



Samba

weicc

Network-based File Sharing

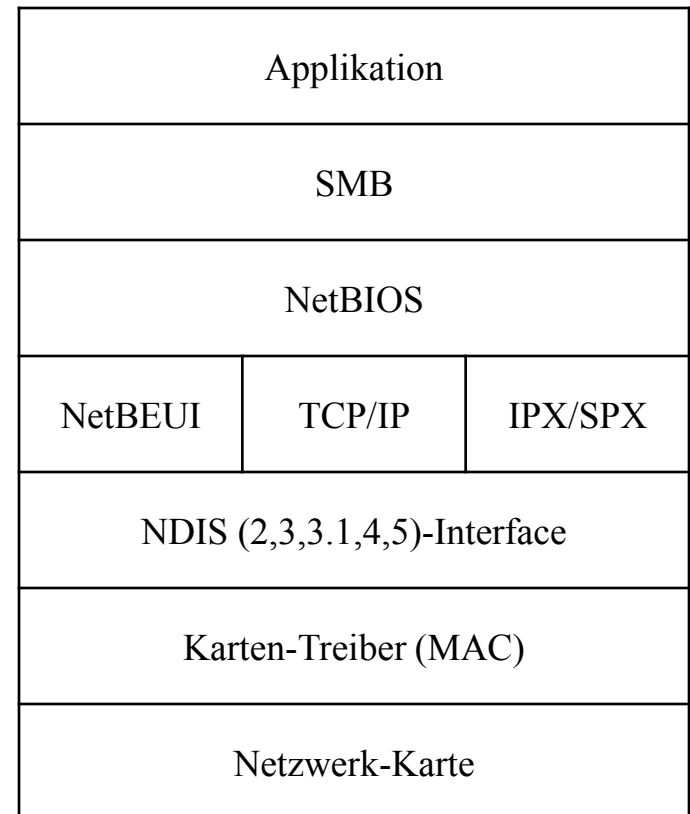
❑ FTP (File Transfer Protocol)

❑ NFS (UNIX-based)

- mountd is responsible for mount request
- nfsd and nfsiod
- Based on RPC

❑ CIFS (Microsoft)

- Common Internet File System
- 網路芳鄰
- SMB (Server Message Block)
- Share access to files, printers, ...
- Based on NetBIOS



Service of SMB and NetBIOS

❑ NetBIOS (Network Basic Input/Output System)

- API related to the session layer allowing applications to communicate over a local area network
- Name Service for name registration and resolution
- Session service for connection-oriented communication
- Datagram distribution service for connectionless communication

❑ SMB

- File and printer sharing service
- Authentication

NetBIOS – Network Basic Input/Output System

❑ NetBIOS (API)

