File Serving Solutions Using Samba-3

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Tue. March 1, 2005

Session 9206

SHARE, Anaheim, CA

Outline for this hour

- Introductions and overview of Samba
- Administration - SWAT, command line
- Authentication - smbpasswd, winbind, LDAP
- Samba Installation on SLES-9
- Using Samba-3
- Integration with OpenLDAP
- Time serving
- Documentation and resources

Enterprise View

- It's a Windows desktop world, it's a UNIX server world
- Windows desktops rule 1 and rule 2:
  - Rule 1: Windows clients should not have to be modified.
  - Rule 2: When a change is needed to Windows client, see rule 1
- Samba crosses enterprise political boundaries
  - Samba works well in small groups and among friendly fiefdoms
  - Don't push Samba where political walls are high
  - Befriend the NT guys
- Success/Failure stories

Samba background

- Samba Team
  - Has done an incredible job of "staying with" Microsoft
  - Founder Andrew Tridgell - founder:
    - Wrote Samba because it was more fun than his PhD dissertation
    - Had a Linux PC at home and wanted to share files with his wife's Windows PC
    - Now an IBMer
  - Some of the more prominent members:
    - Jeremy Allison
    - Gerald Carter
    - Jim McDonough, Steve French - IBMers funded by the LTC
- License - GPL
- History - coincidentally shadows the history of Linux

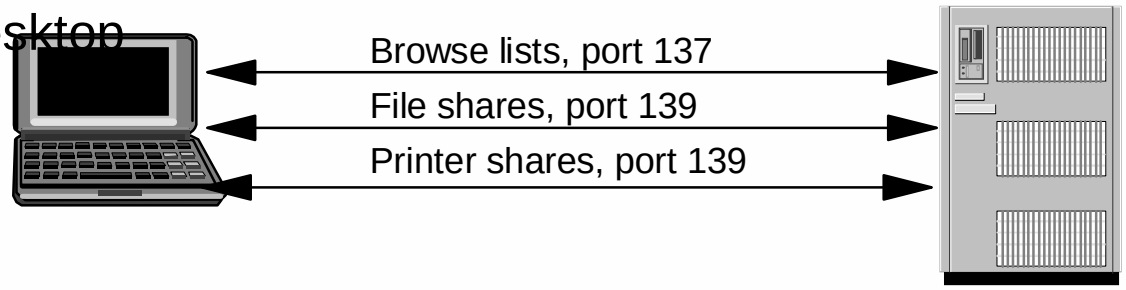
Samba services

- File serving via **smbd**
  - Large file systems - LVM + journalled FS
  - Sharing files among teams
  - Using Access Control Lists
- Print serving via **smbd**
  - An existing print server must first exist - lpd, LPRng or CUPS
  - smbd acts as "middle-man" between print server and Windows clients
- Browse lists via **nmbd**
  - Viewable via "Network Neighborhood" or "My Network Places"
  - Not the UNIX model for file shares, however, useful for printers
- Time Serving via **smbd**
  - middle-man between existing time server and Windows clients
- Domain login via **smbd**
- Authentication via **winbind** and administration via **swat**
  - Not really services, but important issues

Samba services

Windows NT/2000/2003 server

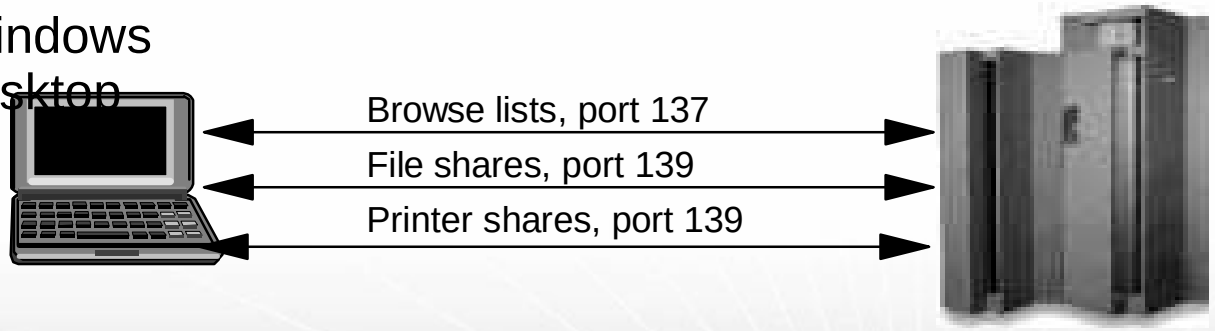
Windows desktop



Before

Samba-3 on Linux

Windows desktop



After

Samba administration

- Via the command line
  - /etc/init.d/nmb, /etc/init.d/smb "service scripts"
  - /etc/samba/smb.conf - one configuration file
  - /etc/samba/smbpasswd - one password file with "NT hashes"
  - Samba commands - testparm, smbpasswd, net command (new), etc.
  - /var/log/samba/* - log files
- SWAT - the Samba Web Administration Tool
  - Enable via inetd or xinetd
  - Sometimes using read/only is a compromise
- z/VM front end - EZLNXID
  - IBM-written freeware
  - Good for shops with better VM skills than Linux skills
  - See:

    `ftp://www.redbooks.ibm.com/redbooks/REDP3604/`

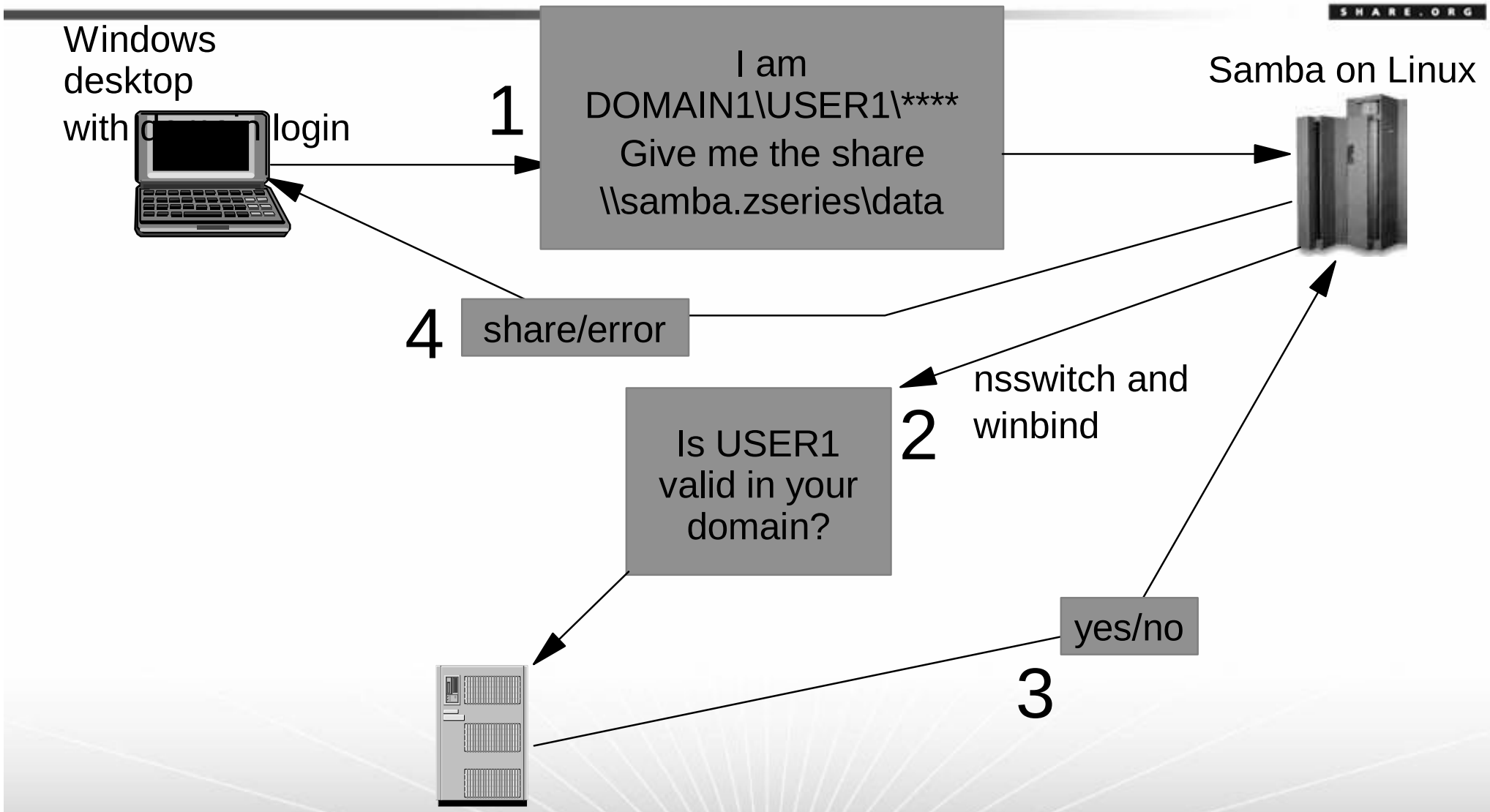
Authentication - can be done many ways

- Not at all (`guest = OK`)
- Traditional UNIX style:
  - On Linux with encrypted passwords /etc/passwd and /etc/smbpasswd
  - On Linux with unencrypted passwords - /etc/passwd
- Windows style
  - With Samba acting as a NT PDC
  - On the Windows Domain Controller with winbind
  - On the Windows DC + auto home directories and /etc/passwd file
    - use the smb.conf parameter to run a script beore authentication is done:

```
add user script = /usr/local/samba/bin/addSambauser
```

- LDAP style
  - Allows an enterprise directory running on Linux
  - OpenLDAP is an open source solution that can grow in the enterprise

