- Samba can provide Wins services.
- Loadrunner (and winrunner) from Mercury Interactive

<http://www-svca.mercuryinteractive.com/>

- Samba can serve as a:
  - Local master browser
  - Preferred master browser
  - Domain master browser
  - Primary domain controller
- Domain master browser and primary domain controller should be the same machine
- If joining an existing domain do not setup samba as a master browser, samba will win the election every time

# Share Names



- No blanks
- No slashes
- Generally avoid punctuation



# Interfaces



- `Interfaces = <my-ip-address>/255.255.255.0`

# Domains



- a member of the domain for  
"security = domain"
- Linux account not need login privs  
but does need to exist (non-winbindd)

# Printer Drivers



- Auto-install print driver:
  - 95 yes,
  - NT no

# Examples



```
ps -ugax | grep -i mb
root      15343  0.0  0.2  2428  584 ?      S    Jul16   0:00  smbd  -D
root      15354  0.0  0.3  1992  796 ?      S    Jul16   0:38  nmbd  -D
root      22849  0.0  1.0  3960 2756 ?      S    Jul17   0:05  smbd  -D
```

# Example smb.conf



```
# Samba config file created using SWAT
# from guest3.casita.net (192.168.29.131)
# Date: 2001/07/21 14:10:29

# Global parameters
[global]
    workgroup = CASITA.NET
    netbios aliases = main
    server string = La Casita Samba Server
    map to guest = Bad User
    log file = /var/log/samba/%m.log
    keepalive = 30
```

# Example smb.conf



```
logon script = %U.bat
logon drive = H:
domain logons = Yes
os level = 2
domain master = Yes
kernel oplocks = No
hosts allow = 192.168.29.0/255.255.255.0
```

```
[netlogon]
```

```
path = /export/netlogon
```

# Example smb.conf



```
[homes]
```

```
comment = user home directories
```

```
writeable = Yes
```

```
create mask = 0750
```

```
browseable = No
```

```
[cdrom]
```

```
comment = CD-ROM
```

```
path = /cdrom
```

```
locking = No
```

# Example smb.conf



```
[printers]
    comment = All Printers
    path = /tmp
    create mask = 0700
    printable = Yes
    browseable = No

[tmp]
    path = /tmp
    writeable = Yes
```



# Example smb.conf



```
[web]
```

```
comment = World Wide Web Files  
path = /var/web  
writeable = Yes  
guest ok = Yes
```

```
[home]
```

```
comment = Home Directory  
path = /home/%u  
writeable = Yes
```



```
Command Prompt
D:\home\rtroth>net use
New connections will be remembered.

Status          Local        Remote          Network
-----
OK              G:           \\syslexia\l390team  Microsoft Windows Network
OK              U:           \\fs02-hou\rtroth$   Microsoft Windows Network
The command completed successfully.

D:\home\rtroth>
```

3 1/2 Floppy (A:)

hda1 (C:)

hda5 (D:)

l390team on 'syslexia' (G:)

rtroth\$ on 'fs02-hou' (U:)

Control Panel

rtroth on trothnec



File Edit View Favorites Tools Help



Back Forward Home Search Folders History

Address rtroth Go

**rtroth**

Select an item to view its description.

Home Directories

Capacity: 1.80 GB

Used: 1.63 GB

- |          |        |            |         |              |
|----------|--------|------------|---------|--------------|
|          |        |            |         |              |
| .vmesa   | .VMESA | .vmware    | .vnc    | .wastebasket |
|          |        |            |         |              |
| .Windows | .wine  | .workspace | .xauth  | aim          |
|          |        |            |         |              |
| bin      | boot   | cmsfs      | cmsfs.d | doc          |

245 object(s)

15.6 MB

Local intranet

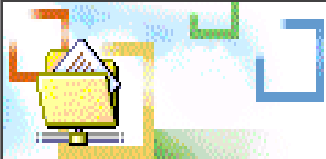


 **rtroth on trothnec** \_ □ ×

File Edit View Favorites Tools Help

← Back →   Search  Folders  History     

Address  rtroth Go



      
3270v4.1-gl... antiworm.bat autoexec.bat autofile.asc backup

## rtroth

**cmsfs**  
File Folder

Modified: 1/24/2001 2:35 AM

Attributes: (normal)

      
blindbox bmclogo.gif bookmark.html boot.ini brown

      
cmsfs.tar copytree days dead.letter diddlebug-s...

