

# Deploying W2K with Samba PDC - HOWTO

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# 1. Introduction

## 1.1 About this document

I wrote this document in order to fulfill a subject at school. While doing this I thought to write this in a general matter so more people could read the document. While using Samba as main servers in mostly Windows networks I always found it hard to find information about doing certain things in Windows. I'm no MCSE-er and do not ambition to be one ever. I really do not like the Windows OS but found I cannot get around it. It's clear that the information in this document is very accessible for a MCSE-er but for others I found it hard to get all information together and more important FREE. So this document came together after many implementations of Samba servers and looking up Usenet archives and other resourceful websites. Hopefully others will find it useful. I'm always open to suggestions or criticism and can be contacted at: [arnaud@sphaero.org](mailto:arnaud@sphaero.org)

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## 1.4 Assumptions

During this document I assume the following:

- You know the basics of samba and setting it up
- You are familiar with the terms HAL, PDC/Primary Domain Controller,
- You know how to manage, install and configure Windows 2000 workstations and set them up in a domain.
- You are familiar with command line interface of W2K

## 1.5 Needed software

You'll need the following software:

- Microsoft Windows 2000 Professional, including service packs
- Sysprep v1.1
- Samba (2.2)
- A partition imaging program, (i.e. Norton Ghost)

## 2. Setting up Samba:

### 2.1 Enabling Samba PDC support

First thing would be to setup samba as a PDC for the W2K clients. I will not go into details about setting up samba for this.

Please visit these links to setup samba.

<http://de.samba.org/samba/docs/man/Samba-HOWTO-Collection.html#SAMBA-PDC>

It basically involves setting the following in your smb.conf:

```
encrypt passwords = yes
domain master = yes
logon path = \\%L\profiles\%U
logon drive = Y:
logon home = \\%L\%U
domain logons = yes
```

and creating the [profiles] and [netlogon] share. Have a look at the example smb.conf in the next chapter. It shouldn't be too hard.

Once you've got this running we'll turn to the W2K clients.

### 2.2 Example smb.conf

(copied from the Samba-HOWTO-collection.)

```
[global]
; Basic server settings
netbios name = POGO
workgroup = NARNIA

; we should act as the domain and local master browser
os level = 64
preferred master = yes
domain master = yes
local master = yes

; security settings (must user security = user)
security = user

; encrypted passwords are a requirement for a PDC
encrypt passwords = yes

; support domain logons
domain logons = yes

; where to store user profiles?
logon path = \\%L\profiles\%u
```

```
; where is a user's home directory and where should it
; be mounted at?
logon drive = H:
logon home = \\homeserver\%u

; specify a generic logon script for all users
; this is a relative **DOS** path to the [netlogon] share
logon script = logon.cmd

; necessary share for domain controller
[netlogon]
path = /usr/local/samba/lib/netlogon
read only = yes
write list = ntadmin

; share for storing user profiles
[profiles]
path = /export/smb/ntprofile
read only = no
create mask = 0600
directory mask = 0700
```

### 3. Installing complete W2K workstation

Quick Overview

- Windows NT Domains theoretical background.
- Installing the complete W2K workstation
- Create policies for your workstations and users
- Setting profiles for new users
- Make an inventory of hardware and collect all needed third party drivers.
- Prepare sysprep utility for cloning the system.
- Test clone the system and adjust issues.

#### 3.1 Windows NT Domains theoretical background

First of all, the basic theory I explain here is based on the document available from the Microsoft website:

[http://www.microsoft.com/ntserver/techresources/management/prof\\_policies.asp](http://www.microsoft.com/ntserver/techresources/management/prof_policies.asp)

For a more complete theory about Windows NT domains please read this. It's very informative and helpful to understand the use of the PDC.

OK, let's get to the point. I assume you have a running samba server with a profiles share and a netlogon share and it's all running happily.

Basically what a Windows workstation in a Windows NT PDC controlled domain will try when a user logs on is to download the NTconfig.POL file. This is a file describing what certain users or group of users is able to do on a specific workstation or a group of workstations. The NTconfig.POL file is basically a mask for setting certain registry settings. So you just have to create this file on any workstation and define your settings and save the file as NTconfig.POL and copy it to the netlogon share (You cannot save to the netlogon share because if you have read the documentation the netlogon share will be unwritable for clients!) Creation of the NTconfig.POL file will be explained in chapter 3.3.

A same construction is true for the users profiles. When a user logs on to the domain for the first time, the W2K client will look for the 'Default User' folder in the netlogon share. It will download this and will use it to create the users profile. Creation of the Default User will be explained in chapter 3.4.

