

Samba



Network-based File Sharing

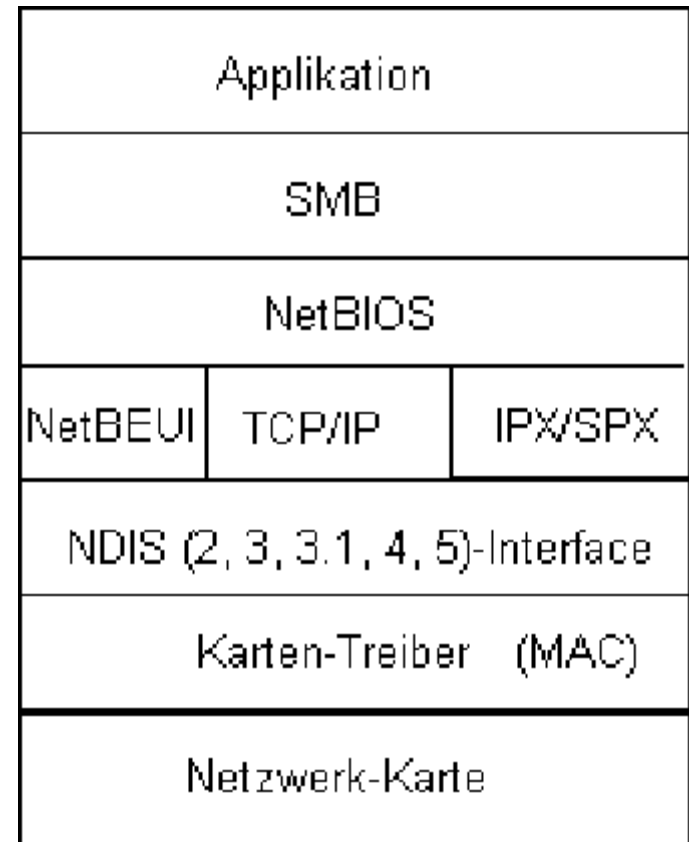
❑ FTP (File Transfer Protocol)

❑ NFS (UNIX-based)

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

❑ SMB/CIFS (Microsoft)

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



Service of SMB and NetBIOS

- ❑ NetBIOS (Network Basic Input/Output System)
 - Name Service for name registration and resolution
 - Session service for connection-oriented communication
 - Datagram distribution service for connectionless communication
- ❑ SMB (Server Message Block)
 - File and printer sharing service
 - Authentication

NetBIOS – Network Basic Input/Output System

❑ NetBIOS (API)

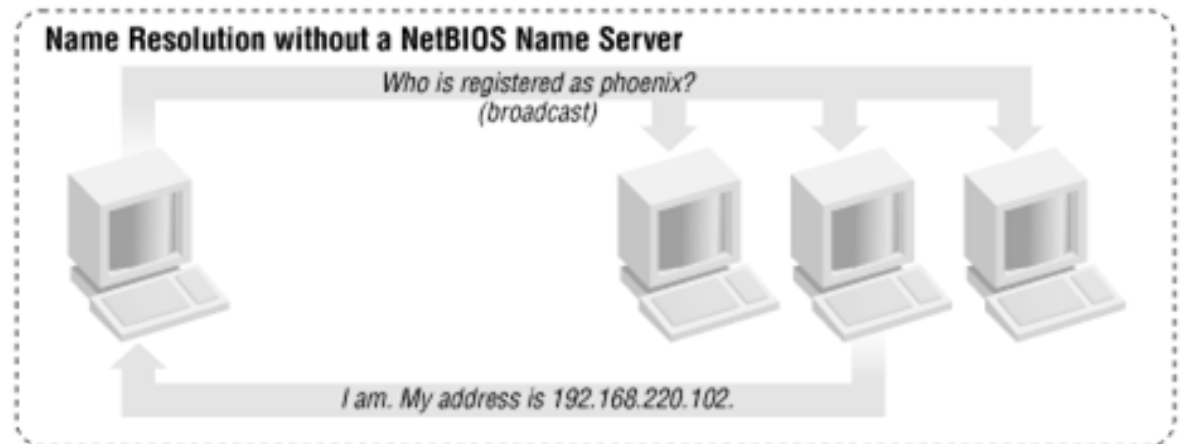
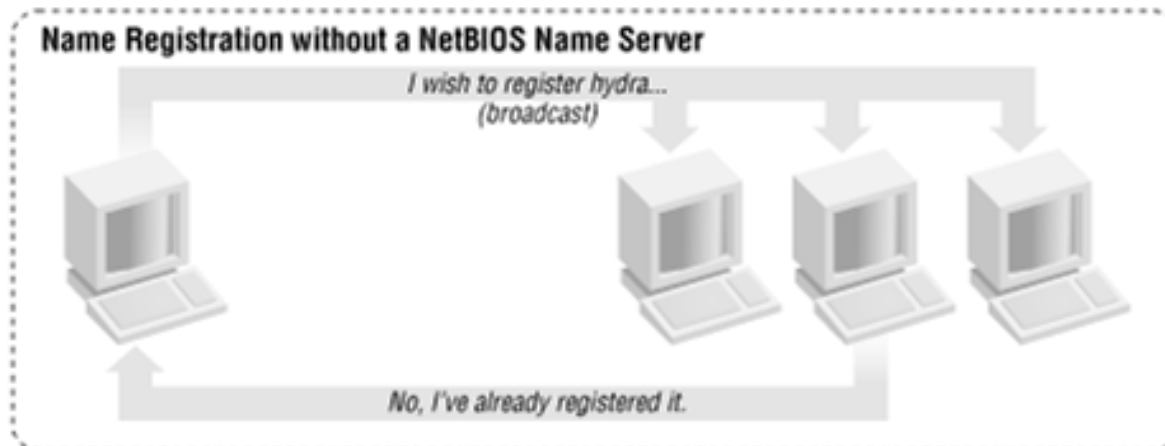
- 1983 – developed as an **API** for software communication over IBM's PC-Network LAN
 - NetBIOS relied on proprietary Sytek networking protocols
- In 1985, IBM went forward with the **token ring** network scheme
 - NetBEUI – NetBIOS Extended User Interface
 - using the **NetBIOS Frames** (NBF) routing 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

