



Samba

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MarsW

# Network-based File Sharing (1)

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## ❑ 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

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## ❑ NetBIOS

- 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)

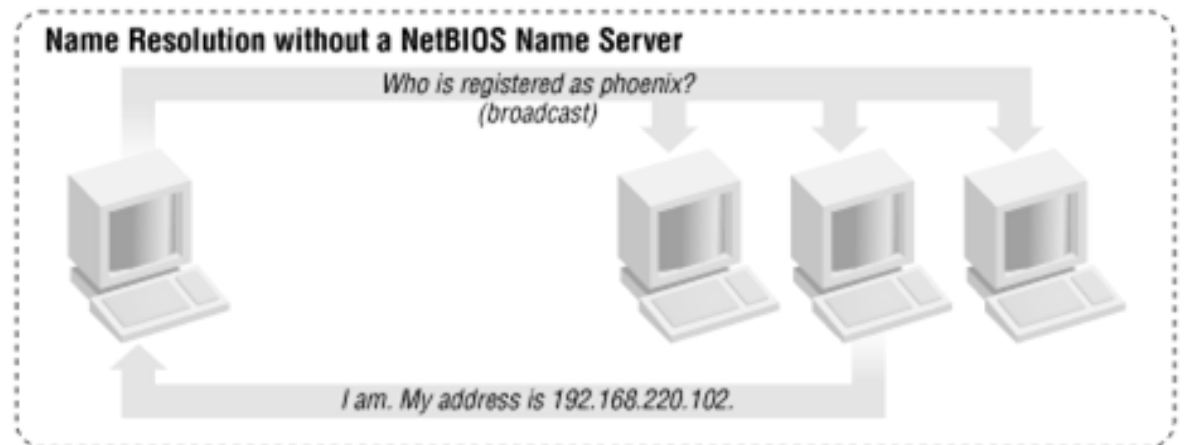
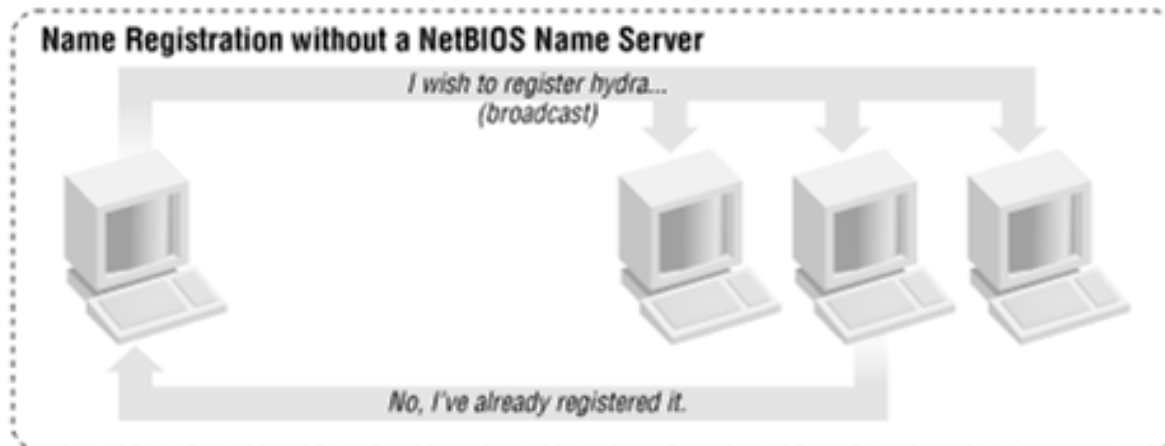
- 1983 – developed as an **API** for software communication over IBM's PC-Network LAN
  - NetBIOS relied on proprietary Sytek networking protocols
- In 1985, IBM went forward with the **token ring** network scheme
  - NetBEUI – NetBIOS Extended User Interface
  - using the **NetBIOS Frames** (NBF) routing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