1 object(s) selected

 Local intranet



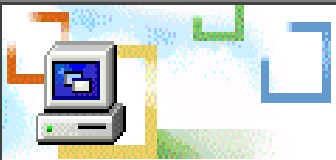
trothnec

File Edit View Favorites Tools Help

Back Forward Stop Search Folders History Refresh Stop

Address trothnec

Go



**trothnec**

\\trothnec\sww

Comment: /sww (automounted)



casita



cdrom



flathead



hilbeprinter



incoming



l390home



l390team



myhome



rtroth



seaturtle



sww



trothnec



trothv15



vmware



whitewhale


1 object(s) selected

Samba Web Administration Tool - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites History Print Copy Paste Refresh Stop

Address <http://dali157.software-ag.de:901/>



**HOME** **GLOBALS** **SHARES** **PRINTERS** **STATUS** **VIEW** **PASSWORD**

**Welcome to SWAT!**

Please choose a configuration action using one of the above buttons

**Samba Documentation**


- **Daemons**
  - [smbd](#) - the SMB daemon
  - [nmbd](#) - the NetBIOS nameserver
  - [winbindd](#) - the winbind daemon
- **Configuration Files**
  - [smb.conf](#) - the main Samba configuration file
  - [lmhosts](#) - NetBIOS hosts file
  - [smbpasswd](#) - SMB password file

Samba Web Administration Tool - Microsoft Internet Explorer

File Edit View Favorites Tools Help

← Back → Stop Home Search Favorites History

Address <http://dali157.software-ag.de:901/globals>



**HOME** **GLOBALS** **SHARES** **PRINTERS** **STATUS** **VIEW** **PASSWORD**

## Global Variables

Commit Changes Reset Values Advanced View

### Base Options

<a href="#">Help</a>	workgroup	<input type="text" value="LINUX390"/>	<input type="button" value="Set Default"/>
<a href="#">Help</a>	netbios name	<input type="text" value="DALI157"/>	<input type="button" value="Set Default"/>
<a href="#">Help</a>	server string	<input type="text" value="Samba 2.2.0a for S/390"/>	<input type="button" value="Set Default"/>
<a href="#">Help</a>	interfaces	<input type="text" value="10.20.45.157"/>	<input type="button" value="Set Default"/>

### Security Options

<a href="#">Help</a>	security	<input type="text" value="USER"/>	<input type="button" value="Set Default"/>
----------------------	----------	-----------------------------------	--

# Samba Version 2.2



- PDC Support
  - Ability to act as limited PDC for NT & W2K
    - Adding NT & W2K clients to domain
    - Authenticate users logging on to domain
  - Domain account can be viewed using User Manager for Domains
  - Viewing/adding/deleting resources on Samba PDC via Server Manager for Domains



- PDC Support
  - Win95/98/ME clients will allow user level security to be set and browsing of domain accounts
  - Machine account password updates
  - Changing of user passwords from NT client
  - Partial support for NT username mapping
    - Group name mapping is slated for later release

# Samba V2.2



- PDC features not supported
  - Trust relationships
  - PDC and BDC integration
- Kernel oplocks
  - Allow Linux to present a consistent view of file system
- Samba can act as Microsoft DFS server
- Full Windows printer support

# Now in 2.2.2



- Winbind
  - Allows NT domain users & groups to automatically appear to exist under Linux (no need to appear in **/etc/passwd**)
  - Allows Linux services to authenticate against NT domains
- ACL Support
  - Used to set permissions on files & directories
  - Finer-grained control over permissions than most UNIX
  - Samba will preserve NTFS ACLs rather than mapping to UNIX scheme

- **winbindd** is a daemon that provides a service for the Name Service Switch capability that is present in most modern C libraries.
- The Name Service Switch allows user and system information to be obtained from different databases services such as NIS or DNS. The exact behavior can be configured through `/etc/nsswitch.conf`.
- Users and groups are allocated as they are resolved to a range of user and group ids specified by the administrator of the Samba system.