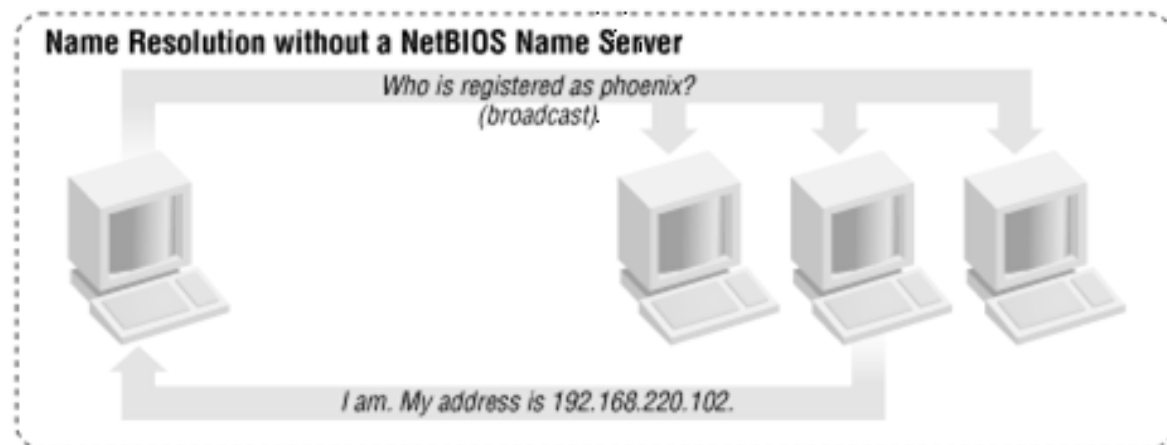
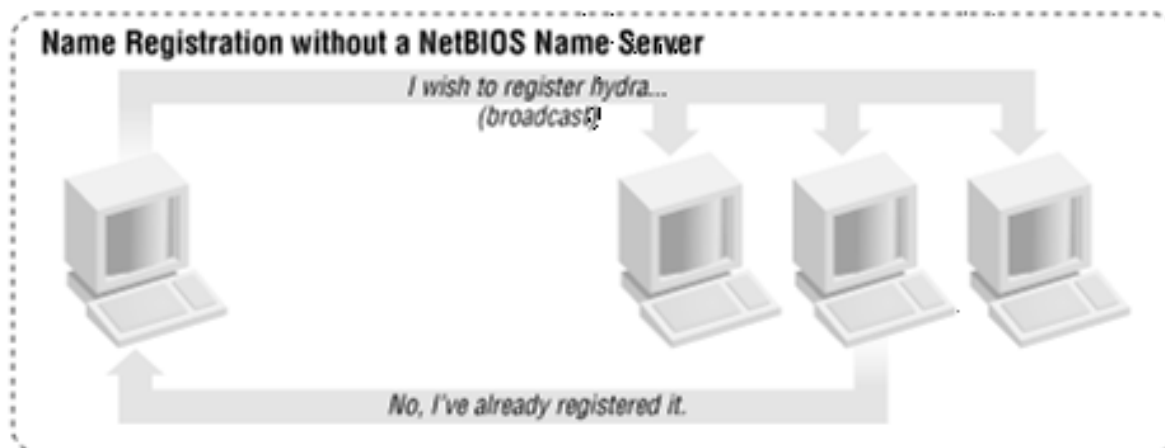
- 1983 – developed as an **API** for software communication over IBM's PC-Network LAN
 - NetBIOS relied on proprietary Sytek networking protocols
- In 1985, IBM went forward with the **token ring** network scheme
 - NetBEUI – NetBIOS Extended User Interface
 - using the **NetBIOS Frames** (NBF) routing protocol
- 1985 – Microsoft created a NetBIOS implementation for its MS-Net network topology
 - By NBF protocol
- Difference between local filesystem and network filesystem when accessing
- Used to share or access network-based filesystem just as BIOS does in local filesystem

❑ NetBIOS over TCP/IP

- In 1987
- NBT

NetBIOS Naming Service

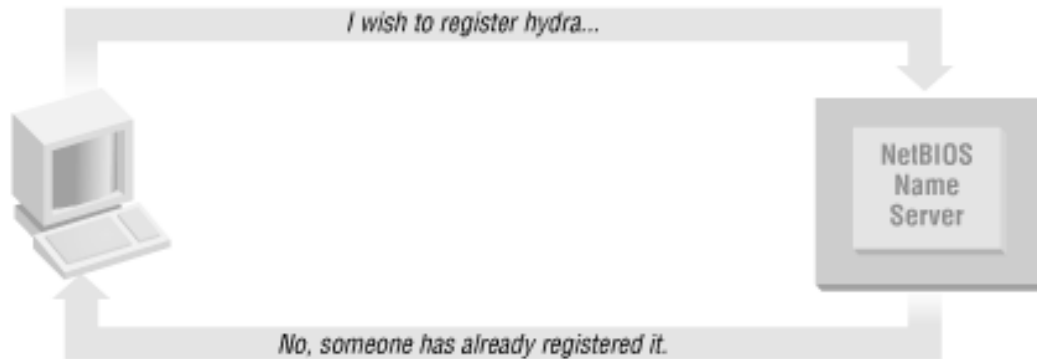
❑ Peer to peer (Workgroup model)