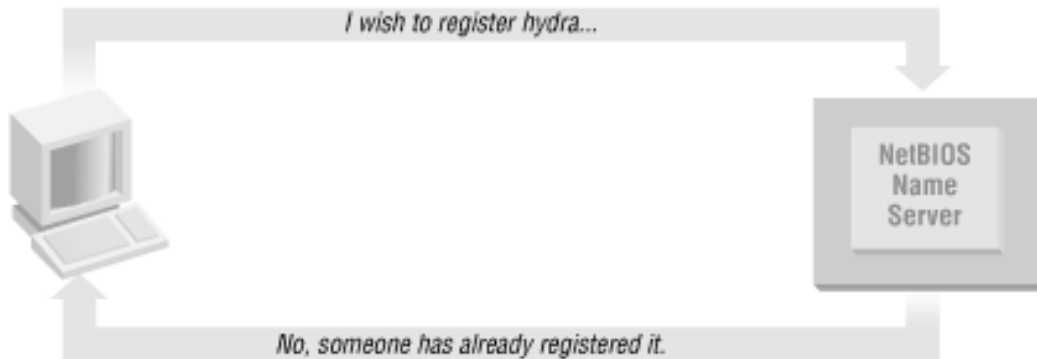
## ❑ Peer to peer (Workgroup model)



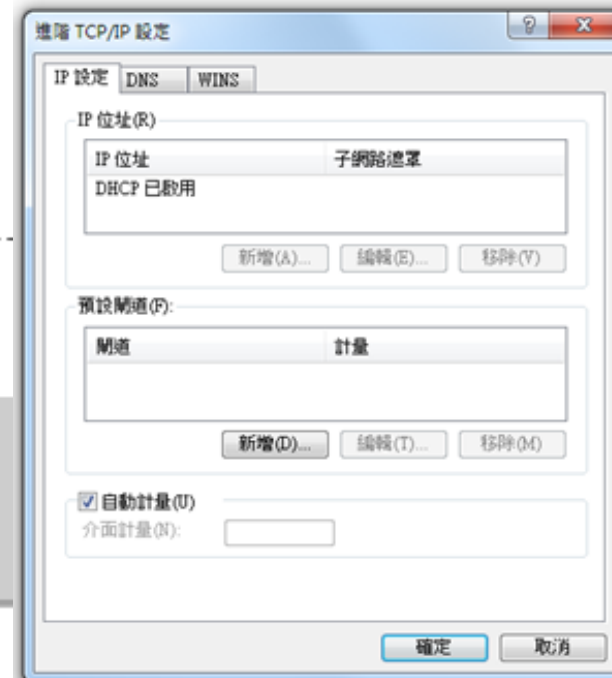
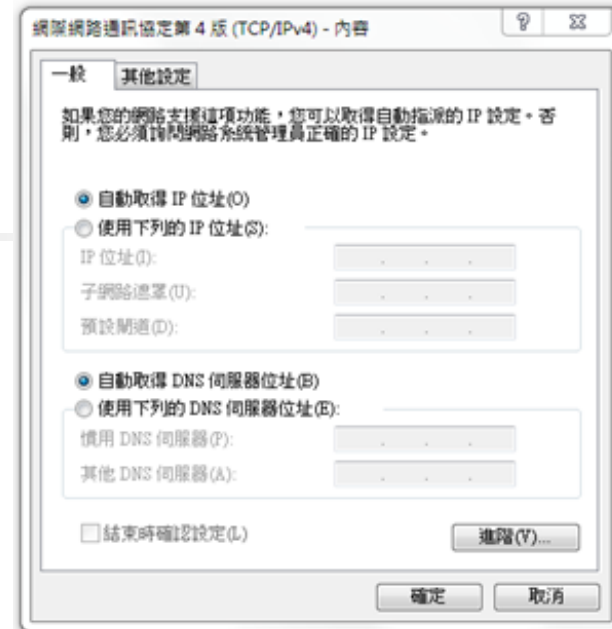
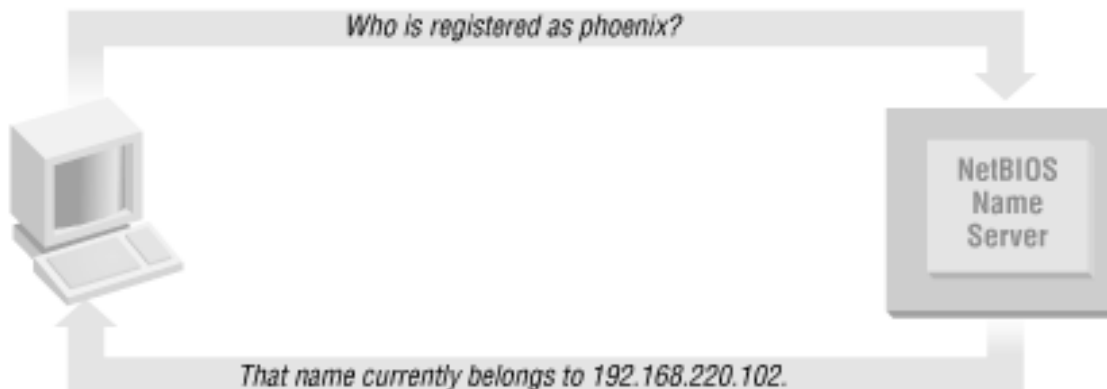
# NetBIOS Naming Service