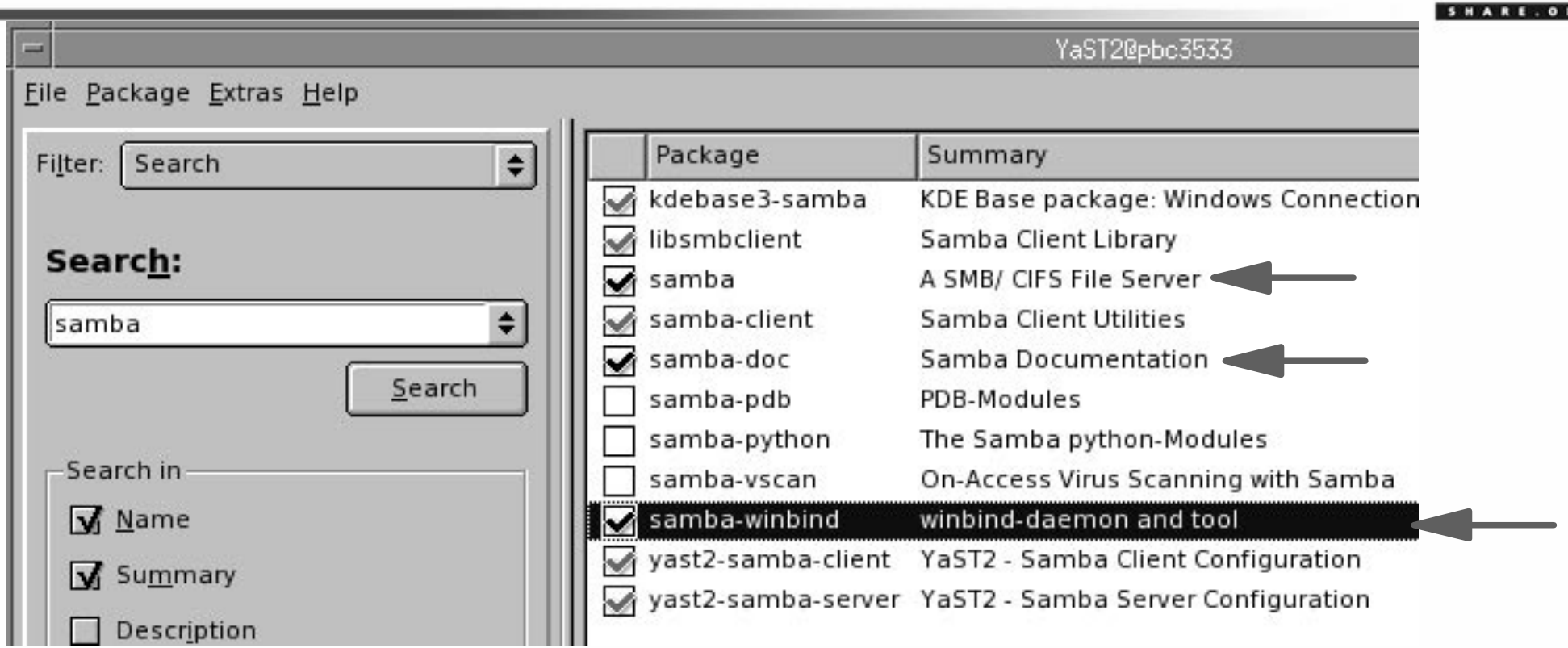
Authentication via winbind



Samba-3 Installation on SLES-9

The Samba server is not installed on a default SLES-9 system

Samba-3 Installation (cont'd)



Now do I have Samba installed?

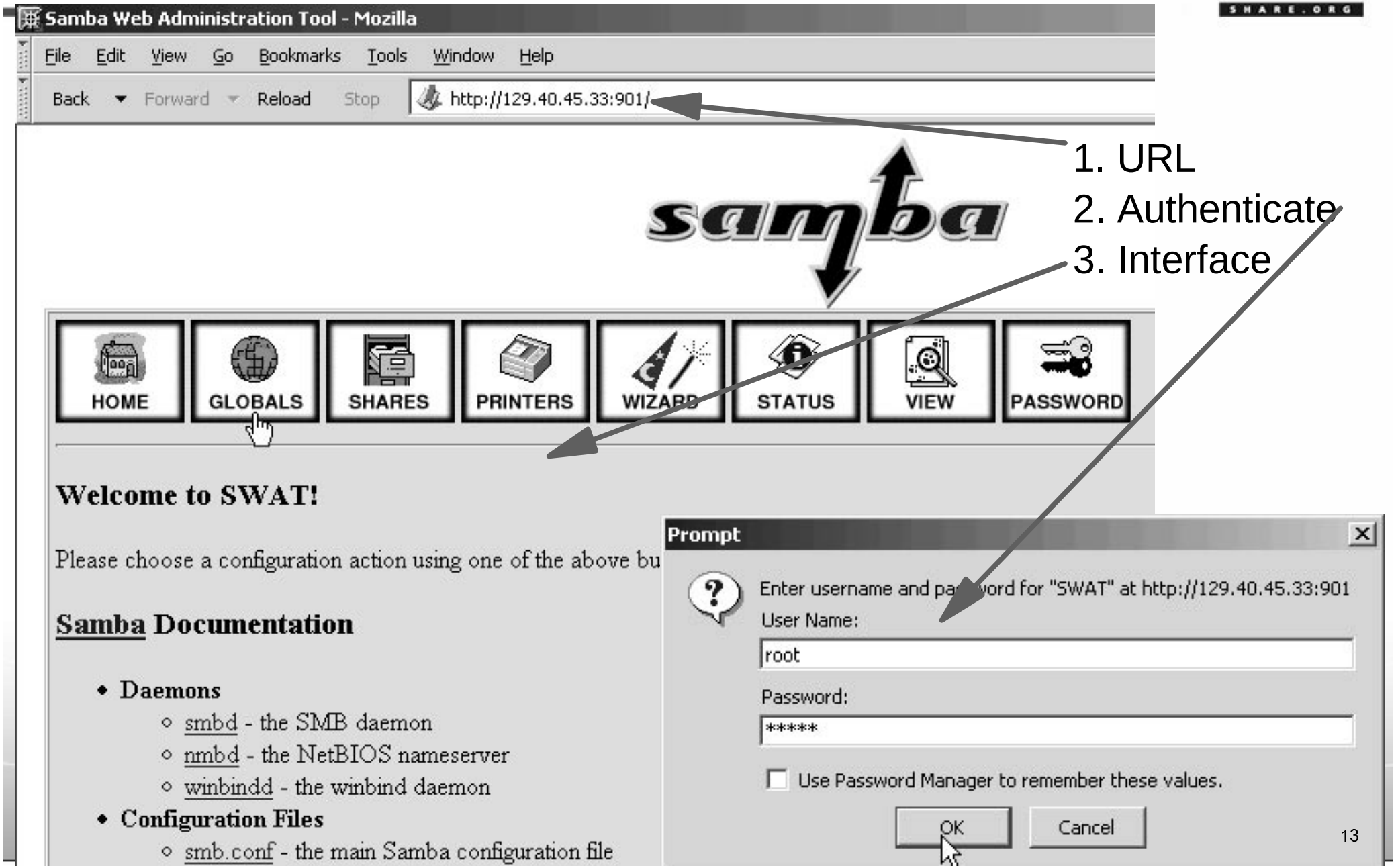
```
# rpm -qa | grep samba
yast2-samba-server-2.9.28-1.2
samba-client-3.0.4-1.22
kdebase3-samba-3.2.1-68.16
yast2-samba-client-2.9.17-1.2
samba-3.0.4-1.22
samba-doc-3.0.4-1.22
samba-winbind-3.0.4-1.22
```

Configuring Samba-3: SWAT:

- The Samba Web Administration Tool (SWAT)
  - To configure:

```
# rpm -qa | grep xinetd
xinetd-2.3.13-39.3
# cd /etc/xinetd.d
# vi swat  ==> comment out two lines:
service swat
{
        socket_type     =  stream
        protocol        =  tcp
        wait            =  no
        user            =  root
        server          =  /usr/sbin/swat
#       only_from       =  127.0.0.1
        log_on_failure  += USERID
#       disable         =  yes
}
# chkconfig xinetd on
# rcxinetd start
Starting INET services. (xinetd)                           done
```

Configuring Samba-3: SWAT (cont'd)



Configuring Samba-3 (cont'd)

- Command line - set up smb.conf file

```
# cd /etc/samba
# cp smb.conf smb.conf.orig
# vi smb.conf
[global]
        workgroup = TUX-NET
        printing = cups
        printcap name = cups
        printcap cache time = 750
        cups options = raw
        printer admin = @ntadmin, root, administrator
        username map = /etc/samba/smbusers
        map to guest = Bad User
        logon path = \\%L\profiles\.msprofile
        logon home = \\%L\%U\.9xprofile
        logon drive = P:
[homes]
...
[printers]
...
[print$]
...
```

Configuring Samba-3 (cont'd)

- Start Samba services across reboots

```
# chkconfig nmb on
# chkconfig smb on
```

- **Start Samba services now and verify**

```
# rcnmb start
Starting Samba NMB daemon                                  done
# rcsmb start
Starting Samba SMB daemon                                  done
# rcnmb status
Checking for Samba NMB daemon                            running
# rcsmb status
Checking for Samba SMB daemon                            running
```