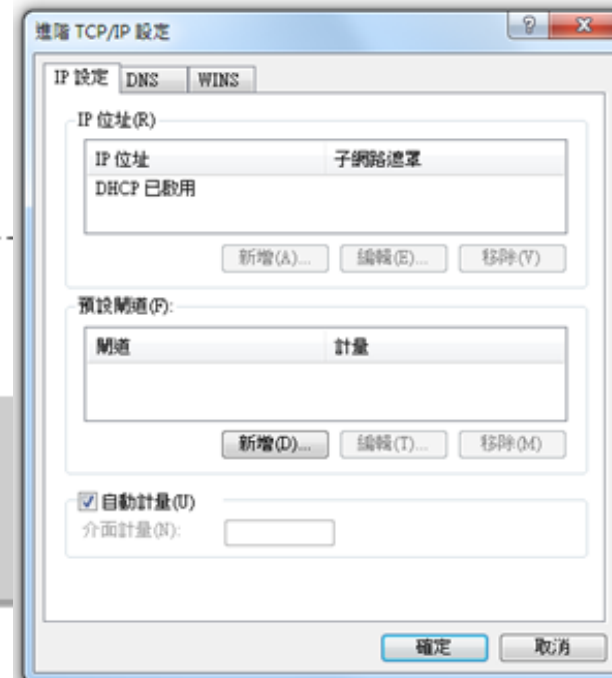
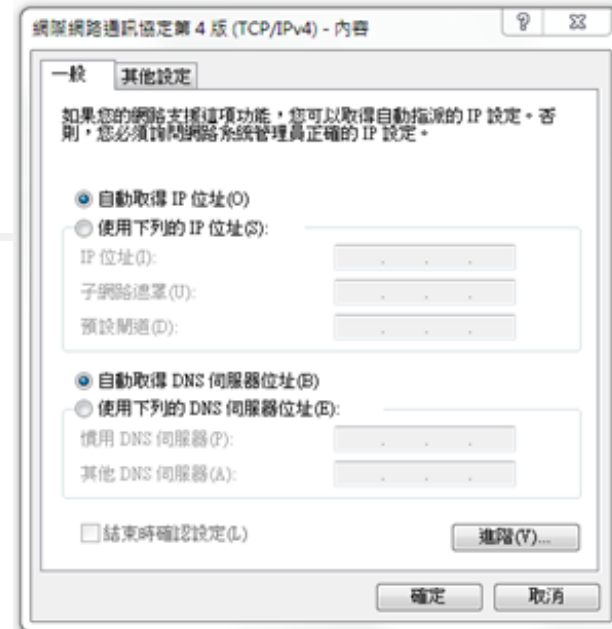
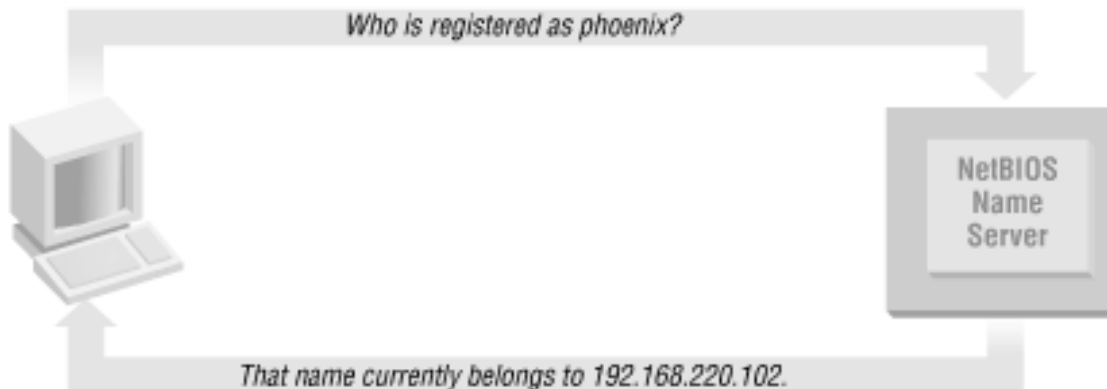
NetBIOS Naming Service