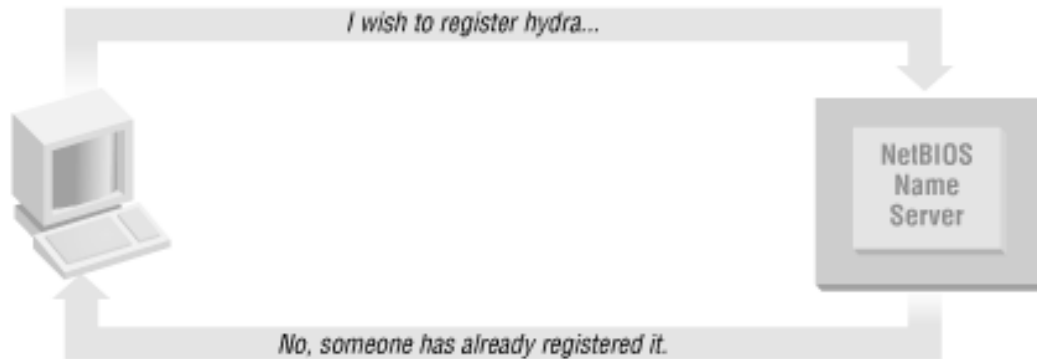
❑ Peer to peer (Workgroup model)



