

Controlling and Accounting for Printing on a Windows Network

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Introduction

The purpose of this white paper is to discuss the basics of controlling the use of printers on a Windows network, and to discuss how to account for the printing that occurs on a Windows network.

Windows Networks

There are two kinds of Windows networks, Workgroup (peer-to-peer), and Domain (server-client).

In Workgroups, all the connected PCs have the same status. No one computer is in charge of certain basic functions, specifically user logon authentication, computer name authentication, and share permissions.

By contrast, Domains have at least one specific computer, the Primary Domain Computer (PDC), that accomplishes these (and other important) tasks. Specifically, the PDC maintains a file system called Active Directory which is charged with these (and other) tasks.

Think of the PDC as a "boss" or "traffic cop".

Problems with Workgroups

While it is certainly possible (even easy) to print between peers in a Workgroup, there are certain problems that crop up with both printer control and print accounting.

Specifically, there are five problems.

First, user authentication is only to the local PC. If you print as Joe from one PC to another PC where there is no user named Joe, the print queue in the destination PC will say "Guest". If you want to attribute Joe's printing to Joe, you have to make sure that Joe is a user (of the same status) in both PCs.

Secondly, there is no common file for comparing an IP address to a computer (or netbios) name, and as a result, at least in some cases, the machine ID of a print job coming from a remote computer may be the IP address instead of the computer name. If you want to consolidate all printing from a computer named, for example, Client 1, any printing usage data associated with Client 1's IP address would be missed, absent a separately generated lookup table.

Thirdly, XP Home and XP Pro peers have the annoying habit of adding printshares automatically. The printshare takes the form "Auto printshare on HostID". When you print to such a print share, the print queue for the destination printer shows obvious defects such as: 1) the name of the document becomes "remote downlevel document", and 2) the number of pages becomes zero.

One easy way to get rid of these defects is to delete the autoprntshare, and use the Add Printer Wizard to add the printshare. When you use the Add Printer Wizard, the print share is shown in the PC's Printer Folder in the universal naming convention (UNC) format (\\HostID\printshare). Printing to these printshares produces the correct document name and number of pages.

Fourthly, it is very difficult if not impossible to control printers remotely in a Workgroup environment, especially if the PCs involved have mixed operating systems. At the same time, for Windows XP, there is no obvious way to set permissions for the control of a local printer or the documents in its queue. To reveal permissions in XP Pro, you have to click Start, left click My Computer, choose Tools \ Folder Options \ View, and uncheck "Use simple file sharing".

This option is not available in XP Home. While you are in this window in XP Pro, go to the top of the View options and you uncheck "Automatically search for network folders and printers". This is an additional way to get rid of the autoprntshare "feature".

Fifthly, workgroup computers are limited in the number of simultaneous connections they support (about 10). A server application with active clients, like Print-Track, would be subject to this limitation.

It seems clear that if you want to control printers and account for printing usage in a Windows network environment and avoid these considerable problems, using a Workgroup network is not the best way to go, and further, XP Home has serious limitations.

Superiority of a Domain Network

In a Domain network, all of the above problems go away. You cannot use a PC in a Domain unless the PDC authenticates you. When a print job from a remote PC comes into a printer's queue, the user name is always the logon name, never "Guest", and the document name is always the correct name, not "remote downlevel document". Printers are always added, either through the Add Printer Wizard or from the Active Directory, in the UNC format. (Hint: always add printshares through the Active Directory; local printers have to be checked off as in Active Directory for them to show up as a printshare selection. See below.) Permissions set for printshares in the Active Directory apply to all PCs in the Domain. An Admin can still set printer permissions at the client (subject to the XP Pro comment above), but there seems little need to do so.

Setting up a Domain Network

If you have never set up a Domain before, the process may seem intimidating. While this white paper cannot talk about all the problems you might encounter in setting up a Domain, we herewith offer you some "tips" that may very well help you avoid wasting a lot of time.

A PDC computer can only be set up on a Windows server operating system. In the discussion that follows, we are talking only about using Windows 2003 Server. Be sure to go the excellent website <http://www.visualwin.com/> for detailed step-by-step instructions for many common setup tasks.

After you install Windows 2003 server, you need to install the PDC, the DNS server, and a print server. We suggest that you install all of these on the Windows 2003 server.

Adding a Domain Administrator

You should create a Domain Administrator User right away. You can do this by going to Start \ Administrative Tools \ Active Directory Users and Computers. Right click on Users and select New and User. Fill in at least the first name of you new user and the logon name.

Now enter (and confirm) a password. We suggest that you uncheck the default "change of password selection" and instead check off "user cannot change password".

It's possible at this point that your new user will be kicked back, because the "password lacks complexity". We will deal with this issue shortly, but assume for now that that is not the case.

You should now find yourself back at the Active Directory starting point. Now click Users to expand them. You will see that your new user has been added. To make this new user a Domain Administrator, simply drag the new user to the folder "Domain Admins". Remember this new user and password, because you will need it.

Changing Password Policy

Suppose now that your new user was kicked back for a lack of password complexity. You can solve this by going to Start \ Administrative Tools \ Domain Security Policy. Choose Account Policy \ Password Policy, and follow the dialogs from there.