❑ WINS

Name Registration with a NetBIOS Name Server



Name Resolution with a NetBIOS Name Server



SMB – Server Message Block

□ SMB

- Original designed by IBM with the aim of turning DOS interrupt local file access into a network filesystem
 - Run on top of netbios
 - Microsoft has made considerable modifications to the most common used version
- 1990 – Microsoft merged the SMB protocol with LAN Manager
- 1992 – Microsoft merged and add features to SMB protocol in Windows for Workgroup
- 1996 – Microsoft renames SMB as CIFS
 - Support for symbolic link, hard link, larger file sizes, ...
 - Initial attempt at supporting direct connections over TCP port 445
- 2006 – Microsoft introduced SMB2 with Windows vista
- Windows 7 – SMB 2.1
 - Performance enhancement with a new opportunistic locking
- Windows 8/Windows Server 2012 – SMB 3.0 (Previously named SMB 2.2)
 - Enables the use of multiple physical network interfaces

UNIX-Windows communication

❑ SAMBA

- 1991 – Andrew Tridgwell developed the first version of Samba
 - Using a packet sniffer on DEC Pathworks server software
- A UNIX application that speak SMB protocol
- Can not use the Original Name: Server Message Block (SMB)
 - Samba
 - `grep -i '^s.*m.*b' /usr/share/dict/words`
 - Napster, Simba

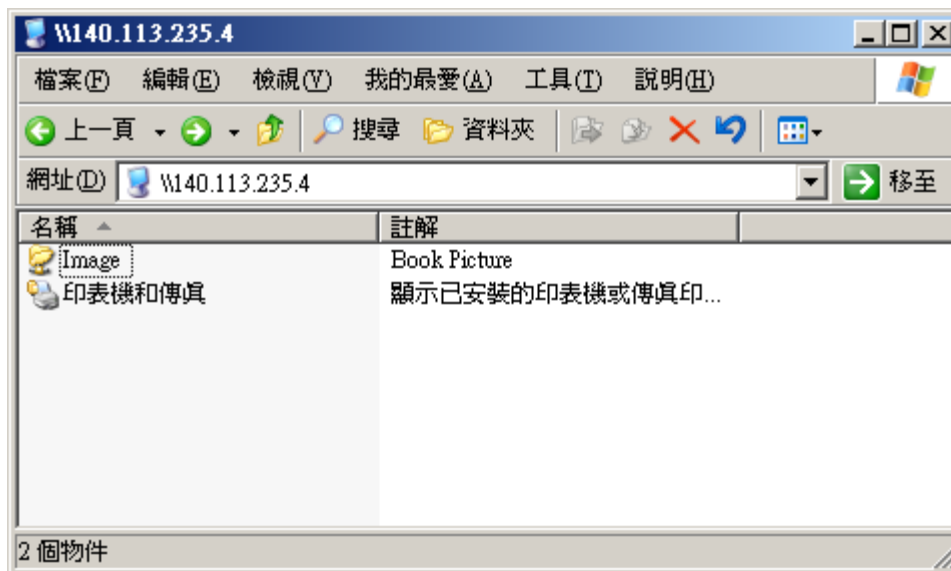
❑ Why samba ?

Applikation		
SMB		
NetBIOS		
NetBEUI	TCP/IP	IPX/SPX
NDIS (2,3,3.1,4,5)-Interface		
Karten-Treiber (MAC)		
Netzwerk-Karte		

What SAMBA can do?

❑ Sharing

- Sharing files or printers just like Microsoft does
- Authenticate user identity just like Microsoft does
- Resolve **NetBIOS** name just like Microsoft does



Install SAMBA

❑ Using ports

- % cd /usr/ports/net/samba46
 - Samba 4.6.8
- % portmaster -BD net/samba46

❑ Using package

- % pkg install samba46

```
samba46-4.6.8
+ ADS      Active Directory client support(implies LDAP)
+ AD_DC    Active Directory Domain Controller support
+ CUPS     CUPS printing system support
+ DEBUG    Build with debugging support
+ DEVELOPER With development support(implies NTVFS)
+ DOCS     Build and/or install documentation
+ EXP_MODULES Experimental modules(WANT_EXP_MODULES)
+ FAM      File Alteration Monitor support
+ LDAP     LDAP client support
+ MANPAGES Build manpages from DOCBOOK templates
+ NTVFS    Build *DEPRECATED* NTVFS file server
+ QUOTAS   Disk quota support
. (+)
54%
```