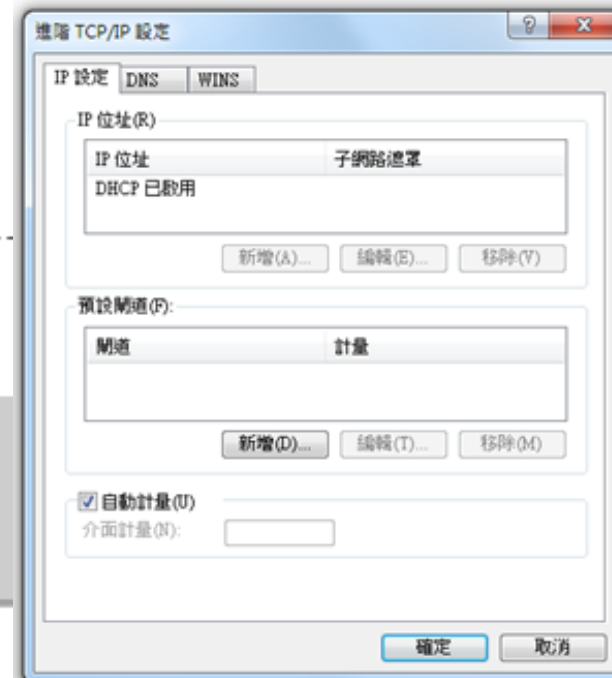
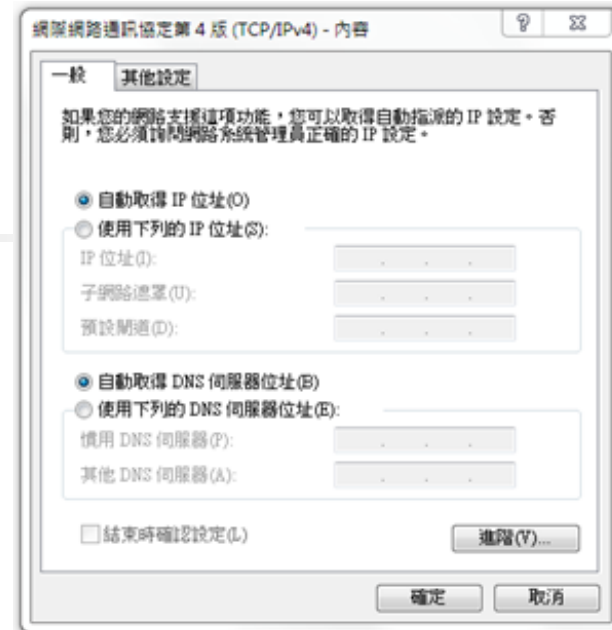
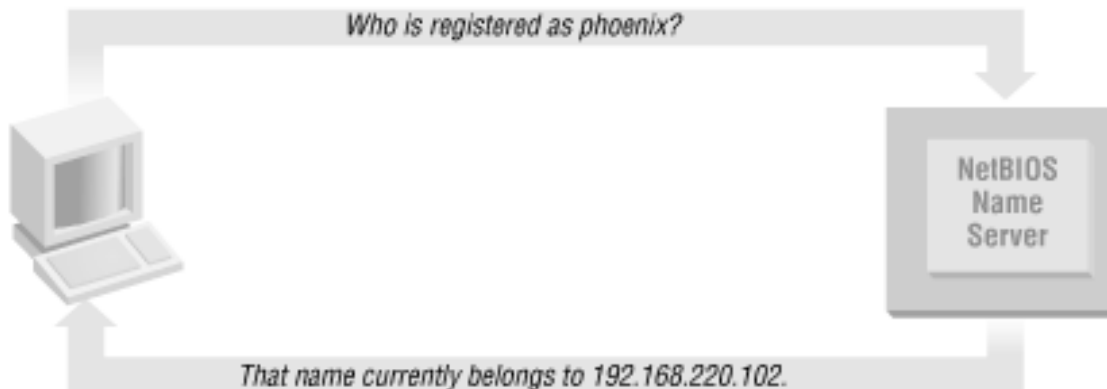
NetBIOS Naming Service

❑ WINS (NetBIOS Name Server)

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 – 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

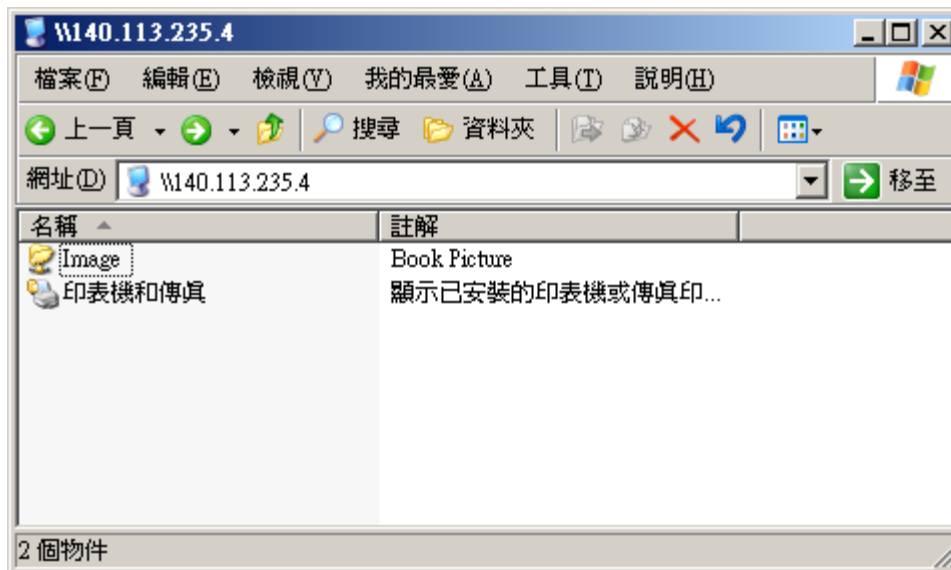
❑ Why samba ?