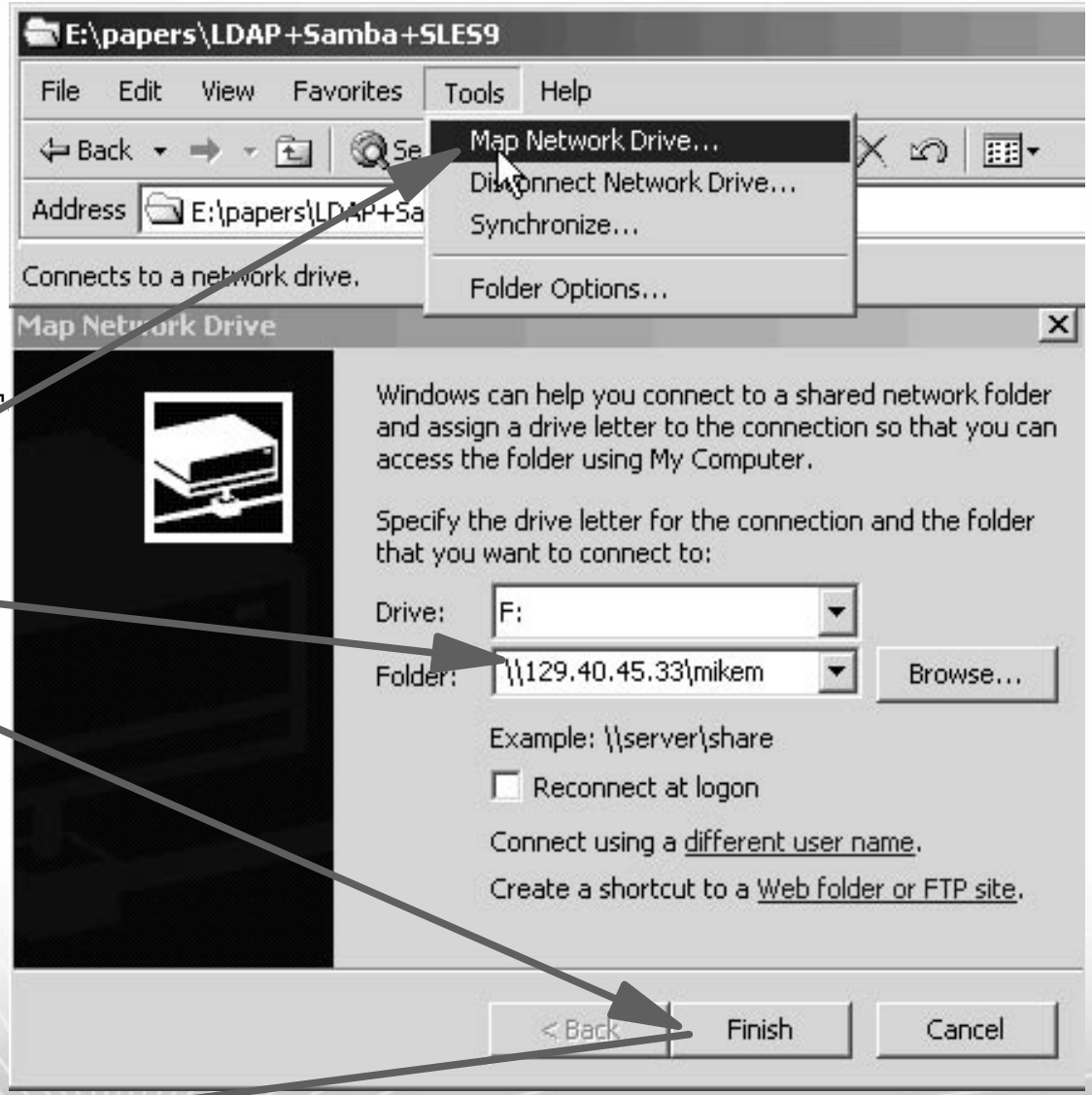
Using Samba-3

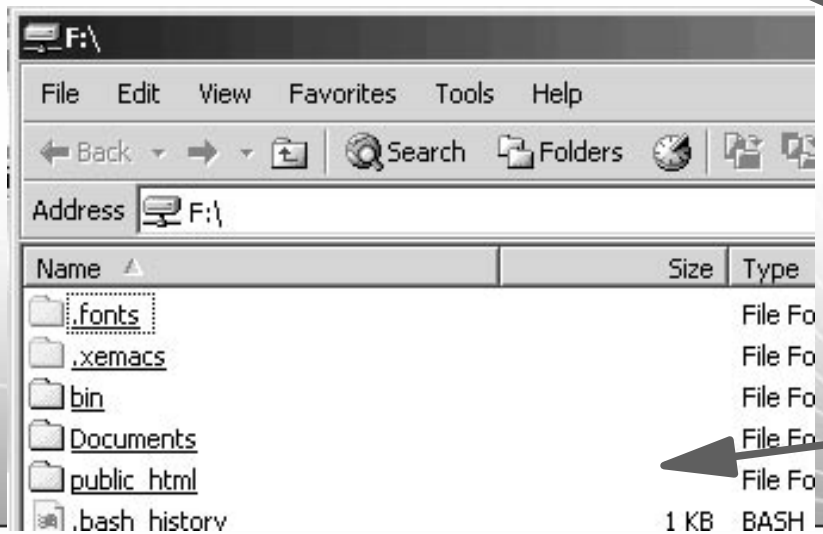
- Add a user

```
# useradd mikem
# passwd mikem
...
# smbpasswd -a mikem
...
# tail -1 smbpasswd
mikem:1000:F32654EA880E4DF
```

- Get a share from Windows:

1.
2.
3.





Samba can be this easy

Configuring Samba-3 (cont'd)

- Add a directory worth sharing

```
# vi smb.conf => add below [homes] section
...
[linuxdoc]
        path = /usr/share/doc/packages
[printers]
...
# rcsmb restart
Shutting down Samba SMB daemon                              e
Starting Samba SMB daemon                                   e
```

- Get the share **\\<samba.IP.addr>\linuxdoc**
- Good Linux docs from Windows

Configuring Samba-3 with LDAP

- Let's focus on just one "backend": LDAP
  - First clean up: remove the smbpasswd entry

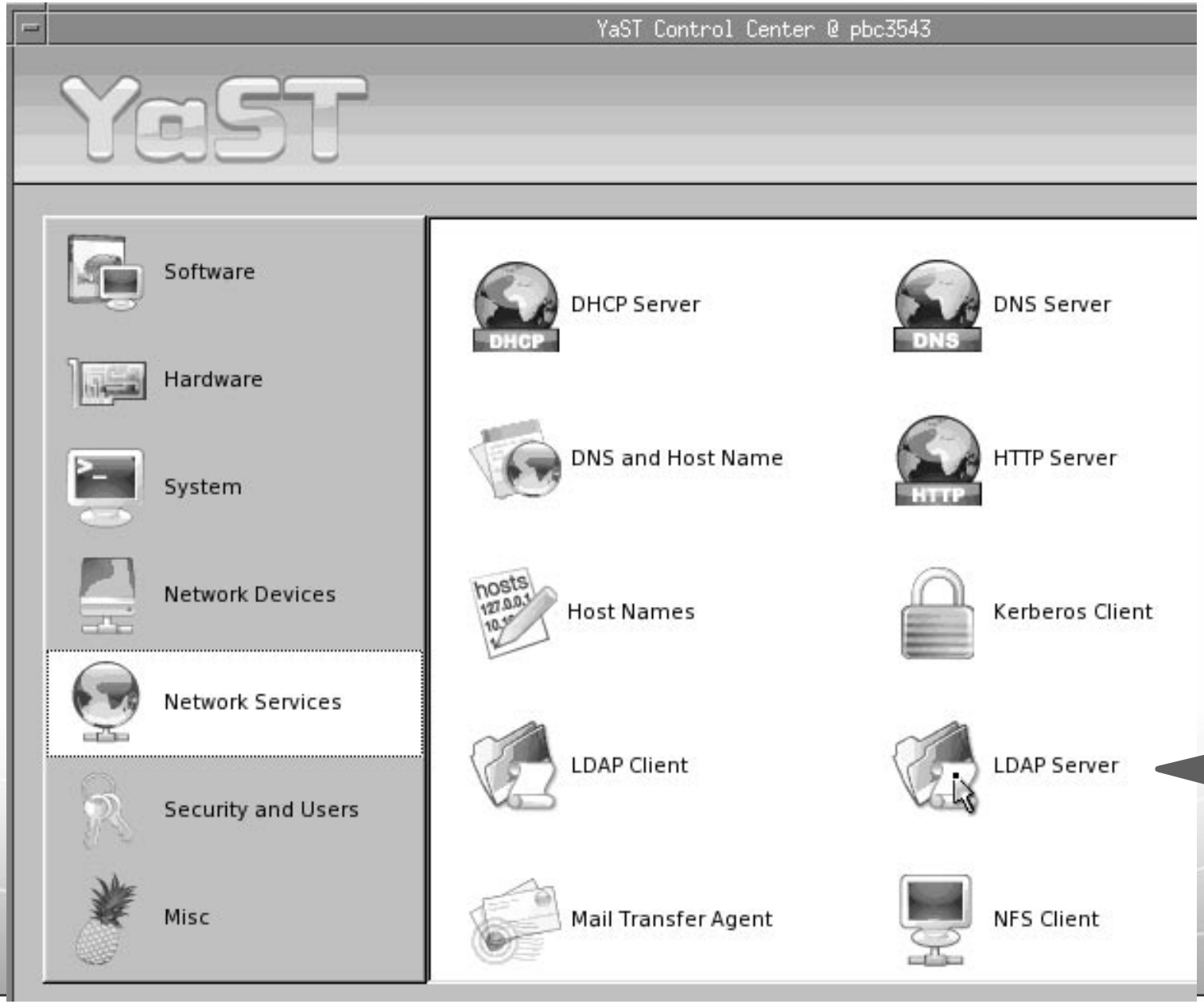
```
# cd /etc/samba
# smbpasswd -x mikem
Deleted user mikem.
# userdel mikem
no crontab for mikem
```

  - Look at the LDAP tree beforehand

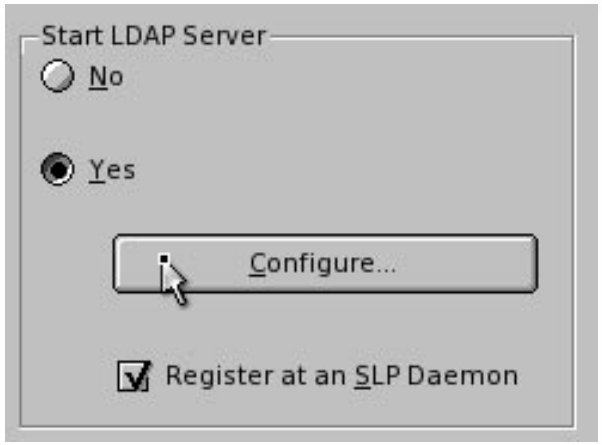
- How to configure?
  - Configure via the command line
    - **This is not easy**!!!
  - Configure LDAP via YaST
    - This has a *chance* of competing with Active Directory (but there is room for improvement)
    - Invoke YaST:

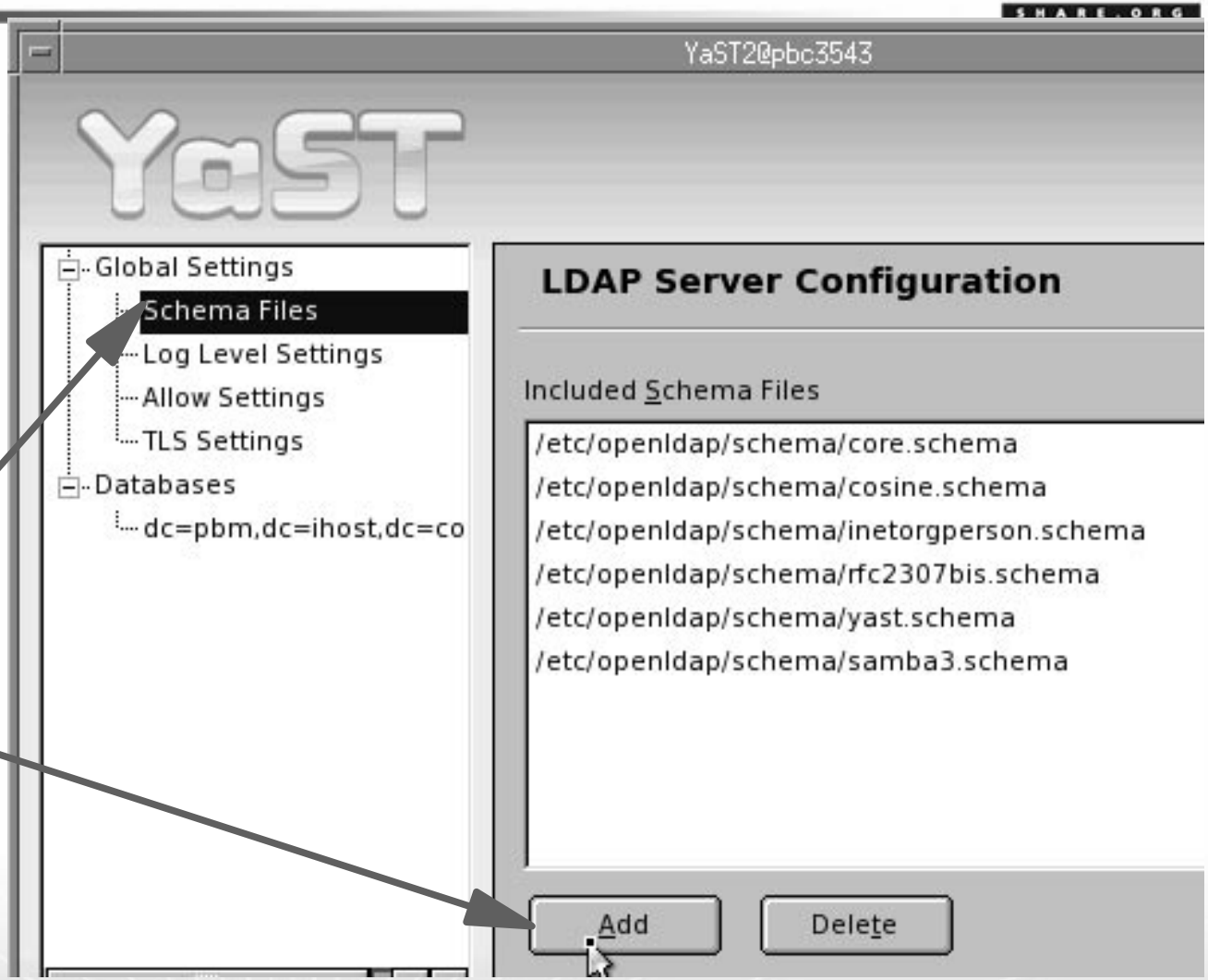
```
# yast2 &
```

Configuring Samba-3 with LDAP (cont'd)



Configuring Samba-3 with LDAP (cont'd)

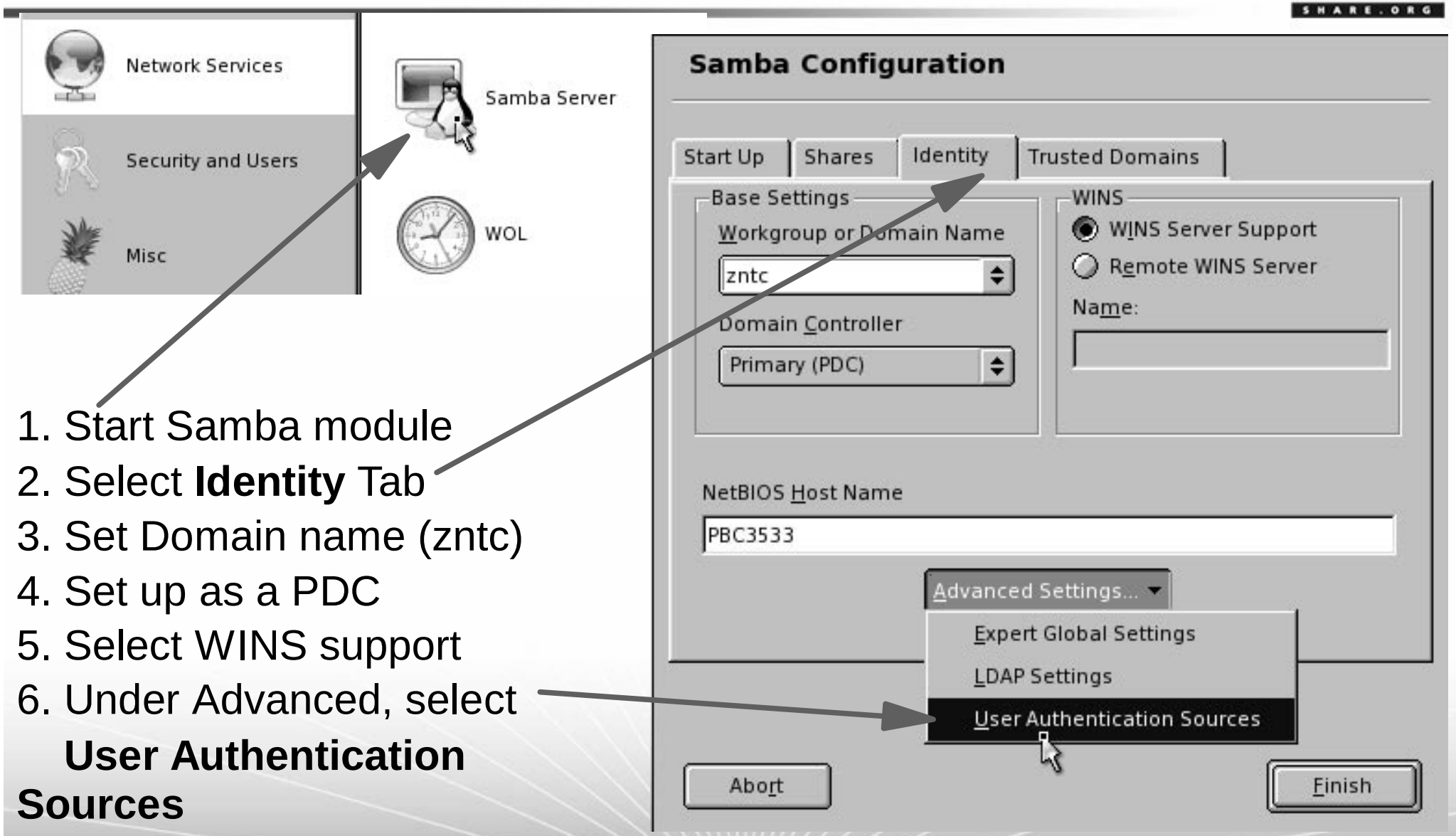




1. Click **Configure**
2. Select Schema files
3. Click **Add**
4. Choose samba3.schema
5. Click **Finish**

```
# grep samba /etc/openldap/slapd.conf
include         /etc/openldap/schema/samba3.schema
# ls /etc/openldap/schema/samba*
/etc/openldap/schema/samba3.schema
```

Configuring Samba-3 with LDAP (cont'd)

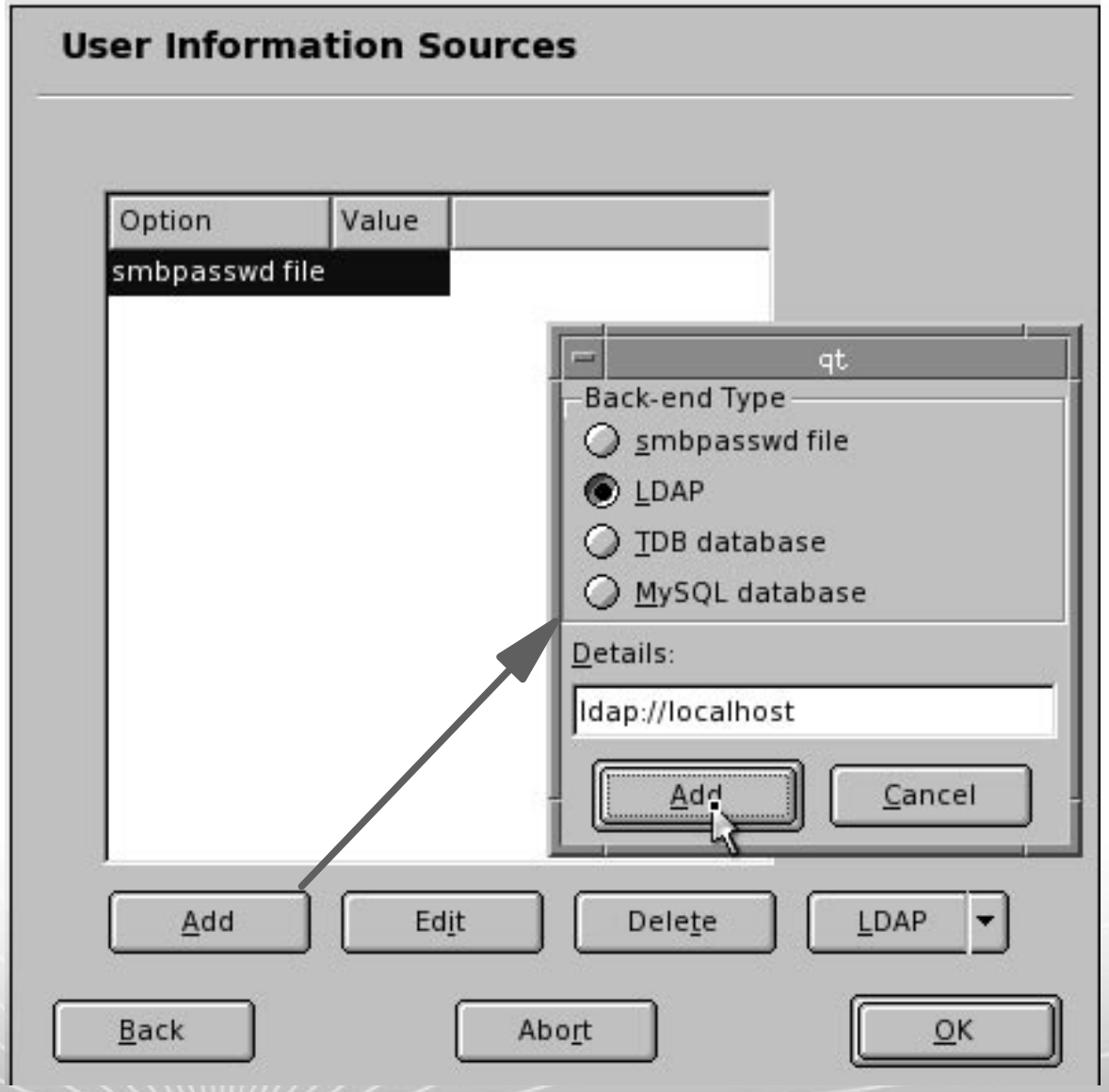


1. Start Samba module
2. Select **Identity** Tab
3. Set Domain name (zntc)
4. Set up as a PDC
5. Select WINS support
6. Under Advanced, select **User Authentication Sources**