SAMBA components

❑ Configuration files

- `/usr/local/etc/smb.conf.sample` → `/usr/local/etc/smb.conf`
 - `chmod 644 smb.conf`
- `/usr/local/etc/lmhosts`

❑ Major execution files

- `smbd (/usr/local/sbin/smbd)`
 - Management of sharing directories, files and printers
- `nmbd (/usr/local/sbin/nmbd)`
 - Resolve NetBIOS name and manage workgroup
- `winbindd (/usr/local/sbin/winbindd)`
 - WINS services
- `pdbedit (/usr/local/bin/pdbedit)`
 - Manage the Samba user database
- `smbpasswd (/usr/local/bin/smbpasswd)`

SAMBA password

- ❑ samba4 password file
 - Now samba stores accounts and passwords in tdb
 - Default database path: /var/db/samba4
- ❑ tdb v.s. smbpasswd

```
derek[~] -chiahung- sudo pdbedit -L -v
```

```
-----
Unix username:      chiahung
NT username:
Account Flags:      [U                ]
User SID:           S-1-5-21-3763889141-129722405-4261865294-1000
Primary Group SID:  S-1-5-21-3763889141-129722405-4261865294-513
Full Name:          Chia-Hung Tsai
Home Directory:     \\derek\chiahung
HomeDir Drive:
Logon Script:
Profile Path:       \\derek\chiahung\profile
Domain:             DEREK
Account desc:
Workstations:
Munged dial:
Logon time:         0
Logoff time:        never
Kickoff time:       never
Password last set:  Mon, 12 Jul 2010 00:03:29 CST
Password can change: Mon, 12 Jul 2010 00:03:29 CST
Password must change: never
Last bad password   : 0
Bad password count  : 0
Logon hours         : FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
-----
```

```
derek[/var/db] -chiahung- sudo pdbedit -w -u chiahung
chiahung:1000:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX:
3CDEC7966A2F9837F9F628DC13CC02AE:
[U                ]:
LCT-4C39EB51:
```

SAMBA password

❑ smbpasswd command

- -a
 - Add new user
- -d
 - Let some account in smbpasswd file can not login (to disable)
- -e
 - Let some disable account resume (to enable)

❑ pdbedit command

- pdbedit -a username
 - Add new user
- pdbedit -x username
 - delete user
- pdbedit -L -v
 - List user
- pdbedit -r -c username
 - pdbedit -r -c “[DX]” test

SAMBA configuration file

□ smb.conf

- Sections
 - Each section in the smb.conf file represents either a share or a meta-service
 - Global section is special
 - Global setting
 - Meta-service
 - Printer Sharing Setting
 - Home Sharing Setting

```
# comments
[global]
para1 = value1
...

[printers]
para2 = value2
...

[homes]
para3 = value3
...

[share-dir]
para4 = value4
...
```

SAMBA configuration file – Global Setting (1)

❑ Global Configuration

- **workgroup**
 - Group name to join
 - Ex: workgroup = chwong
- **server string**
 - Description of this host
 - Ex: server string = Samba Server of SA Course
- **netbios name**
 - NetBIOS name of this host
 - Ex: netbios name = sabsd
- **Charset Settings**
 - “display charset”, “unix charset”, “dos charset”
 - Ex:
 - unix charset = CP850
 - dos charset = CP850
- **hosts allow**
 - Apply to all services, regardless or individual service setting;
 - Ex: hosts allow = 140.113.235. 140.113.

SAMBA configuration file – Global Setting (2)

- guest ok (or public = yes)
 - If this is yes, no password is required
 - Ex: guest ok = no
- guest account
 - If guest can use this samba service, any guest request will map to this guest account
 - Ex: guest account = ftp
 - Add this account into your /etc/passwd
 - Otherwise, the user nobody is used
- log file
 - Full path of log file
 - Ex: log file = /var/log/samba/log.%m
- max log size (KB)
 - Ex: max log size = 500

SAMBA configuration file – Global Setting (3)