## ❑ WINS

### Name Registration with a NetBIOS Name Server



### Name Resolution with a NetBIOS Name Server



# SMB – Server Message Block

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## □ 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
  - `grep -i '^s.*m.*b' /usr/share/dict/words`

## ❑ Why samba ?

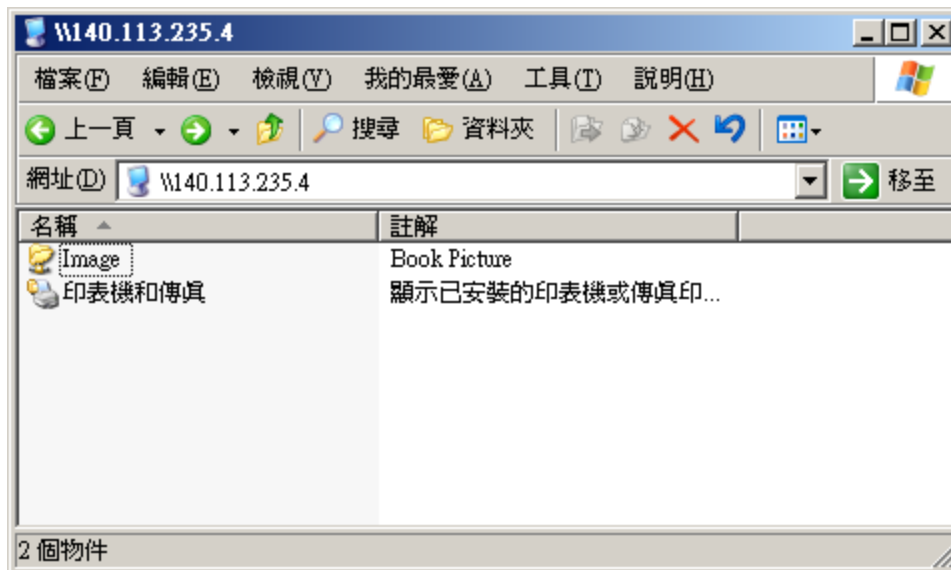
OSI				TCP/IP	
Application	SMB				Application
Presentation					
Session	NetBIOS	NetBEUI	NetBIOS	NetBIOS	
Transport	IPX <sup>1</sup>		DECnet	TCP&UDP	TCP/UDP
Network				IP	IP
Link	802.2, 802.3,802.5	802.2 802.3,802.5	Ethernet V2	Ethernet V2	Ethernet or others
Physical					