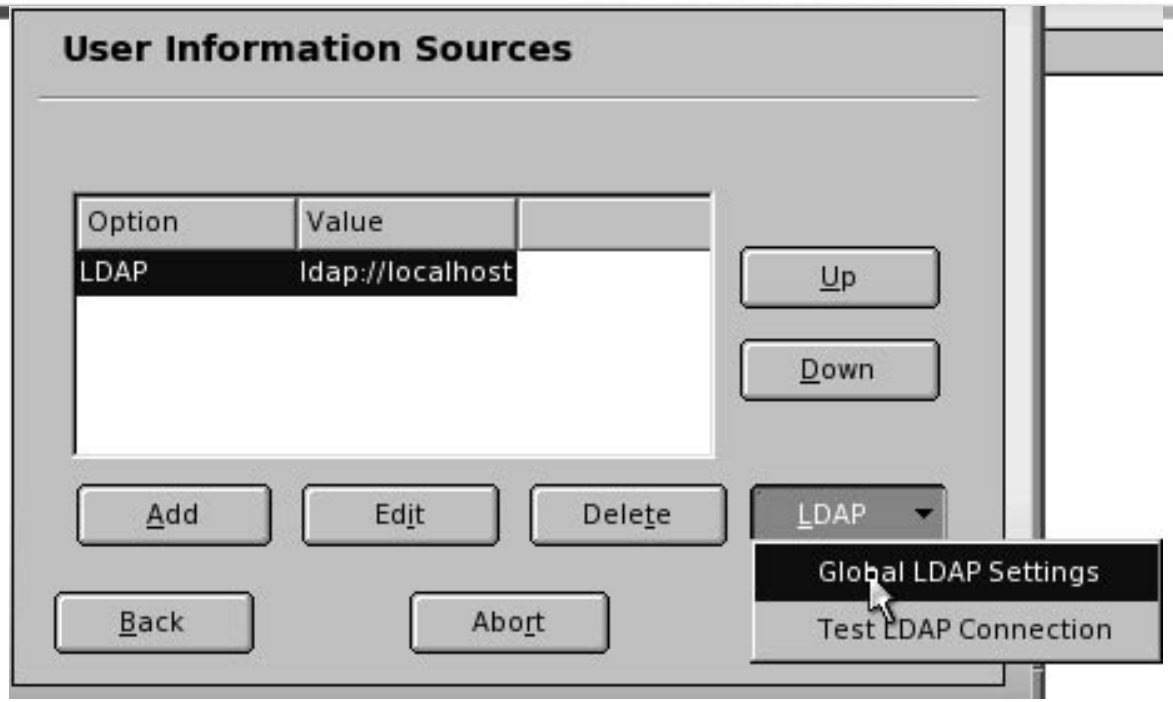
Configuring Samba-3 with LDAP (cont'd)

1. Click **Add**
2. Choose **LDAP** back-end
3. Click **Add**
4. With "smbpasswd file" selected, click **Delete**

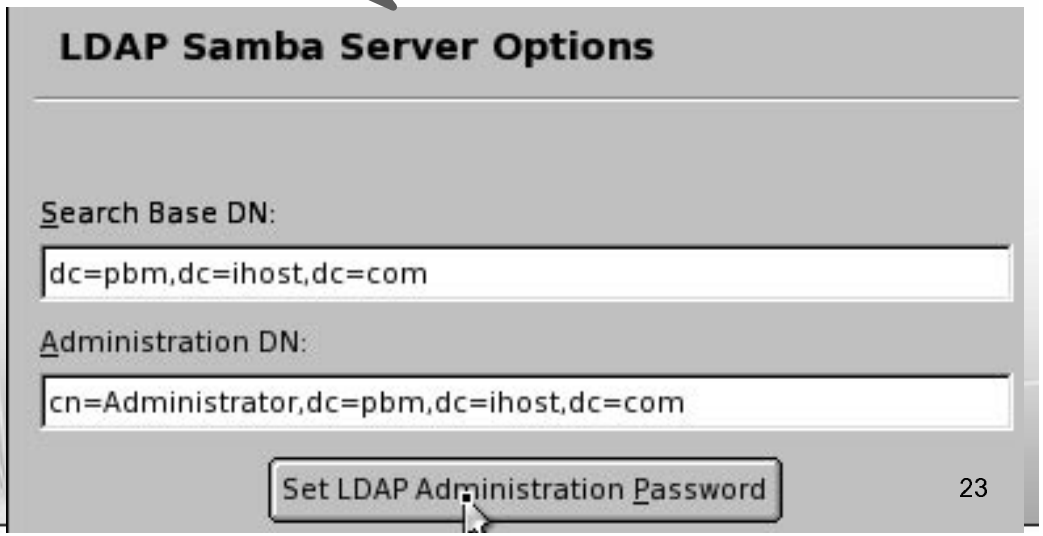
You should now have just LDAP as a backend



Configuring Samba-3 with LDAP (cont'd)

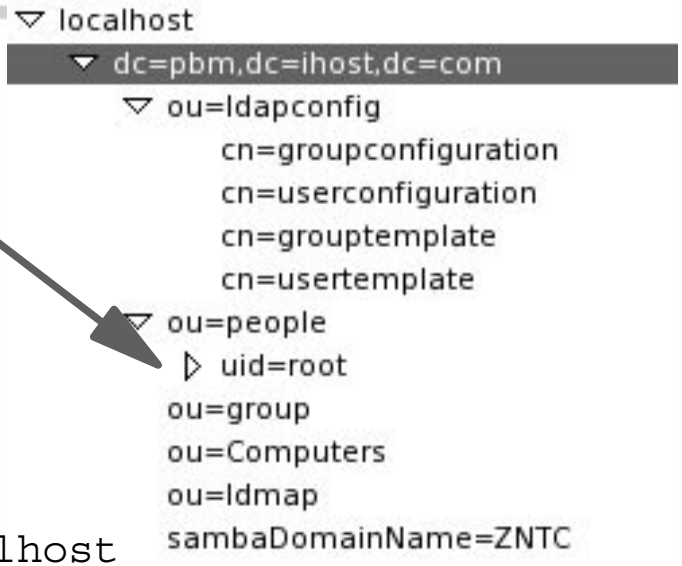


1. Choose **LDAP** => **Global LDAP settings**
2. Click **Set LDAP Admin Password**
3. Set the password
4. Click **LDAP** => **Test LDAP conn'n**
5. Click **OK**
6. Click **Finish** (on Samba panel)



Configuring Samba-3 with LDAP (cont'd)

- Look at the LDAP tree afterward

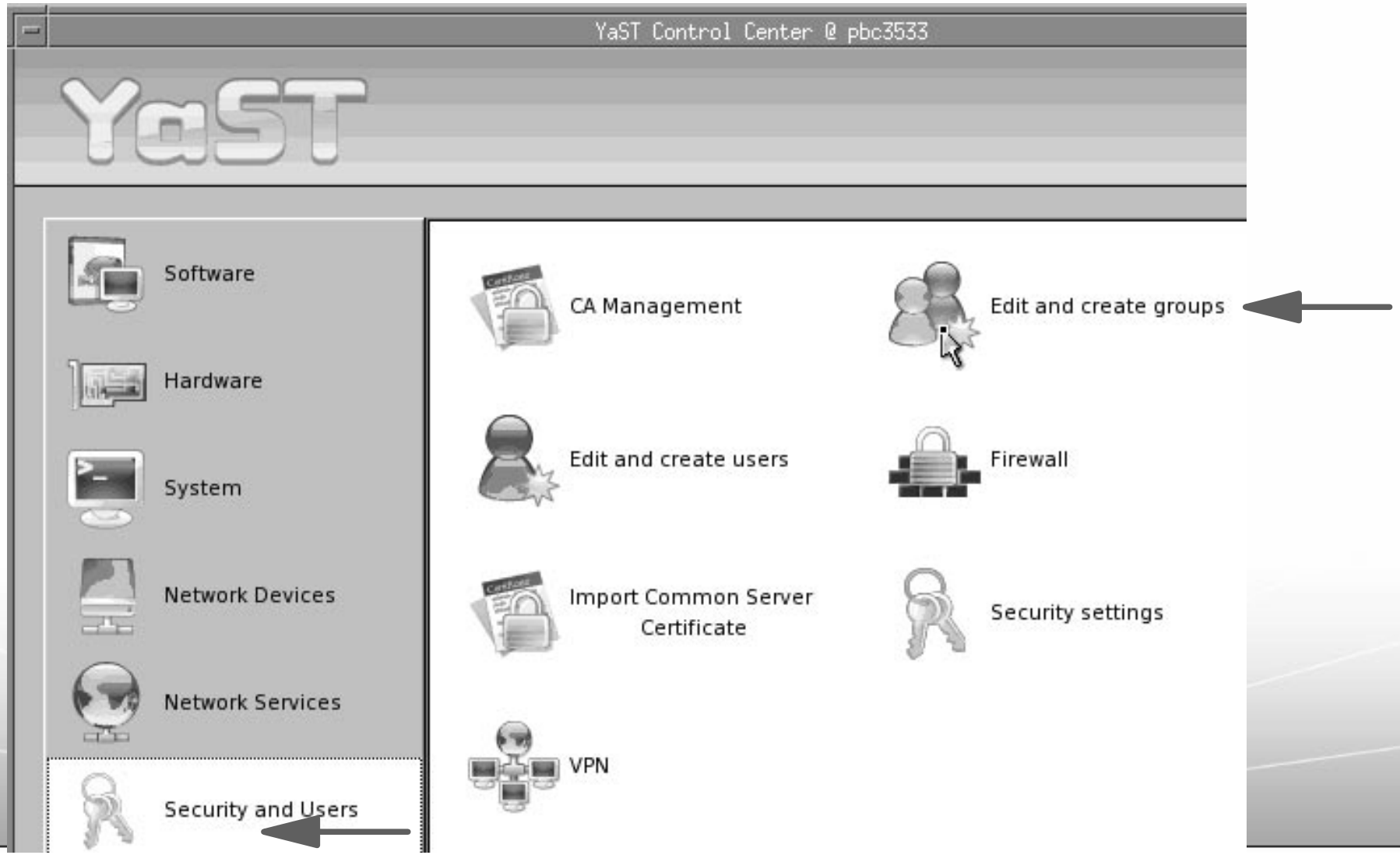


- Look at the smb.conf changes (some):