This is basically what you will need to know. It's very basic, I know. If you need more detailed information please read the document I was referring to at the beginning of this chapter.

#### 3.2 Installing the complete W2K workstation

I'm not going to explain how to install W2K. I assume you know this. There are some things you need to think of when installing W2K:

Partitions:

Because you will be installing W2K workstations which are similar (cloning) you will need to decide how big your partition(s) will be. Please do not mess around with utilities like PartitionMagic unless you know what you are doing. These utilities do not always show the partition numbers correctly. The only trustworthy application I know of which does this right is good old Linux fdisk. W2K will not boot if the partition numbers change, even if you change the boot.ini file. So your best bet is to remove all partitions from the harddrive and create a partition for your W2K image. You also might want to consider any other partitions you would think be useful to your system. Remember that the partition tables have to be very similar if not the same, in order to clone easily.

#### Permissions:

Unfortunately we cannot use NTgroups with samba(2.2). You can add your domain users to 3 different groups:

Guests: only have temporary profiles, profiles will be deleted after log off. No permissions to make modifications to the workstation.

Users: have their own profile and limited modification permissions.

Administrators: Can do everything on the workstation and the domain. (Note that a Domain Administrator is not the same as the Administrator on the workstation).

Please read the smb.conf man page for the settings to do this.

Because of this you need to take care when installing the applications in order to give the user the rights to the application you want them to have. For example: Adobe Premiere installation will not give Users the right to use Premiere correctly. You need to set these permissions by hand. In order to find these workarounds you need to test your image thoroughly. You'll find that I will be stating that more often.

#### All Users Profile:

When installing software on your workstation some installations will place shortcuts installed in the All Users profile others will in the users profile. The All Users profile is machine dependent and the user profile user dependent. It's probably easiest to install shortcuts in the All users profile. This way you could also manage a different machine which for example has a CD-burner installed or a photo-scanner.

#### Implement scripts:

The best way to manage the workstations is through batch-scripts. In W2K you can have 4 different types:

Startup-scripts: These will be run at system startup and will run with 'System' permissions.

Logon-scripts: These will be run when a user logs on to the workstation and will run with the user's permissions.

Logoff-scripts: These will be run when the user logs off from the workstation and will run with the user's permissions.

Shutdown-scripts: These will be run when the system shuts down and will be run with 'System' permissions.

Through these scripts you could manage a workstation, by editing registry settings etc. You might even have left a permission error in your clone master image. Instead of recreating the image you could run a script at startup to fix this.

For example; I run a startup-script which will update the virus scanner. I use a startup script for this because users do not have permissions to mess around with the virus scanner files. 'System' does have these permissions.

To set these scripts you have to start the Group Policy Editor. (Start - run - gpedit.msc) This management Console will let you set the \*-scripts. Beside setting the \*-scripts this console will let you set a lot more. Have a look around because this Management console will replace the Policy Editor once Samba 3.0 is out.

Note: There is also the possibility to set the logon-script for a profile in the user-editor.

### 3.3 Policies for your workstations and users

The creation of the NTconfig.POL file is done with help of the policy editor. (poledit.exe). This program is not supplied with W2K professional but we're smart people and by extracting any W2K service pack we'll find the poledit program and can install it happily. The poledit program is supplied with the server editions from Microsoft but we probably do not have this since we are using Samba as a PDC.

*Extracting the service pack without installing it is accomplished through running the service pack executable with /x switch. It will then extract all files from the archive. You can also slipstream your W2K CD this way so the service pack will be integrated into the installation CD. Do a Google search for detailed information.*

When you start poledit (start - run - poledit), first go to the options menu where you can select 'Policy template'. This is where you can select templates to use to create your specific policy. (In W2K you'll find that some templates cannot be used because they are meant for the newer Active Directory system which replaces the old Windows NT policy system). Once you have selected the templates you need to select 'New Policy' from the 'File' menu. This will create 'Default User' and 'Default Computer'. By double clicking on one of those you can edit settings for them. And you'll probably feel this coming; The settings you set here will be applied to all users or computers who do not have any special setting, the default settings, sort of.

So now we'd like to give a certain computer special settings. Select Add computer from the edit menu and enter the name of the computer you'd like to set certain settings for. You can then set settings for this computer just as the 'Default Computer'. When this computers logs on to our domain it will use the settings you set in that newly created policy. The same goes



for users. Unfortunately we cannot use groups since samba (<=2.2) does not support NT user groups samba TNG (>3.0) will support this but as for the moment this is still beta.