- `security = [share/user/server/domain]`
 - `share`: no need of id and password to login
 - `user`: default option, login with id and password
 - `domain`: check id and password by domain controller
 - `ads`: check id and password by AD server
 - `server`: check id and password by another server
 - It is highly recommended not to use this feature
 - Ex:
 - `security = user`
 - `passwd backend = tdbsam`

SAMBA configuration file – Global Setting (4)

- ❑ Example of global setting

```
[global]
server string = Samba Server Version %v
unix charset = CP850
workgroup = MYGROUP
log file = /var/log/samba/log.%m
max log size = 50
usershare allow guests = Yes
guest account = pcguest
security = USER
idmap config * : backend = tdb
cups options = raw
```

Samba parameters

- ❑ Default parameters in samba
 - %m
 - Client NetBIOS name
 - %M
 - Client Hostname
 - %I
 - Client IP
 - %L
 - Samba server NetBIOS name
 - %h
 - Samba server Hostname
 - %H
 - User home directory
 - %U
 - Login name
 - %T
 - Current Date time

SAMBA configuration file – Home Sharing Setting (1)

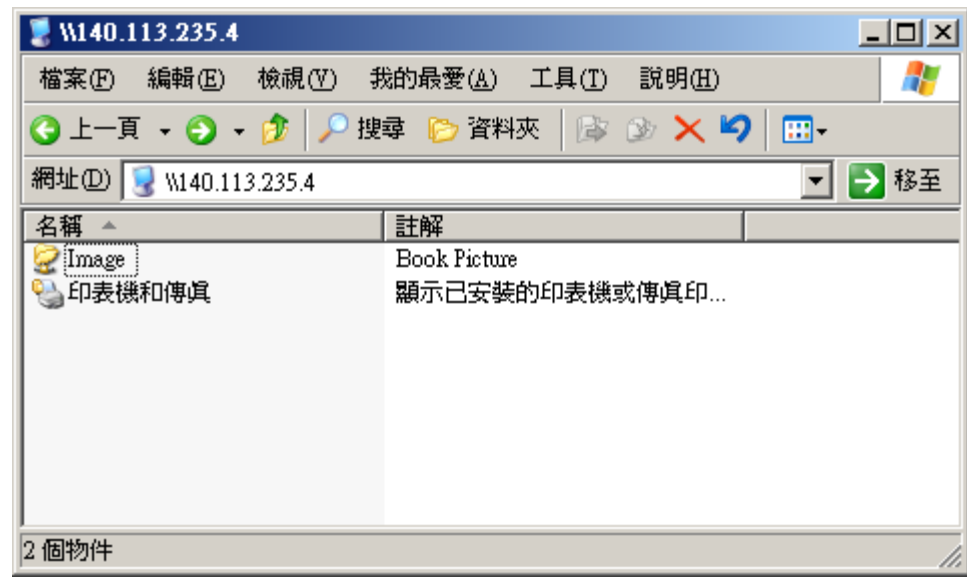
□ Home sharing setting

- comment
 - Description of this directory
- path
 - Sharing directory path
- browseable
 - Display sharing name or not
- read only , writeable
- admin users = \$username
- **valid users = %S** (write list)
 - Only users on this can write content if read only
- create mode / create mask
 - Default permission when file is created
- directory mode / directory mask
 - Default permission when directory is created
- guest ok (or public = yes)

SAMBA configuration file – Sharing Setting (2)

❑ Example of image sharing

```
[Image]
comment           = Book Picture
path              = /home/image
read only         = no
public            = yes
writable          = yes
create mode       = 0664
directory mode    = 0775
```



SAMBA configuration file

Additional tuning

❑ Disable printer

- load printers = no
- printing = bsd
- printcap name = /dev/null
- disable spoolss = yes

❑ Performance tuning

- max protocol = SMB2
- socket options = TCP_NODELAY
- socket options = TCP_NODELAY SO_RCVBUF=8192 SO_SNDBUF=8192
- read size
- read prediction
- ...