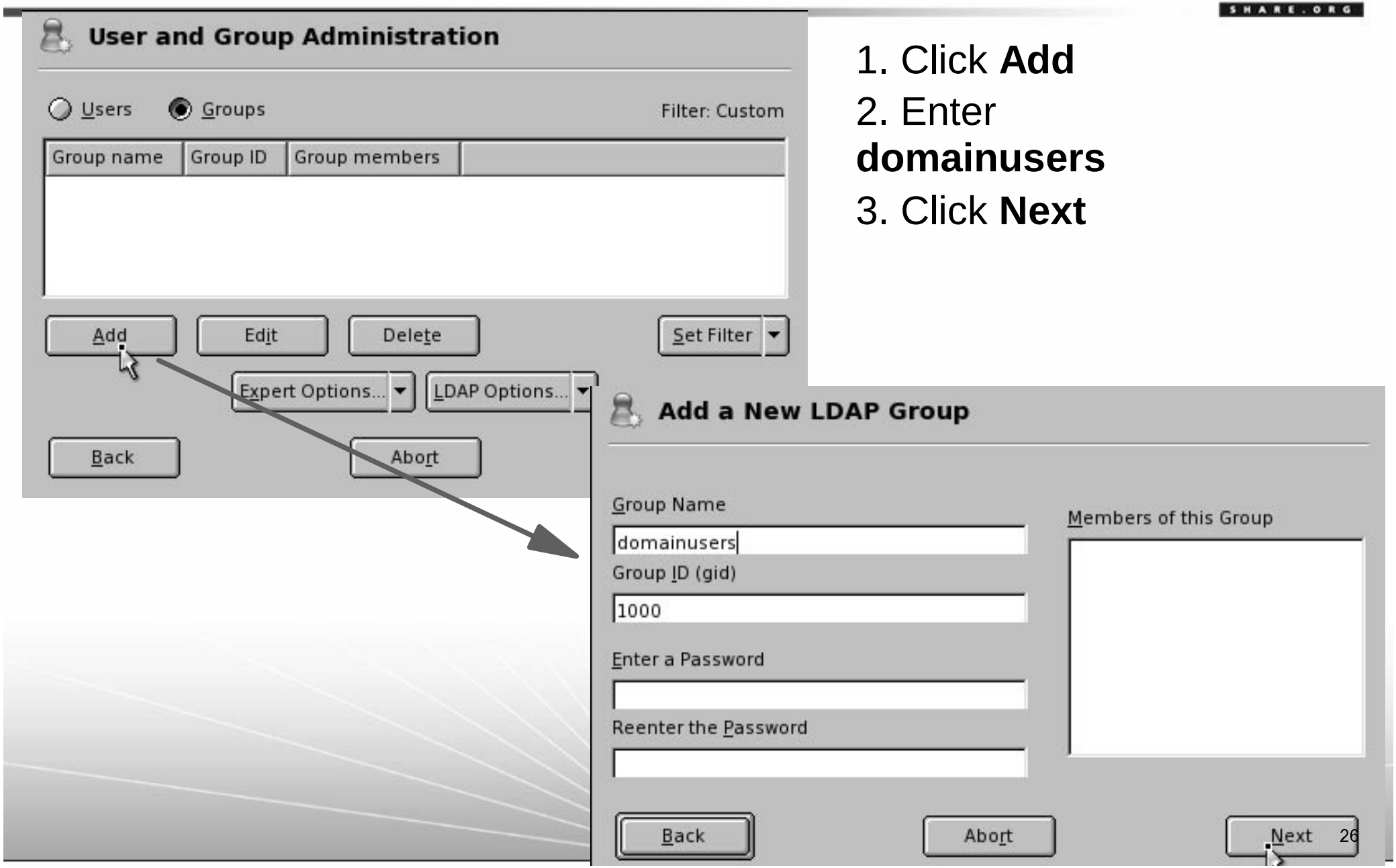
```
<     workgroup = ZNTC
<     ldap suffix = dc=pbm,dc=ihost,dc=com
<     ldap group suffix = ou=group
<     ldap user suffix = ou=people
<     security = user
<     encrypt passwords = yes
<     passdb backend = ldapsam:ldap://localhost
<     domain logons = yes
<     idmap backend = ldapsam:ldap://localhost
<     ldap admin dn = cn=Administrator,dc=pbm,dc=ihost,dc=com
<     ldap idmap suffix = ou=Idmap
<     ldap machine suffix = ou=Computers
<     local master = yes
<     wins support = yes
<     netbios name = PBC3533
<     add machine script =
        /sbin/yast /usr/share/YaST2/data/add_machine.ycp %m$
<     domain master = yes
<     preferred master = yes
<     os level = 65
```

Configuring Samba-3 with LDAP (cont'd)

- Create groups and users
  - Click **Edit and create groups** and enter LDAP Admin password

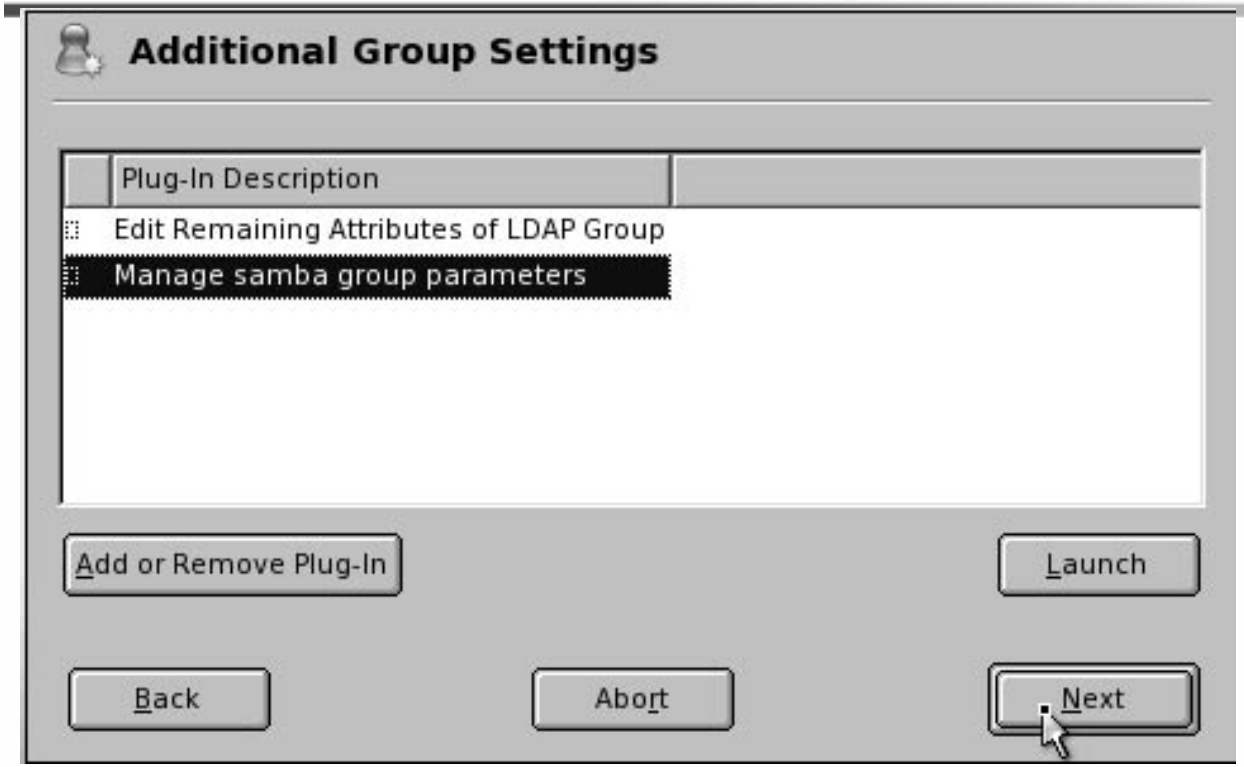


Configuring Samba-3 with LDAP (cont'd)



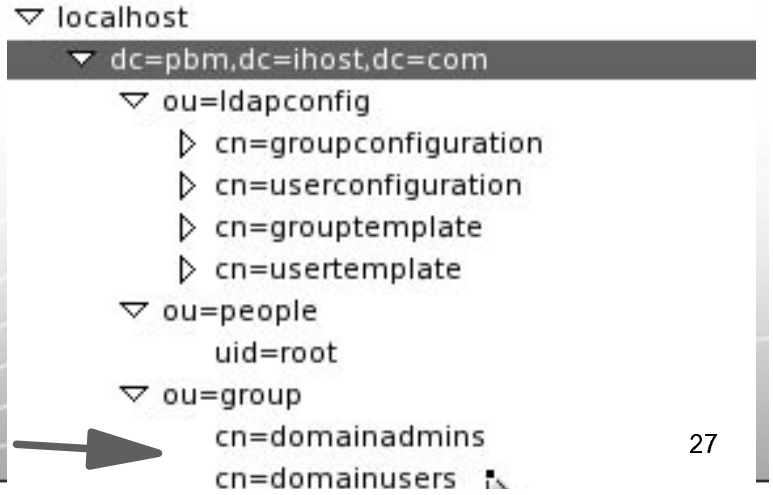
1. Click **Add**
2. Enter **domainusers**
3. Click **Next**

Configuring Samba-3 with LDAP (cont'd)



4. Select **Manage Samba** ...
5. Click **Add or remove plug-in**
6. Click **Next**
7. Repeat 1-6 to add group for "domainadmins"

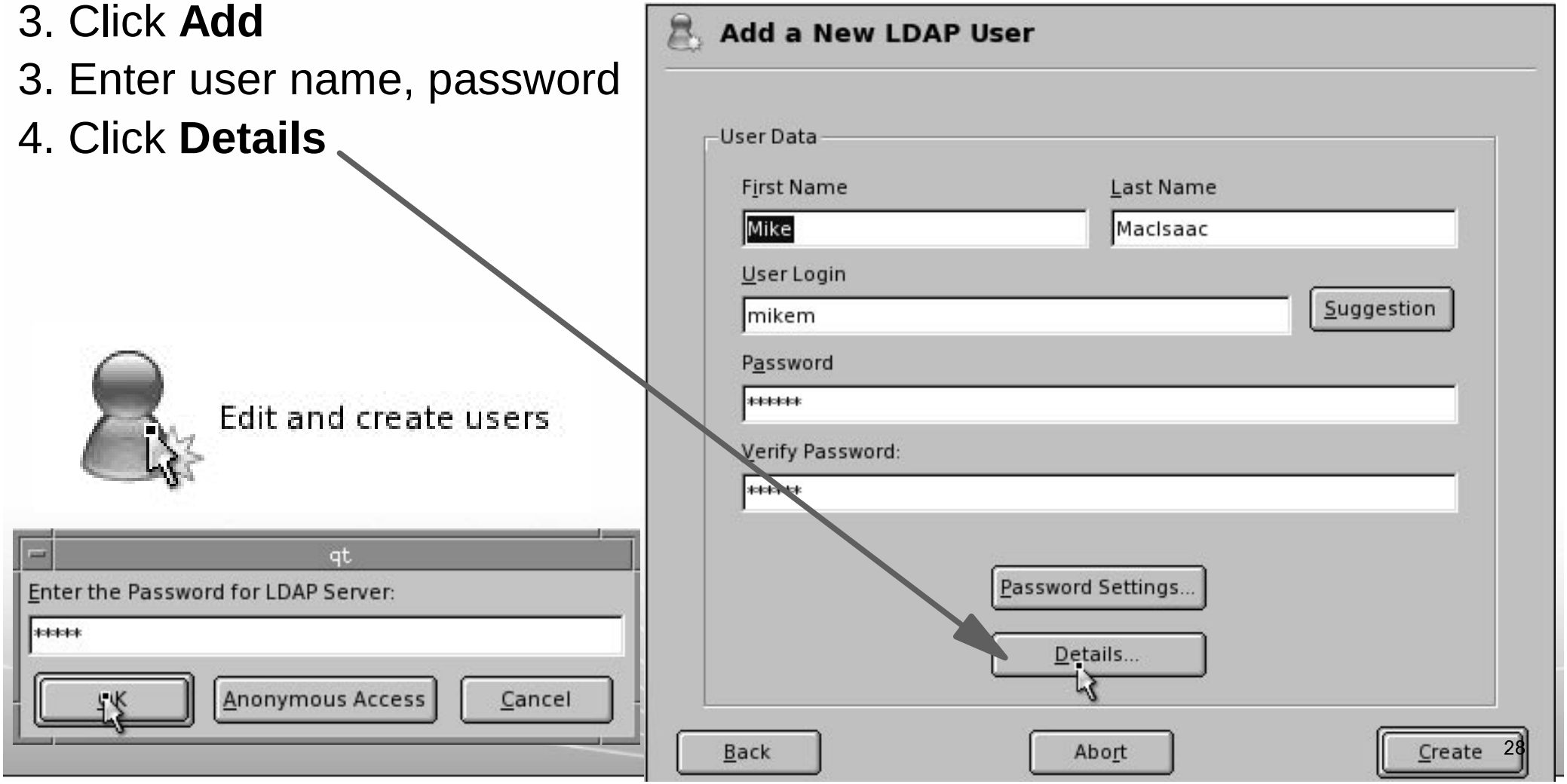
Verify with



Configuring Samba-3 with LDAP (cont'd)