You are now familiar with setting policies for users and computers. You can change the policies during time by just using the policy editor again change or add policies. Make sure you backup your old policies because when things do go wrong probably your whole domain will suffer.

Note: Some software houses supply templates (.ADM) for their software to use in the policy editor (though I never used these). It is possible to create .ADM templates yourself, do a Google search.

### **3.4 Setting profiles for new users**

When a new user logs on to our domain for the first time it will need a profile and we want to set a specific default profile. You can do this by adding a new user to a W2K workstation. Log in as this user on this workstation. Then configure the profile to you're needs. You can than log on as administrator and copy the profile and set its name to 'Default User'. Make sure you give 'everyone' rights to this profile. Copy this profile (found in Documents and Settings) to the netlogon share. New users will than automatically get this profile from the netlogon share if they do not already have a profile. (Make sure you give everybody read access to this Default User on the netlogon share, again NO write access!!!).

### **3.5 Make an inventory of hardware and collect third party drivers**

Because not all drivers for hardware are included with the W2K install, we'll need to make an inventory of the hardware and collect the drivers which W2K does not offer. Getting drivers is probably not the most difficult issue, but most drivers are offered as a self-extracting executable which starts the installation of the drivers. You'll need to get the driver files without using the installation program. Most self extracting archives can also be unpacked with utilities like WinZip or WinRAR. Some won't and your best bet is to find where the program temporary extracts the files to. Usually the Temp folder in your profile. Once you have the drivers collect them and keep them in a safe place. Keep every driver in a separate folder. For example [d:\drivers\video\nvidia](#) [d:\drivers\video\matrox](#). We'll need them later when we prepare for cloning.

### **3.6 Prepare Sysprep for cloning your W2K workstation**

Before proceeding remember to test your image before deploying it to the complete domain. I cannot address this too often!

Now we should have a running samba PDC and workstation setup with our NTconfig.POL and Default User in the netlogon share. The workstation we used to create the W2K installation now has to be cloned and this is not easy unfortunately. Trying to install every machine individually is not attractive and will easily allow for differences in the workstation. This can be a pain when we want users to log on to any machine and use the same settings on all machines. Basically Microsoft does not want you to use a W2K installation on a different

machine. However, they have provided a tool which will give some hope, called 'sysprep' (as for the moment it's at version 1.1). This utility will prepare your system to be transferred onto another machine. It will modify your system and shutdown afterward. On next reboot it will start a mini installation of W2K. The condition for this utility to function is that the hardware is similar in all workstations (for example you cannot switch between HALs). This is not always true as I found myself. Anyway it's the best we can get. First, download the Sysprep tool:

[http://download.microsoft.com/download/win2000platform/Update/5.0.2195.2104/NT5/EN-US/Q257813\\_W2K\\_spl\\_X86\\_EN.exe](http://download.microsoft.com/download/win2000platform/Update/5.0.2195.2104/NT5/EN-US/Q257813_W2K_spl_X86_EN.exe)

It will include documentation you'll need to read. I will not go into depths about the sysprep tool. I will explain how to create a sysprep.inf with some values for the W2K mini-setup. Again remember to test your image because it can fail on many occasions.

At first, create a sysprep folder in your W2K system drive (probably C:). Copy sysprep.exe and setupcl.exe into that folder. Create a text file called sysprep.inf. This file will be the file containing all the settings and values to answer the mini-setup wizard with. This way you won't have to answer all setup questions and will enable automated deployment.