Starting SAMBA

❑ Script

- /usr/local/etc/rc.d/samba {start|stop}
- /etc/rc.conf
 - samba_enable="YES"
 - smbd_enable="YES"
 - nmbd_enable="YES"
 - winbindd_enable="YES"

smbstatus

❑ Report on current Samba connections

```
hsccl[~] -chiahung- smbstatus
```

```
Samba version 3.0.37
```

PID	Username	Group	Machine
47945	hsccl	hsccl	hsccl-d30aedc531 (140.113.240.124)
48533	Pegasus	hsccl	simba-pc (140.113.240.135)
47944	zn	hsccl	bdeca39d90d4 (140.113.240.133)

Service	pid	machine	Connected at
zn	47944	bdeca39d90d4	Mon Oct 18 17:12:02 2010
hsccl	47945	hsccl-d30aedc531	Mon Oct 18 17:12:02 2010
Pegasus	48533	simba-pc	Mon Oct 18 17:58:46 2010

```
Locked files:
```

Pid	Uid	DenyMode	Access	R/W	Oplock	SharePath	Name	Time
47947	509	DENY_NONE	0x100001	RDONLY	NONE	/home/hsccl	UG/Films/[USA	
47946	509	DENY_NONE	0x100001	RDONLY	NONE	/home/hsccl	UG/Animation	

Tool: smbclient (1)

- ❑ A client program that can talk to an SMB server
- ❑ Usage:
 - -L [hostname]
 - List sharable resource
 - -U [username]
 - Login with username
 - smbclient -L host_IP -U user_ID

Tool: smbclient (2)

```
hscws5[~] -chiahung- smbclient -L hsc -U chiahung
Enter chiahung's password:
Domain=[HSCCLAB] OS=[Unix] Server=[Samba 3.0.37]
```

Sharename	Type	Comment
-----	----	-----
IPC\$	IPC	IPC Service (HSCC SAMBA)
chiahung	Disk	Home Directories

```
Domain=[HSCCLAB] OS=[Unix] Server=[Samba 3.0.37]
```

Server	Comment
-----	-----
HSCC	HSCC SAMBA

Workgroup	Master
-----	-----
EC219	EC219
HSCCLAB	HSCC
LAB635	JJSU-LABPC
LAB636	2AMW1GP6PMLTL77

Tool: smbtree

❑ A smb browser program in text mode

❑ Usage:

- **-b** Query network nodes by sending requests as broadcasts instead of querying the local master browser.
- **-D** Only print a list of all the domains known on broadcast or by the master browser
- **-S** Only print a list of all the domains and servers responding on broadcast or known by the master browser.

❑ `smbtree -b`

```
mango@mango:~ $ smbtree
WORKGORUP
  \\MANGOCOLD
SANA
  \\SATA
    (sata server)
      \\SATA\IPC$          sata server
                          IPC Service
      \\SATA\Video        ftp directory
      \\SATA\Image        test directory
```

Tool: mount_smbfs

- ❑ Mount a shared resource from an SMB file server
- ❑ Usage:
 - -I
 - Do not use NetBIOS name resolver and connect directly to host, which can be either a valid DNS name or an IP address.
 - -N
 - Do not ask for a password.
- ❑ `mount_smbfs (-I IP or host name) -N '//NetBIOS name/dir' mount_point`

Tool: testparm

❑ check an smb.conf configuration file for internal correctness

❑ Usage

- testparm /usr/local/etc/smb4.conf
- Load smb config files from /usr/local/etc/smb4.conf
Processing section "[homes]"
Processing section "[printers]"
Processing section "[public]"
Loaded services file OK.
Server role: ROLE_STANDALONE

Press enter to see a dump of your service definitions

SWAT (1)

Edit /etc/inetd.conf

- Unmark

```
swat stream tcp nowait/400 root /usr/local/sbin/swat swat
```

Restart inetd

Browse http://




Logged in as **chwong**

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
- **Administrative Utilities**

完成  網際網路

SWAT (2)

❑ Root access



HOME GLOBALS SHARES PRINTERS WIZARD 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
- **Administrative Utilities**
 - [smbcontrol](#) - send control messages to Samba daemons
 - [smbpasswd](#) - managing SMB passwords
 - [SWAT](#) - web configuration tool
 - [net](#) - tool for administration of Samba and remote CIFS servers
 - [pdbedit](#) - Samba user account management tool
 - [tdbbackup](#) - Tool for backing up TDB databases
- **Client Tools**