

Table of Contents

1.	9	Sum	mary	/	2
	1.1			at is SMB	
		1.1.1	1.	Distributed File Systems	2
	-	1.1.2	2.	Remote file protocol	2
	-	1.1.3	3.	A brief history	3
	2.	Fu	unctio	onal Description of Windows Resource Sharing	4
	2.1		The	Network Stack	4
	2.2	2.	Defa	aults Share Points	4
	2.3	5.	Con	figuring File Sharing	4
3.	(Crea	ating	and Sharing a folder on Windows 10 Workstation	5
4.	(Con	necti	ng to a Windows Shared Drive from Linux SLES using smbclient	7
	4.1		Smb	tree	7
	4.2	2.	smb	client	8
	4	4.2.2	1.	Listing SMB shared folder through command prompt	8
	4	4.2.2	2.	Connect to SMB shared folder	9
	4	4.2.3	3.	Mounting the SMB shared folder to local folder	9

1. Summary

1.1. What is SMB

When discussing SMB, one should distinguish :

- SMB the protocol
- SMB services that run on the protocol NetBIOS
- DCE/RPC services that use SMB as an authenticated Inter-process communication channel (over named pipes)
- "Network Neighborhood" protocols which primarily (but not exclusively) run as datagram services directly on the NetBIOS transport

1.1.1. Distributed File Systems

Any computer file system that supports sharing of files and other resources as persistant storage over a computer network.

- First file server were developped in the 1970s
 - Network File System (NFS)
 - Created at Sun Microsystems
 - 1985
 - First widely used distributed file system
 - Other notable distributed file systems
 - Andrew File System (AFS)
 - Server Message Block SMB
 - AKA CIFS
- SMB is a distributed File Systems like NFS, AFS

1.1.2. Remote file protocol

- Remote (not Local)
 Access file across the wire (LAN, WAN)
- File (not Block)
 - Different semantics
- Protocol

•

- $\circ \quad \text{Well-defined and documented} \\$
- Examples
 - o NFS, SMB2, SMB3, WebDAV

SMB is a session-oriented protocol. Peer SMB applications running on two stations must establich a link with each other prior to exchanging SMB messages. For this reason, SMB traffic is always carried in TCP datagrams.

OSI					TCP/IP	
Application Presentation		Application				
Session	NetBIOS	NetBEUI	NetBIOS	NetBIOS		
Transport	IPX1		DECnet	TCP&UDP	TCP/UDP	
Network				IP	IP	
Link	802.2,	802.2	1241	Ethernet V2	Ethernet or	
Link	802.3,802.5	802.3,802.5	Ethernet v2	Ethernet V2	others	
Physical						

1.1.3. A brief history

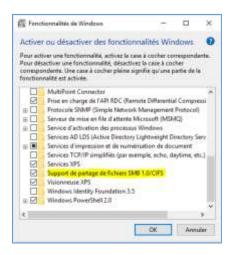


SMB

SMB stands for "Server Message Block." It's a file sharing protocol that was invented by IBM and has been around since the mid-eighties. It was designed to allow computers to read and write files to a remote host over a local area network (LAN). The directories on the remote hosts made available via SMB are called "shares."

CIFS

CIFS stands for "Common Internet File System." CIFS is a dialect of SMB. That is, CIFS is a particular implementation of the Server Message Block protocol, created by Microsoft.



SAMBA

Samba is an implementation of SMB written for UNIX by a fellow named <u>Andrew Tridgell</u>. Samba was designed to allow Windows clients to access UNIX directories and files via the SMB protocol, just as if they were talking to a Windows server. Samba now runs on multiple platforms and is a mainstay on most Linux distros.

NFS

NFS stands for "Networked File System." It was developed by Sun Microsystems and serves essentially the same purpose as SMB (i.e., to access files systems over a network as if they were local), but is an entirely different protocol. This means that NFS clients can't speak directly to SMB servers.

2. Functional Description of Windows Resource Sharing

2.1. The Network Stack

The network stack consists of the following major elements :

- Network applications
 - o Wnet
 - o Named pipes
 - o Mailslots
 - Winsock
 - Network providers
 - Windows provider (SMB provider = Microsoft Client)
 - NetWare provider
 - o Remote Desktop provider
 - o Web Client provider
 - Winsock provider
- Redirectors
 - Windows Redirector
 - This driver communicates with Windows servers Using the Server Message Block (SMB) command protocol
 - o Netware Redirector
 - RDP Redirector
 - WebDAV Redirector
- Transports
- Network adapter interfaces

2.2. Defaults Share Points

An SMB server exposes network resources in the form of share points. A share point can be a folder or a printer. A shared folder is often just called a share.