Edit the sysprep.inf file with your favourite text editor. (I'd recommend notepad). Enter the following values:

```
;This is a sysprep.inf that will load some IDE mass storage device drivers
;that ship with W2K
;
[Unattended]
    OemSkipEula = Yes
;Skip license nonsense ;)
    OemSkipWelcome = Yes
;Skip Welcome nonsense

[GuiUnattended]
    timezone=020
;Set time zone, 020 is Amsterdam (CEST if I am correct)
    adminpassword=*
;set administrator password, * means no password

[UserData]
    fullname="Lazy Bone"
    Orgname="Lazy Bones Inc."
    computername=""
; Please read comments about computernames in next section
; * means a random generated name
    productid=xxxxx-xxxxx-xxxxx-xxxxx-xxxxx
; This was always hard to remember

[Networking]
    InstallDefaultComponents = Yes

[SysprepMassStorage]
    PCI\CC_0101=%systemroot%\inf\mshdc.inf
    PCI\VEN_10B9&DEV_5215=%systemroot%\inf\mshdc.inf
    PCI\VEN_10B9&DEV_5219=%systemroot%\inf\mshdc.inf
```

```

PCI\VEN_10B9&DEV_5229=%systemroot%\inf\mshdc.inf
PCI\VEN_1097&DEV_0038=%systemroot%\inf\mshdc.inf
PCI\VEN_1095&DEV_0640=%systemroot%\inf\mshdc.inf
PCI\VEN_1095&DEV_0646=%systemroot%\inf\mshdc.inf
PCI\VEN_0E11&DEV_AE33=%systemroot%\inf\mshdc.inf
PCI\VEN_8086&DEV_1222=%systemroot%\inf\mshdc.inf
PCI\VEN_8086&DEV_1230=%systemroot%\inf\mshdc.inf
PCI\VEN_8086&DEV_7010=%systemroot%\inf\mshdc.inf
PCI\VEN_8086&DEV_7111=%systemroot%\inf\mshdc.inf
PCI\VEN_8086&DEV_2411=%systemroot%\inf\mshdc.inf
PCI\VEN_8086&DEV_2421=%systemroot%\inf\mshdc.inf
PCI\VEN_8086&DEV_7199=%systemroot%\inf\mshdc.inf
PCI\VEN_1042&DEV_1000=%systemroot%\inf\mshdc.inf
PCI\VEN_1039&DEV_0601=%systemroot%\inf\mshdc.inf
PCI\VEN_1039&DEV_5513=%systemroot%\inf\mshdc.inf
PCI\VEN_10AD&DEV_0001=%systemroot%\inf\mshdc.inf
PCI\VEN_10AD&DEV_0150=%systemroot%\inf\mshdc.inf
PCI\VEN_105A&DEV_4D33=%systemroot%\inf\mshdc.inf
PCI\VEN_1106&DEV_0571=%systemroot%\inf\mshdc.inf

```

So this file is a basic answer file for the mini-setup that sysprep will invoke. There are a lot more values which can be used in this file. Read the unattended.doc which comes with the sysprep tool.

In some ways sysprep is very limited in control. For example it will not let you set specific computer names automatically, the same goes for ipaddresses, unless you use DHCP. Usually you are not asked for TCP/IP setup in the mini-setup wizard. A workaround is to give illegal values. So to ask the user for a computer name you would add to your sysprep.inf file:

```

[Userdata]
    computername="&&"

```

"&&" Is an illegal name. When the mini-setup comes to the point of setting this value it will give an error and will ask you to correct the name.

The next thing is device drivers. The mini-setup will only use drivers shipped with the original W2K CD. Sysprep has a solution to this.

```

[Unattended]
    OemPnPDriversPath = "drivers\audio;drivers\video"

```

This option will tell the mini-setup to look for device drivers in [C:\drivers\audio](#) and [C:\drivers\video](#). This way you can collect all your drivers for the hardware and they will be installed automatically. As mentioned earlier we have collected our drivers and we only need to add the paths to this section. Remember to enter every individual folders full path name excluding the %Systemdrive (C:)

Note: This is quite the same as modifying registry setting:  
 hklm\software\microsoft\currentversion\devicepath

Please note: I found that running Sysprep without the /pnp switch will not collect the drivers from any given path. The /pnp switch will force the mini-setup to rescan for hardware and will take a few more minutes during the install. You might also want to add

[unattended]

```
DriverSigningPolicy = Ignore
```

This will ignore the unsigned drivers warning for your third party drivers. It's been said it might prevent drivers not being installed during mini-setup.

I've used:

```
OemPreInstall = Yes
```

very often. I'm not sure what it does exactly but it seems to help in some cases. The Unattended.doc says something about copying subfolders. Perhaps someone could shed some light here.

Another way to create a sysprep.inf is to extract the files from the deploy.cab file located on the original W2K CD. You'll find setupmgr.exe which is basically a wizard to create a sysprep.inf. However, it will only give you a basic sysprep.inf and you'll probably need to add items to the sysprep.inf file by hand. Do not use the sysprep which you'll be able to find in deploy.cab. This sysprep version is 1.0.