# 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

- portmaster net/samba36

```
Options for samba35 3.5.11

[*] LDAP           With LDAP support
[*] ADS            With Active Directory support
[ ] CUPS           With CUPS printing support
[*] WINBIND       With WinBIND support
[*] SWAT          With SWAT WebGUI
[ ] ACL_SUPPORT   With ACL support
[ ] AIO_SUPPORT   With Asynchronous IO support
[ ] FAM_SUPPORT   With File Alteration Monitor
[*] SYSLOG        With Syslog support
[ ] QUOTAS        With Disk quota support
[ ] UTMP          With UTMP accounting support
[ ] PAM_SMBPASS   With PAM authentication vs passdb backends
[ ] DNSUPDATE     With dynamic DNS update(require ADS)
[ ] AVAHI         With Bonjour service discovery support
↓(+)73%

< OK >           <Cancel>
```

# SAMBA components

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## ❑ 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

# SAMBA password

## ❑ samba password file

- Now samba stores accounts and passwords in tdb
  - Default database path: /var/db/samba

```
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

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## ❑ pdbedit command

- `pdbedit -a username`
  - Add new user
- `pdbedit -x username`
  - delete 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)

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## ❑ 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:
    - 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)

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- 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)

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- 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           = chwong
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

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## ❑ 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)

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## ❑ Home sharing setting

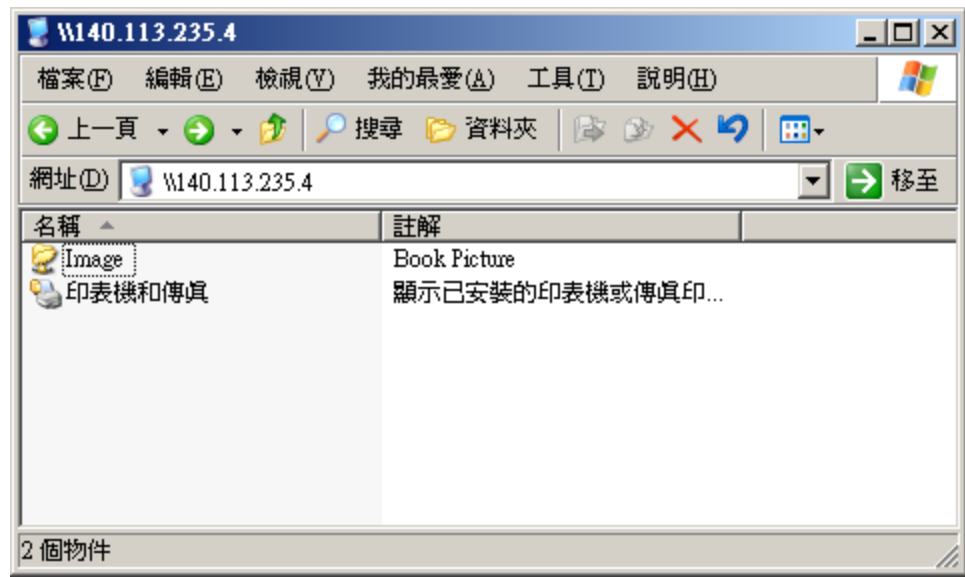
- comment
  - Description of this directory
- path
  - Sharing directory path
- browseable
  - Display sharing name or not
- read only , writeable
- **valid users = %S** (write list)
  - Only users on this can write content if read only
- create mode / create mask
  - Default permission when file is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

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- ❑ 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
  - ...
  
- ❑ [http://www.samba.org/samba/docs/using\\_samba/ch08.html](http://www.samba.org/samba/docs/using_samba/ch08.html)

# Starting SAMBA

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## ❑ 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)

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

# Tool: smbclient (2)

```
hsccls5[~] -chiahung- smbclient -L hsccl -U chiahung
```

```
Enter chiahung's password:
```

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

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

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

Server	Comment
-----	-----
HSCCL	HSCCL SAMBA

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