Add a user

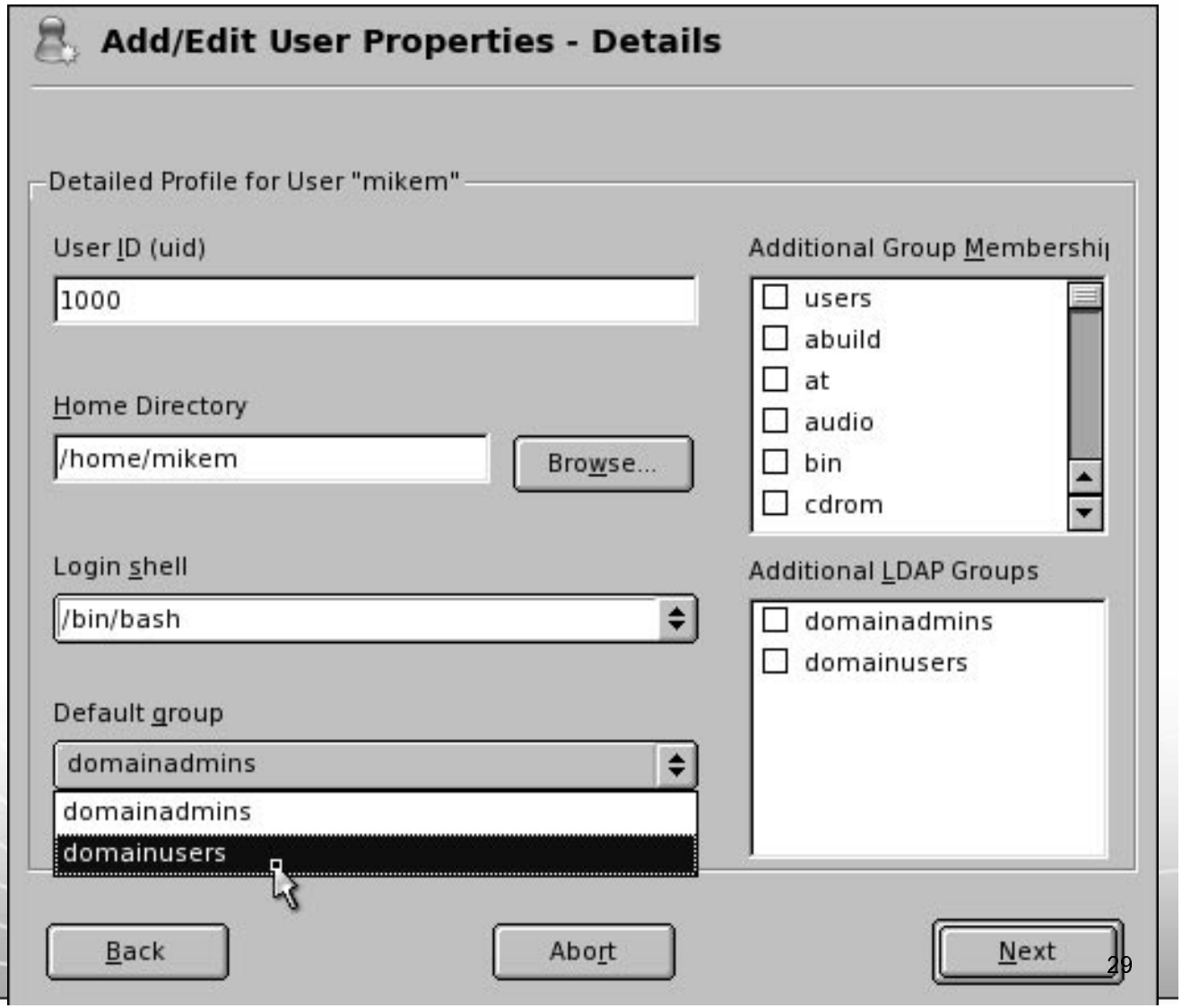
1. Click **Edit and create users**
2. Enter LDAP admin password
3. Click **Add**
3. Enter user name, password
4. Click **Details**



Configuring Samba-3 with LDAP (cont'd)

Add a user

5. Select domainadmins as default group
6. Click **Next**
7. Accept defaults on "Additional user settings"
8. Click **Create**
9. Click **Finish**

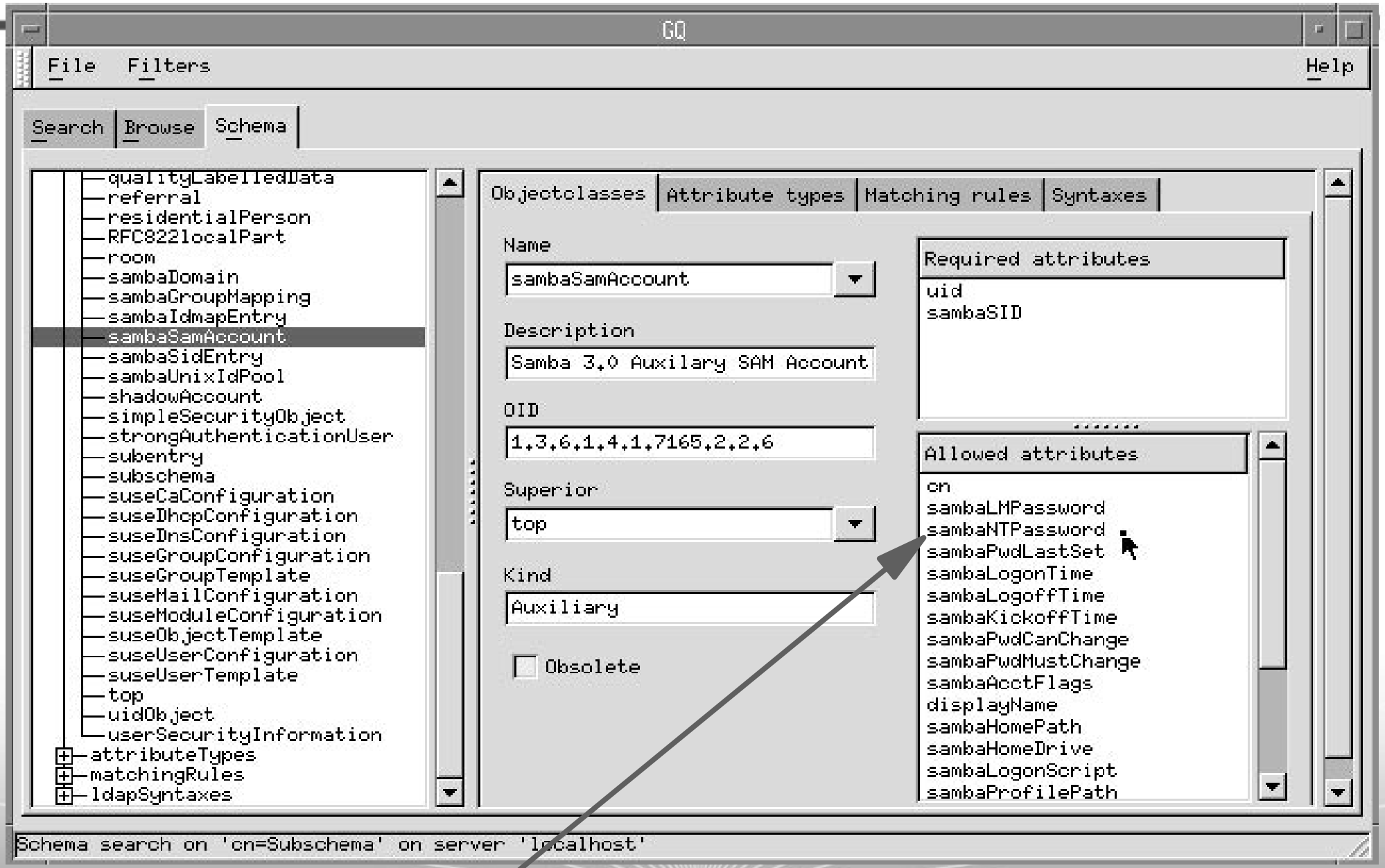


Configuring Samba-3 with LDAP (cont'd)

- Go back to Linux and see what changed:

```
# id mikem
id: mikem: No such user
# ldapsearch -x | grep mikem
# mikem, people, pbm.ihost.com
dn: uid=mikem,ou=people,dc=pbm,dc=ihost,dc=com
cn: mikem
homeDirectory: /home/mikem
sn: mikem
uid: mikem
# rcnscd restart
Shutting down Name Service Cache Daemon                    done
Starting Name Service Cache Daemon                         done
# id mikem
uid=1000(mikem) gid=1000(domainusers) groups=1000(domainusers)
```

Configuring Samba-3 with LDAP (cont'd)



Important

Time serving with NTP

- The Network Time Protocol (NTP) daemon in xntpd
  - In a sense all Linux time servers are clients
- Configure the software clock so Samba can serve time accurately
  - There are public time servers (stratum 1 and 2) on the Internet. See:

    ```
    http://ntp.isc.org/bin/view/Servers/StratumTwoTimeServers
    ```

  - Find two servers your Linux image can get to
  - Configuration file is /etc/ntp.conf:

    ```
    # egrep -v "^$|^#" /etc/ntp.conf
    server sundial.columbia.edu
    server clock.nyc.he.net
    driftfile /var/lib/ntp/drift/ntp.drift # path for drift file
    logfile   /var/log/ntp          # alternate log file
    ```

  - Start xntpd for this session and across reboots

    ```
    # rcxntpd start
    Try to get initial date from  sundial.columbia.edu clock.nyc.he.net      done
    Starting network time protocol daemon (NTPD)                             done
    # chkconfig xntpd on
    # chkconfig xntpd
    xntpd  on
    ```

Time serving with NTP (cont'd)

- Wait for time to settle down - few seconds to tens of minutes

```
 # ntptrace | grep stratum
localhost: stratum 16, offset 0.000000, synch distance 0.000000
... a few minutes later
# ntptrace | grep stratum
localhost: stratum 2, offset 0.003003, synch distance 0.009264
```

- If Samba is running, it is now an *accurate* SMB time server
- Other Linux clients can set their clock nightly via the cron entry:

```
# cat /etc/cron.daily/set-clock
#!/bin/bash
/usr/sbin/ntpd -q
```

- Set the time from a Windows client
  - DOS command (Samba server is 9.57.26.222):

```
net time \\9.57.26.222 /set /yes
```

    - This can be put in autoexec.bat or a logon profile

Solution - Set up a logical volume

- Overall
  - Get some DASD defined to the VM user ID
  - Add the DASD in Linux
  - Format each DASD, carve into a single partition and verify
  - Create physical volumes for each DASD - SLES9 uses LVM2
  - Verify physical volumes
  - Create the volume group and verify
  - Create a striped logical volume using most of the volume group
  - Create a journalled file system and mount the logical volume
  - Give group write privileges and make a Samba share of the directory:
  - Set the LVM to come up at IPL (boot) time

Solution - Set up a logical volume (cont'd)

- Get some DASD defined to the VM user ID

```
USER MP3KLNX6 LNX6 128M 512M     G
 INCLUDE LNXDFLT
 MDISK 100 3390 0001 3338 VM20F  MR RPASS WPASS MPASS
 MDISK 101 3390 0751 0100 VM218  MR RPASS WPASS MPASS
 MDISK 200 3390 0001 3338 VM210  MR RPASS WPASS MPASS
 MDISK 201 3390 0001 3338 VM211  MR RPASS WPASS MPASS
 MDISK 202 3390 0001 3338 VM212  MR RPASS WPASS MPASS
 MDISK 203 3390 0001 3338 VM213  MR RPASS WPASS MPASS
 MDISK 204 3390 0001 3338 VM214  MR RPASS WPASS MPASS
 MDISK 191 3390 0851 0050 VM218  MR RPASS WPASS MPASS
```

- Add the DASD in Linux (new process for SLES9)

```
# cd /etc/sysconfig/hardware
# cp hwcfg-dasd-bus-ccw-0.0.0100 hwcfg-dasd-bus-ccw-0.0.0200
# cp hwcfg-dasd-bus-ccw-0.0.0100 hwcfg-dasd-bus-ccw-0.0.0201
...
```

- Reboot Linux and the new dasd should be in /proc/dasd/devices

Solution - Set up a logical volume (cont'd)

- Be sure you have LVM2 installed

```
# rpm -qa | grep lvm
# yast -i lvm2  // and some screens flash by - cool way to add RPMs
# rpm -qa | grep lvm
lvm2-2.00.15-0.8
```

- Format each DASD, carve into a single partition and verify

```
# for i in c d e f g
> do
>  dasdfmt -b 4096 -y -f /dev/dasd$i
>  fdasd -a /dev/dasd$i
> done
Finished formatting the device.
Rereading the partition table... ok
...
# dasd list
0100(ECKD) at ( 94:  0) is dasda : active, 2347 MB
0101(ECKD) at ( 94:  4) is dasdb : active, 70 MB
0200(ECKD) at ( 94:  8) is dasdc : active, 2347 MB
...
0204(ECKD) at ( 94: 24) is dasdg : active, 2347 MB
```

Solution - Set up a logical volume (cont'd)

- Initialize LVM

```
# vgscan
  Reading all physical volumes.  This may take a while...
  No volume groups found
```

- Create physical volumes for each DASD

```
# pvcreate /dev/dasd[cdefg]1
pvcreate -- physical volume "dasdc1" successfully created
pvcreate -- physical volume "dasdd1" successfully created
pvcreate -- physical volume "dasde1" successfully created
pvcreate -- physical volume "dasdf1" successfully created
pvcreate -- physical volume "dasdg1" successfully created
```

- Verify physical volumes

```
# pvscan
pvscan -- reading all physical volumes (this may take a while...)
pvscan -- inactive PV "/dev/dasdc1" is in no VG  [2.29 GB]
pvscan -- inactive PV "/dev/dasdd1" is in no VG  [2.29 GB]
pvscan -- inactive PV "/dev/dasde1" is in no VG  [2.29 GB]
pvscan -- inactive PV "/dev/dasdf1" is in no VG  [2.29 GB]
pvscan -- inactive PV "/dev/dasdg1" is in no VG  [2.29 GB]
pvscan -- tot: 5 [11.46 GB] / in use: 0 [0] / in no VG: 5 [11.46 GB]
```

Solution - Set up a logical volume (cont'd)

- Create the volume group and verify:

```
# vgcreate datavg /dev/dasd[cdefg]1
Volume group "datavg" successfully created
#  ls -ld /dev/datavg
dr-xr-xr-x    2 root     root     72 Jan 16 14:29 /dev/datavg/
# ls -l /dev/datavg
crw-r-----    1 root     disk     109,   0 Jan 16 14:06 group
# vgdisplay datavg | grep Size
VG Size               11.43 GB
PE Size               4 MB
Alloc PE / Size       0 / 0
Free  PE / Size       2925 / 11.43 GB
```

Solution - Set up a logical volume (cont'd)

- Create a striped logical volume using most of the volume group

```
# lvcreate --stripes 5 --size 11.4G -n lv1 /dev/datavg
logical volume "/dev/datavg/lv1" successfully created
# lvdisplay /dev/datavg/lv1
--- Logical volume ---
LV Name                /dev/datavg/lv1
VG Name                datavg
LV Write Access        read/write
LV Status              available
LV #                   1
# open                 0
LV Size                11.41 GB
...
# vgdisplay datavg | grep Size
MAX LV Size            255.99 GB
VG Size                11.43 GB
PE Size                4 MB
Alloc PE / Size        2920 / 11.41 GB
Free  PE / Size        5 / 20 MB
```

Solution - Set up a logical volume (cont'd)

- Create a journalled file system and mount the logical volume

```
# mke2fs -j /dev/datavg/lv1
...
# mkdir /data
# mount /dev/datavg/lv1 /data
# df -h
Filesystem            Size  Used Avail Use% Mounted on
/dev/dasda1           2.3G  1.6G  744M  69% /
shmfs                  62M     0   62M   0% /dev/shm
/dev/datavg/lv1        12G   33M   11G   1% /data
```

- Give group write privileges and make a Samba share of the directory:

```
# cd /
# chown root.users data
# chmod g+sw data
# ls -ld data
drwxrwsr-x    4 root     users        4096 Jul 22 13:27 data/
# cd /etc/samba
# vi smb.conf                          # add the entry
# cat smb.conf
...
[data]
        path = /data
        read only = no
```

Solution - Set up a logical volume (cont'd)

- Set the LVM to come up at IPL (boot) time

```
# cd /etc
# cp zipl.conf zipl.conf.orig
# vi zipl.conf                          # add DASD 200-204
# cat zipl.conf
...
[ipl]
target=/boot/zipl
image=/boot/kernel/image
ramdisk=/boot/initrd
parameters="dasd=100-101,200-204 root=/dev/dasda1"
...
# zipl
# cp fstab fstab.orig
# vi /etc/fstab                         # and add a line
# cat /etc/fstab
/dev/dasda1          /           reiserfs   defaults              1 1
/dev/datavg/lv1      /data       ext3       acl                   0 2
/dev/dasdb1          swap        swap       pri=42                0 0
devpts               /dev/pts    devpts     mode=0620,gid=5       0 0
proc                 /proc       proc       defaults              0 0
# shutdown -r now
...
```

Documentation and resources

- Documentation
  - *Migrating Windows servers to Samba*, Mike MacIsaac

    `http://www.linuxvm.org/Present`
  - SuSE docs, including Samba docs

    ```
    [sharedocs]
            path = /usr/share/doc/packages
    ```
  - *Using Samba*, Jay Ts, Robert Eckstein, David Collier-Brown (2nd ed)
  - SWAT - includes *Using Samba* on line
  - *SAMBA Essentials for Windows Administrators*, Gary Wilson
  - Redbooks
    - *Linux for zSeries and S/390: Distributions*

      `http://www.redbooks.ibm.com/abstracts/sg246264.html`
    - *Understanding LDAP* , SG24-4986

      `http://www.redbooks.ibm.com/abstracts/sg244986.html`

Documentation and resources (cont'd)

- Web sites
  - Linuxvm.org - the Linux on zSeries portal:
    `http://linuxvm.org`
  - DeveloperWorks - IBM Boeblingen
    `http://www10.software.ibm.com/developerworks/opensource/linux390/index.shtml`
  - ISV applications for Linux on zSeries:
    `http://www.ibm.com/servers/eserver/zseries/solutions/s390da/linuxproduct.html`
  - z/VM and Linux:
    `http://www.vm.ibm.com/linux`
  - linux-390 archives:
    `http://www.marist.edu/htbin/wlvindex?linux-390`
  - z/VM publications:
    `http://www.vm.ibm.com/pubs/`
- Mailing lists
  - linux-390 mailing list (subscribe at bottom of page)
    `http://www.marist.edu/htbin/wlvindex?linux-390`
  - Samba mailing list (this host or other mirror)
    `http://us2.samba.org/samba/archives.html`

Questions??

- Are there any questions?

???

Birds of a Feather Advertisement

- **Linux Appliance BoF: Weds. at 6:00PM in room 207A** (session 0103)
- "The Linux on zSeries Appliance Cookbook: Featuring z/VM" will be discussed:
  - It is a draft redbook and associated tar file with EXECs and scripts
  - A goal is to approach the concept of "Linux appliances" on zSeries under z/VM
  - You can go "from LPAR to Linux cloning in two days" doing the following tasks:
    - Install and configure z/VM 5.1 from DVD
    - Install and configure a "golden image" Linux to be cloned from
    - Install and configure a "controller" Linux to clone, back up appliances, more
    - Create appliances such as Web server, LDAP server, File/print server, SNA server, 374x
    - Address z/VM and Linux backup, restore, service and monitoring requirements
- It is designed for people with mainframe/IT skills but not necessarily VM and Linux skills