Adding Clients to the Domain

To bring PCs into the network (assuming they do not have network card or network setting problems), follow these three steps:

First Step:

Make sure that you know the local IP of the PDC. It should be fixed (not dynamic, or DHCP). The standard way to check this is to go to Control Panel \ Network Connections \ Local Area Connection for the PDC. Choose Properties, then choose Internet Protocol (TCP\IP) without accidentally unchecking it (very annoying if you make this mistake). Click properties, and make sure that the PDC is set up with a fixed local IP address. We offer the following sample settings:

IP address: 192.168.1.xx (e.g., xx = 70)
Subnet mask: 255.255.255.0
Default gateway: 192.168.1.1 (this is an example; ask your IT professional what it should be)

It is also important to set the DNS servers:

Preferred: 127.0.0.1
Secondary: 192.168.1.1 (same as default gateway)

Second Step:

Now go to a typical client (say an XP Pro PC). You will need to go into its Internet Protocol settings, using the same procedure detailed above. Your settings should look like this (following the example above):

IP Address: 192.168.1.xx (e.g., xx = 71)
Subnet mask: 255.255.255.0
Default gateway: 192.168.1.1 (again, this is an example)

Preferred DNS: 192.168.1.70 (the PDC local IP address)
Secondary DNS: 192.168.1.1

The important points here is that the clients should have fixed local IP addresses, and that they look to the PDC (192.168.1.70, which is the Domain DNS server in our example) and the router-gateway (192.168.1.1) for regular (external) DNS IP resolution.

If you don't put the PDC (windows Domain DNS server) IP address in one of the DNS slots above, the client will not find the PDC when it attempts to hook up to the Domain.

Third Step:

Hook the client up to the Domain by right clicking on My Computer and selecting Properties. Now select Network Identification. It should be obvious at this point how to join the Domain. When you try to do so, you will be prompted to enter a Domain User logon and password, but you already set this account up earlier.

It's that simple and that hard.

Additional suggestions: don't install zonealarm on each PC, but have a decent firewall on your LAN. And turn off Windows Messenger if your not using it.

Setting Printer Permissions

As mentioned above, you should put your printshares in the Active Directory. To do so, log on (where the printer is local) either to the PC or to the Domain as an Administrator or Domain Administrator. Go to the Printers Folder and right click the local printer you are interested in. Choose Properties and select Sharing. Click "Shared As" if this is not already the case, and enter a printshare name. Now check off "List in the Directory". Don't use the same printshare name on two different PCs in the Domain.

Now go back to the PDC and go to Active Directory Users and Computers. Select the computer that the printer is local to. The printshares for that computer are then displayed on the right.

Right click the printshare you are interested in and select Properties. Select the Security Tab and select Authenticated Users. Notice that these users (regular non-administrative users) have read-only privilege. It is not necessary to change anything here: we are only pointing out that you have central control over printshare privileges.

Testing Printer Control on the Domain

It would now be a good idea to add a few regular (authenticated) and Domain Administrator users. This way you can try logging onto clients on the Domain and testing what control if any you have over adding and deleting printers, printer control, and print job control.

What you will find out is that on the Domain, Administrators (Regular and Domain) have full control over all three of the above mentioned functions, whether logged on to the computer only, or to the Domain.

On the other hand, if you log onto the Domain as a regular user, you will find that you have essentially no individual control over your printing. You can print to local printers and network printshares, but you cannot add or delete a local printer, you cannot unpause a paused printer, local or remote, and you cannot resume printing a paused job that you sent to a printer. This situation is ideal for print control by a program running under an Administrator logon somewhere else on the Domain. Print-Track is such a program.

Application Specific Printer Accounting Issues

When trying to account for print job characteristics on a Windows Domain network, there are two critical pieces of information that cannot be obtained by normal Windows calls, specifically the number of copies of a Word job, and whether Duplex, if available, was specified in a Word job. Additionally Excel has the annoying characteristic that it outputs multiple copies of an xls file one at a time. This means that 50 copies of a simple xls file will create 50 separate spool (printer ready) files.

All three of these problems are addressed successfully with **Print-Track**[®]. A list of supported printers is available on www.tekvend.com, under Products \ Print-Track.

Print Pooling Issue

Print pooling is the Windows function whereby identical printers can be "pooled" or shared for the purpose of printing print jobs. If a print job is sent to a busy printer, an available printer pooled to it receives the job instead. In certain Windows NT operating systems, specifically Windows XP Pro and Windows 2003 Server, the print pooling function is turned on by default.

For these operating systems, a result of print pooling is that print jobs cannot automatically be correlated to their spool file number. Print-Track automatically takes care of this problem by disabling print pooling via its "Print Utility".

In the Pro version of Print-Track, print pooling returns by way of the Printer Redirect and Printer Load Balancing features.

Mac OSX Clients

Very recently, OSX Panther has added an Active Directory utility. This utility allows the binding of OSX Panther clients to a Windows Active Directory. Once bound, these clients can use the file and spool shares in that Active Directory.

We have found that using the program ADmitMac to bind Panther and Tiger clients greatly eliminates a lot of frustration in the binding process. ADmitMac has its own printing system, which works well.

When a Panther client prints to an Active Directory printer, it uses the CUPS printing system. The spool file for these print jobs is created on the Mac computer, and does not report accurately in Print-Track.

Print-Track supports Mac OSX (and Linux) clients through its utility called MacDirect™. See our white paper "Accounting for Print Jobs Sent from Mac and Linux Clients" for details on how this utility works within Print-Track.