PS C:∖Window	PS C:\Windows\system32> net share				
Share name	Resource	Remark			
 C\$ D\$ E\$ print\$	C:\ D:\ E:\ C:\Windows\system32\spool\drive				
IPC\$ ADMIN\$ Users	C:\Windows C:\Users	Printer Drivers Remote IPC Remote Admin			
	' Officejet Pro 8600> WSD-d36222d9-283b-4 Spooled completed successfully.	This is a web services printer			

2.3. Configuring File Sharing

A share point represents a network path to a local file system. Windows never provides default share points that ordinary users can access. You must create shares at a server before users can map to the server.

Nervecking Connect using Pres(R) 825/80/M Gipstet Nerveck Connection The connection uses the following term: Configure The connection uses the following term: Configure	Local Area Connect	tion Brosetties	
Yeal(R) 825780M Gipath Network Connecton Configue This connection uses the following term: Google and Topologic Decovery Region (IV) Provide Hearter Protocol Version 5 (TCP/Prv6) Hearter Protocol Version 5 (TCP/Prv6) Hearter Protocol Version 4 (TCP/Prv6) Hearter Protocol Version 4 (TCP/Prv6) Hearter Protocol Version 4 (TCP/Prv6) Hearter Protocol Version 5 (TCP/Prv6) Hearter Protocol Version 6 (TCP/Prv6) Hearter Protocol Version 7 (TCP/Prv6)			
Vesi(R) 82578DM Gipdat Network Connecton Configue This connection uses the following term: Dia Floated Prime Sharing for Norsault Networks Dia Floated Prime Sharing for Norsault Networks A Floated Prime Shar			
Carrigues This connection uses the following sters:	and a state of the		
This connection uses the following term:	Pres (P) 82578	DM-Sigabit Network Conn	ector
Bus Flocket Scheduler Bis and Press Scheduler Second Schedu	This connection uses	the following terms:	Configure
Anne your computer to access resources an a Microsoft network Anne your computer to access resources an a Microsoft	Set and Deve for the	Const Hereiter	
Internet Protocol Version 6 (TCP/IP-46) Internet Protocol Version 4 (TCP/IP-46) Image: Protocol Version 4 (TCP/IP-46) Internet Protocol Version 4 (TCP/IP-46) Image: Protocol Version 4 (TCP/IP-46) Internet Protocol Version 4 (TCP/IP-46) Image: Protocol Version 4 (TCP/IP-46) Internet Protocol Version 4 (TCP/IP-46) Image: Protocol Version 4 (TCP/IP-46) Protocol Version 4 (TCP/IP-46) Image: Protocol Version 4 (TCP/IP-46) Protocol Version 4 (TCP/IP-46) Image: Protocol Version 4 (TCP/IP-46) Protocol Version 4 (TCP/IP-46) Description Notwe your computer to access resources and a Microsoft retrievers.			
Image: State and Produced Version 4 (TCP/IPv4) Imag	File and Pitt	ter Sharing for Monaoft N	Atvolta
Initial Unential Provement Initial Unential Provement Description Advect your computer to access resources on a Microsoft metwork. Provement	2 - Internet Prot	acal Version 6 (TCP/IPv6	8
Init Layer Topology Decovery Responder Init all Unential Decorption Alone your computer to access resources in a Microsoft metwork.	😥 - Internet Fred	acal Vention 4 (TCP/1Pv4). I
Install. Unerstall Properties Description None your computer to access resources an a Microsoft metwork.			
Description Nover your computer to access resources im a Microsoft tertwork.	M - Lek Layer T	opology Discovery Respo	nder
Description Nove your computer to access resources im a Microsoft tertwork.			
Adves your computer to access resources an a Microsoft tetwork.			
network.	intal.	Unental	Properties
		Unmstall	Propertou
DK. Canod	Description	former for the second s	Properties a Microsoft
DK. Caroal	Description Nove your comput	former for the second s	Properties n a Microsoft
OK. Canod	Description Nove your comput	former for the second s	Popertos na Nicrosoft
DK Cancel	Description Nove your comput	former for the second s	Popertos na Norosoft
	Description Nove your comput	former for the second s	