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/samba36
 - Samba 3.6.24 – support for SMB2
- % portmaster -BD net/samba36

```
samba36-3.6.24_2
[x] ACL_SUPPORT  ACL support
[ ] ADS         Active Directory support
[x] AIO_SUPPORT  Asynchronous IO support
[ ] AVAHI       Zeroconf support via Avahi
[x] CUPS        CUPS printing system support
[ ] DNSUPDATE   Dynamic DNS update(require ADS)
[x] DOCS        Build and/or install documentation
[x] EXAMPLES    Build and/or install examples
[ ] EXP_MODULES Experimental modules
[ ] FAM_SUPPORT File Alteration Monitor
[x] IPV6        IPv6 protocol support
[x] LDAP        LDAP protocol support
[ ] MAX_DEBUG   Maximum debugging
[ ] PAM_SMBPASS PAM authentication vs passdb backends
[x] POPT        System-wide POPT library
[x] PTHREADPOOL Pthread pool
[ ] QUOTAS      Disk quota support
[ ] SMBTORTURE  smb torture
[x] SWAT        SWAT WebGUI
[ ] SYSLOG      Syslog logging support
[ ] UTMP        UTMP accounting support
[x] WINBIND     WinBIND support

< OK >          <Cancel>
```

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
- `pdbedit (/usr/local/bin/pdbedit)`
 - Manage the Samba user database
 - `smbpasswd (/usr/local/bin/smbpasswd)`

SAMBA password

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

```

-----
Unix username:      agg2567
NT username:
Account Flags:      [U                ]
User SID:           S-1-5-21-475842050-548411294-2344131120-1001
Primary Group SID: S-1-5-21-475842050-548411294-2344131120-513
Full Name:          User &
Home Directory:    \\sabsd\agg2567
HomeDir Drive:
Logon Script:
Profile Path:      \\sabsd\agg2567\profile
Domain:            SABSD
Account desc:
Workstations:
Munged dial:
Logon time:        0
Logoff time:       Sun, 00 Jan 1900 00:00:00 CST
Kickoff time:      Sun, 00 Jan 1900 00:00:00 CST
Password last set: Thu, 16 Oct 2014 00:53:18 CST
Password can change: Thu, 16 Oct 2014 00:53:18 CST
Password must change: never
Last bad password  : 0
Bad password count : 0
Logon hours        : FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

```

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

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 = SANA
- 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:
 - display charset = UTF8
 - unix charset = UTF8
 - dos charset = UTF8
- 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]
workgroup           = SANA
server string       = sabsd samba server
netbios name        = sabsd
display charset     = UTF8
unix charset        = UTF8
dos charset         = UTF8
printcap name       = /etc/printcap
load printers       = yes
printing            = cups
log file            = /var/log/samba/log.%m
max log size        = 500
security            = user
passdb backend      = tdbsam
```

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)

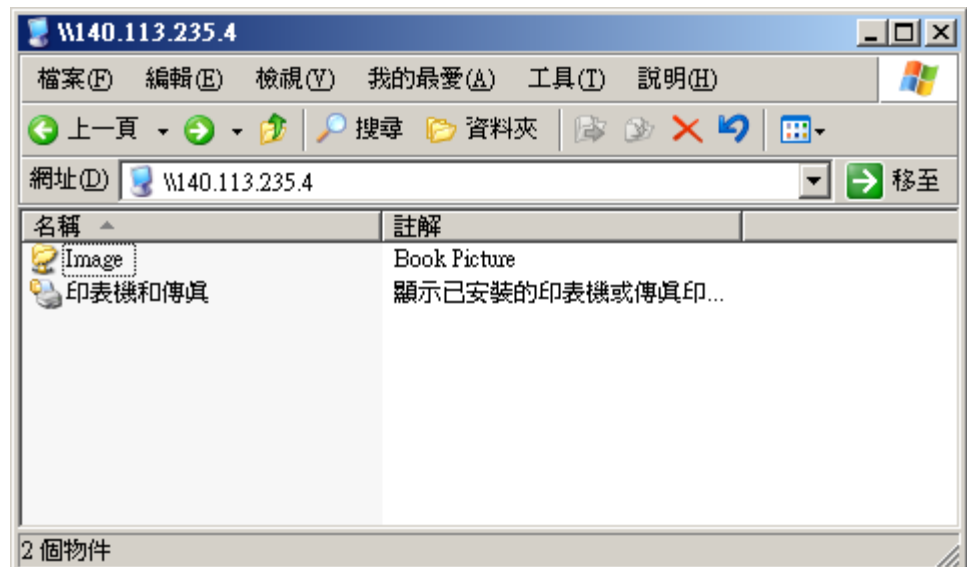
❑ Home sharing setting

- comment
 - Description of this directory
- path
 - Sharing directory path
- browseable
 - Display sharing name or not
- read only , writeable
- **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 (3)

❑ 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`

Tool: mount_smbfs (4)

- ❑ 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_mode`

SWAT (1)

Edit /etc/inetd.conf

- Unmark




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

Restart inetd

Browse http://samba_ip:901/



Logged in as **chwong**


 HOME	 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**

完成  網際網路

SWAT (2)

❑ Root access



HOME GLOBALS SHARES PRINTERS WIZARD STATUS VIEW PASSWORD

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 - [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**