### 3.7 Test clone the system and adjust issues

Now we have prepared sysprep and wrote the sysprep.inf according to our needs. Next step is to actually run the sysprep command from command line. There are several command line switches. Running 'sysprep /?' will give you a list. Basically you'll only need the /pnp switch which invokes the hardware detection at next boot. So check everything is in place and run 'sysprep /pnp'. The system will shutdown and you are now able to use your imaging program to copy the partition. (i.e. Norton Ghost, or even 'dd')

After creation of the master image, copy it to a different machine and see if it boots. Try some other computers as well especially with very different hardware. You should be successful when you stay within the same HAL. If it fails you're in for some long nights... Depending on the error, different solutions might be offered. You could try to see if your mainboard has a bios update. This resolves some issues sometimes. If you get a BSOD saying inaccessible boot device the problem usually lies with the harddisk controller. If your system hangs at invocation of MUP.SYS I'm not sure what the problem is but I suggest you're using the wrong HAL.dll. If the boot stops and complains about the missing ntoskernel you probably got your partition numbers not in the same order as the master image. Other problems? Google is your friend, Google Groups even better.

If you have very hardware-dissimilar computers you might want to create multiple images with different HALs. Cloning your system with different HALs will generally fail. There are some options which are documented but they are very limited. Most PC's require an ACPI HAL or a Non-ACPI HAL. Problems may also arise with harddisk controllers. So once more, test your image before deploying it. If it all went well you'll be able to have all your workstation installed in no-time.

If the system boots, check whether everything is OK and try some more different computers. If it went well you can roll out onto all your computers and take a beer. You'll

probably need some fine tuning but the most difficult part is over.

Well, hopefully for you the sysprep thing works.

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For now I will not paste the tekst of the license here. The license is available at:  
<http://www.gnu.org/licenses/fdl.txt>.

## 5. Tips/FAQ

### 5.1 Working out the HAL thing

W2K uses a Hardware Abstraction Layer in order to maintain functionality while having different hardware. There are a few different HAL types:

**Standard PC:** Old computers first Pentium models for example.

**MPS Uniprocessor PC:** Old dual processor capable system but equipped with only one processor

**MPS Multiprocessor PC:** Old dual processor system (W2K/XP workstation only supports 2 CPU's)

**Advanced Configuration and Power Interface (ACPI)PC:** first generation ACPI capable systems: PII/III systems for example.

**ACPI Uniprocessor PC:** modern systems ACPI capable but only 1 CPU i.e. P4 single machines even if they are dual capable

**ACPI Multiprocessor PC:** modern systems ACPI capable with two CPU's

There are also some vendor specific HALs but I'm not going into details about those. I assume if you own such a machine you know what you are doing. These HAL types can be looked up by changing the computer type in the device manager.

According to Microsoft you cannot switch between HALs except for switching between the Uniprocessor and Multiprocessor HALs. However I found for example while installing W2K on a P4 machine it was using the ACPI Uniprocessor PC HAL. When I cloned the system to a PIII machine it wouldn't boot and rebooted after invoking MUP.sys. When I installed W2K to another PIII machine I found that it was using the Advanced Configuration and Power Interface (ACPI)PC HAL. Both were modern machines and both ACPI capable. I then went back to P4 machine and changed the computer type in device manager from ACPI Uniprocessor PC to Advanced Configuration and Power Interface (ACPI)PC. The machine would boot normally and the only difference I found is that it was using less different IRQ's. So creating an image on this PIII machine (and thus using Advanced Configuration and Power Interface (ACPI)PC HAL) I can clone this to the P4 machine. The other way around won't work. This will even count for the really old machines although I haven't tested this. You should be able to install W2K on an old machine (and thus using Standard PC HAL) and clone this installation to all modern machines and it should work. After you cloned the system you can change the HAL again and get modern functionality. (I don't know why but I've heard this is not a wise thing to do). Anyway forcing to use the Advanced Configuration and Power Interface (ACPI)PC on all your (modern) systems should give you enough functionality. Again the only difference I found is that the ACPI Uniprocessor PC has more advanced IRQ-routing (exceeding the irq 15 for example)

### 5.2 Replacing the image kills trust relationship with the PDC

This is known and more likely to be a feature than a bug. You cannot get around this while using the same computer names. If you have automatically user addition configured in your

samba PDC you just have to remove the computer account from the PDC and than rejoin to the domain. (Make sure you do not have any open samba connections on the client you are trying to rejoin or else it will fail).

### 5.3 No mouse and keyboard when mini-setup starts

After replacing your sysprepped image on a different computer than the original computer no keyboard or mouse is available when the mini-setup displays the welcome message. This way you are not able to click the 'next' button.

Add the following to the sysprep.inf:

```
[GuiUnattended]
    OemSkipWelcome=1
```

This makes sense because you're using a hardware dissimilar computer. So first your hardware needs to be scanned before it can be used. After the welcome message the mini-setup starts scanning hardware and will find your keyboard and mouse. Though this is somewhat bad design... I reckon.