3. Creating and Sharing a folder on Windows 10 Workstation

$\leftarrow \rightarrow$ \checkmark \uparrow \blacksquare \rightarrow Ce PC \rightarrow Data (E:)					
Accès rapide	Nom	Modifié le	Туре	Taille	
•	KeePassDatabase	01/10/2016 10:52	Dossier de fichiers		
🐔 OneDrive		08/12/2016 13:46	Dossier de fichiers		
💻 Ce PC		16/07/2016 18:07	Dossier de fichiers		
🔿 Réseau		13/11/2016 14:11	Dossier de fichiers		
reseau	📄 msdia80.dll	23/09/2005 01:39	Extension de l'app	874 Ko	
• Groupe résidentiel				- 0	×
	 Partage de fichiers Choisir les utilisateurs pouva Tapez un nom et cliquez sur Ajouter, or 		our rechercher un utilis	ateur. Ajouter	
	Nom		Niveau d'autori	sation	
	Stout le monde		Lecture/écriture	-	
	🔏 yves		Propriétaire		
	Je rencontre des difficultés pour parta	<u>ger.</u>			
			Parta	iger Ann	uler

Net share

PS C:\Users\yvesw_000> <mark>net</mark> share				
Nom partage	Ressource	Remarque		
Transfer Users La commande	C:\Users s'est terminée correctement.	Partage par défaut Partage par défaut Partage par défaut IPC distant rs Pilotes d'imprimantes Administration à distance Transfer folder for Linux		
PS C:\Users\yvesw_000>				

Get-SmbConnection -ServerName localhost

🔀 Administr	Administrateur : Windows PowerShell				
PS C:\WIND	PS C:\WINDOWS\system32> dir \\localhost\transfer				
Répert	Répertoire : \\localhost\transfer				
Mode	L	astWriteTime	Length Name		
-a	08/12/20	16 13:44	64004 Screenshot	t from 20	016-12-08 13-44-04.png
PS C:\WIND	OWS\system3	2> Get-SmbConnectio	on -ServerName loca	lhost	
ServerName	ShareName	UserName	Credential	Dialect	NumOpens
localhost	transfer	YVES-W10-DESK\yves	YVES-W10-DESK\yves	3.1.1	0

4. Connecting to a Windows Shared Drive from Linux SLES using smbclient

Linux machines can also browse and mount SMB shares.

An SMB client program for Linux machines is included with the Samba distribution. It's an FTP-like client to access SMB/CIFS resources on a server.

4.1. Smbtree

A text based smb network browser, browse the SMB network

```
linsrv1:~ # smbtree --help
Usage: [OPTION...]
  -b, --broadcast
                                         Use broadcast instead of using the master browser
                                         List only domains (workgroups) of tree
  -D, --domains
  -S, --servers
                                          List domains (workgroups) and servers of tree
Help options:
 -?, --help
                                          Show this help message
      --usage
                                          Display brief usage message
Common samba options:
  -d, --debuglevel=DEBUGLEVEL Set debug level
-s, --configfile=CONFIGFILE Use alternate configuration file
-l, --log-basename=LOGFILEBASE Base name for log files
                                         Print version
  -V, --version
      --option=name=value
                                        Set smb.conf option from command line
Authentication options:
                                         Set the network username
  -U, --user=USERNAME
  -N, --no-pass
                                          Don't ask for a password
  -k, --kerberos
                                          Use kerberos (active directory) authentication
 -A, --authentication-file=FILE Get the credentials from a file
-S, --signing=on|off|required Set the client signing state
  -P, --machine-pass
                                         Use stored machine account password
  -e, --encrypt
                                        Encrypt SMB transport
  -C, --use-ccache
                                         Use the winbind ccache for authentication
      --pw-nt-hash
                                         The supplied password is the NT hash
linsrv1:~ #
```