- The service provided by **winbindd** is called “winbind” and can be used to resolve user and group information from a Windows NT server. The service can also provide authentication services via an associated PAM module.
- The **pam\_winbind** module in the 2.2.2 release only supports the auth and account module-types. The latter is simply performs a `getpwnam()` to verify that the system can obtain a uid for the user.

- **nsswitch** databases that are implemented by the **winbindd** service:
- **hosts**
  - User information traditionally stored in the **hosts** file and used by **gethostbyname** functions. Names are resolved through the WINS server or by broadcast.
- **passwd**
  - User information traditionally stored in the **passwd** file and used by **getpwent** functions.
- **group**
  - Group information traditionally stored in the **group** file and used by **getgrent** functions.

- Users and groups on a Windows NT server are assigned a relative id (rid) which is unique for the domain when the user or group is created. To convert the Windows NT user or group into a unix user or group, a mapping between rids and unix user and group ids is required. This is one of the jobs that **winbindd** performs.

- As winbindd users and groups are resolved from a server, user and group ids are allocated from a specified range. This is done on a first come, first served basis, although all existing users and groups will be mapped as soon as a client performs a user or group enumeration command. The allocated unix ids are stored in a database file under the Samba lock directory and will be remembered.
- **WARNING:** The rid to unix id database is the only location where the user and group mappings are stored by winbindd. If this file is deleted or corrupted, there is no way for winbindd to determine which user and group ids correspond to Windows NT user and group rids.



# Now in 2.2.2



- Added/Changed parameters
  - strict allocate
    - Causes Samba not to create UNIX 'sparse' files, but to follow the Windows behaviour of always allocating on-disk space.
  - use mmap
    - Set to 'on' by default, only set to 'off' on HPUX 11.x or below or other UNIX systems that don't have coherent mmap/read-write internal caches.
  - nt acl support
    - This parameter has been changed to a per-share option, and is very useful in enabling Windows 2000 SP2 to load/save profiles from a Samba share.

# Now in 2.2.2



- Added/Changed parameters
  - disable spoolss
    - Setting this parameter causes Samba to go back to the old 2.0.x LANMAN printing behaviour, for people who wish to disable the new SPOOLSS pipe.
  - use client driver
    - Causes Windows NT/2000 clients to need have a local printer driver installed and to treat the printer as local.

# SPOOLSS



- Samba now supports the native Windows NT printing mechanisms implemented via MS-RPC (i.e. the SPOOLSS named pipe).
- Previous versions of Samba only supported the LanMan printing calls.

# SPOOLSS



- Support for downloading printer driver files to Windows 95/98/NT/2000 clients upon demand.
- Uploading of printer drivers via the Windows NT Add Printer Wizard or the Imprints tool set
- Support for the native MS-RPC printing calls such as StartDocPrinter, EnumJobs(), etc...
- Support for NT Access Control Lists (ACL) on printer objects
- Improved support for printer queue manipulation through the use of an internal database for spooled job information.

# Now in 2.2.3



- LDAP Update (backend improvements)
- Fix for memory leak in winbindd
- Parameter changes:
  - unix extensions
    - Enables the experimental UNIX CIFS extensions in smbd. See the manpage for more details.
  - default devmode
    - Some printer drivers will crash the Windows NT/2000 spooler service if given a default devmode, some require it.
  - share modes
    - This parameter has been restored to allow people who wish smbd to ignore client share modes.

## Now in 2.2.3a



- Fix for “ACCESS DENIED” problem with W2K Explorer

## Now in 2.2.4



- More/better SPOOLSS printing functionality for Windows NT/2k/XP clients
- Several fixes for serving PC database files (such Access and FoxPro) from a Samba file share
- Several improves in Samba's VFS layer which can be seen in the inclusion of a "Recycle Bin" vfs module.
- Addition of a tool (**tdbbackup**) for backup/restore of Samba's tdb's

## Now in 2.2.4



- Continued improvements to **winbind** for greater scalability and stability
- Several fixes related to Samba's MS-DFS support
- Rpcclient's various printer commands now work (again)



# Bug in 2.2.4



- Under certain conditions when serving the MS Access 2000 executable file and an Access database from a Samba share, it is possible to experience data corruption. This bug does not occur when the database is served from a Samba file share but the Access \*.exe is stored on the client's local file system. The exact reason for this bug is unknown at this time.

# Thank You!



- <ftp://www.samba.org/>