Numericable DLNA LG-NAS server

Yves's principal Workstation Samba 4.4.2-29.4-3709-SUSE-SLE 12-x86 64

4.2. smbclient

lingrvi(- # subolienthelp	
Usage: swibblient service (password)	
-R,name-resolve=SUME-RESOLVE-ORDER	Use these name resolution services only
-N,meessge=BOST	Send message
+I,ip-address=IP	Use this IP to connect to
-E,stderr	Write messages to stderr instead of stdout
-Llist=ROST	Set a list of shares evailable on a host
-mmax-protocol=LEVEL	Set the max protocol level
-T,ter=ccix>IXFgphNan	Command line ter
-D, directory=DIR	Start from directory
-c,command=STRING	Execute semicolon separated commands
-b,send-buffer=SYTES	Changes the transmit/send buffer
-t,timeout*SECONDS	Changes the per-operation timeout
-pport=PORT	Fost to connect to
-g,grepable	Froduce grepable output
«В,Вгожае	Browse SMB servers using DRS
Help options:	
-7,help	Show this help meesage
usage	Display brief usage message
Common samba options)	
-d,debuglevel=DEBOGLEVEL	Set debug level
-s,configfile=CONFIGFILE	Use alternate configuration file
-1,log-basename=LOGFILESASE	Bage name for log files
-V,version	Print version
option=name=value	Set amb.conf option from command line
Connection options:	
-D, socket-options=SOCHETOFTICHS	sucket sptions to use
-h,nethiosname=OETBIOSSAMS	Primary nethios name
-W,workgroup+WORKGROUP	Set the workgroup name
-1,scope=SCOPE	Use this Netbics scope
Authentication options:	
-U,user=USERRAME	Set the natwork username
-N,	Don't ask for a password
-RKerberus	Use kerberop (artive directory) suthentication
-A,authentication-file=ffik	Get the credentials from a file
-8,signing=on)off(required	Set the client signing state
-Pmachine-pass	Use stored machine socount password
-tthorypt	Encrypt SNB transport
-C,use-Domone	Use the winning onache for authentication
pw-nz-hash	The supplied password is the WT hash

4.2.1. Listing SMB shared folder through command prompt linsrv1:~ # /usr/bin/smbclient -L //YVES-W10-DESK -U root

```
linsrv1:~ # /usr/bin/smbclient -L //YVES-W10-DESK -U root
WARNING: The "idmap gid" option is deprecated
WARNING: The "idmap uid" option is deprecated
Enter root's password:
OS=[Windows 10 Pro 10586] Server=[Windows 10 Pro 6.3]
       Sharename
                      Type
                               Comment
       _____
                      ____
                                _____
                               Administration à distance
       ADMIN$
                     Disk
       C$
                      Disk
                               Partage par défaut
       E$
                                Partage par défaut
                      Disk
       F$
                                Partage par défaut
                      Disk
       IPC$
                      IPC
                               IPC distant
       print$
                      Disk
                               Pilotes d'imprimantes
       Transfer
                     Disk
                               Transfer folder for Linux
       Users
                      Disk
OS=[Windows 10 Pro 10586] Server=[Windows 10 Pro 6.3]
       Server
                           Comment
       _____
                           _____
       Workgroup
                           Master
       _____
                           _____
```

4.2.2. Connect to SMB shared folder

smbclient \\\\machinename\\foldername -U [username] [password]

linsrv1:~ # /usr/bin/smbclient \\\\YVES-W10-DESK\\transfer -U yves password

```
linsrv1:~ # smbclient \\\\YVES-W10-DESK\\transfer -U yves s1pad\$13_1
WARNING: The "idmap gid" option is deprecated
WARNING: The "idmap uid" option is deprecated
Domain=[YVES-W10-DESK] OS=[Windows 10 Pro 10586] Server=[Windows 10 Pro 6.3]
smb: \> [
```

4.2.3. Mounting the SMB shared folder to local folder

4.2.3.1. Creating Mount Directory on Linux

linsrv1:/ # mkdir /mnt/transfer

4.2.3.2. Mounting Remote SMB Share

mount -t cifs //servername/foldername /localmountpoint -o username=myusername,password=mypassword

linsrv1:~ #

mount -t cifs //192.168.0.20/transfer /mnt/transfer -o username=TERWAYWRKGRP/yves,password=s1pad\$13_1

```
linsrv1:/ # mount -t cifs //192.168.0.20/transfer /mnt/transfer -o username=TERWAYWRKGRP/yves,password=s1pad$13_1
linsrv1:/ # []
```

linsrv1:/ # cd /mnt/transfer				
linsrv1:/mnt/transfer # 1s -la				
total 64				
drwxr-xr-x 2 root root 0 Dec 8 13:46 .				
drwxr-xr-x 1 root root 16 Dec 9 11:59				
-rwxr-xr-x 1 root root 64004 Dec 8 13:44 Screenshot from 2016-12-08 13-44-04.png				

On the Linux Server