

# Integrating PHD Virtual Data Smart Dynamic Export with Symantec Netbackup

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## I. Executive Summary

Virtual systems are becoming more popular every day due to their cost-effectiveness, agility, and ease of use as well as their ability to optimize storage and resource sharing and to enable cloud-computing. The rapid emergence of virtual IT infrastructures is recognized by leading industry analysts as one of the most important trends in the IT industry.

While this trend is positive, it introduces new challenges for data protection and business continuity. Legacy backup solutions were designed to backup static environments focusing primarily on protecting data rather than operating systems. In the virtual infrastructure paradigm, it is imperative to continuously backup the virtual machine (operating system and data), with the ability to restore this unified operating environment, reliably.

PHD Virtual Technologies pioneered a virtual backup and recovery appliance (VBA) and engineered its award-winning product, esXpress, to effectively and efficiently protect virtual machines utilizing native VMware® technology while delivering unprecedented reliability and performance.

This paper focuses on the integration of esXpress, the best in class “virtual to disk” backup software, with Netbackup, one of the most popular legacy backup systems, to create a best-of-breed solution for Data Center Disaster Recovery while protecting existing investments in legacy backup software.

## II. Introduction

Today's system administrators must protect the systems they are responsible for with the best solutions available. Patent pending esXpress' Date Smart Dynamic Exports provide a seamless path for storing uncompressed native VM images to tape while integrating with traditional solutions such as Symantec Netbackup. In a Disaster Recovery (DR) scenario, backed up images can be restored from tape without running the esXpress software, making the restoration process fast and easy.

The Date Smart Dynamic Exports (DSDE) provide a very flexible way to backup VM images to tape and other types of DR contemporary media. DSDE presents the available images in a structure that satisfies the majority of backup scenarios for DR purposes, allowing system administrators to access VM backups by Day of Week, Name, Week number, Current Month, Last Month, and more. Figure 1 shows an example of the directory structure used.

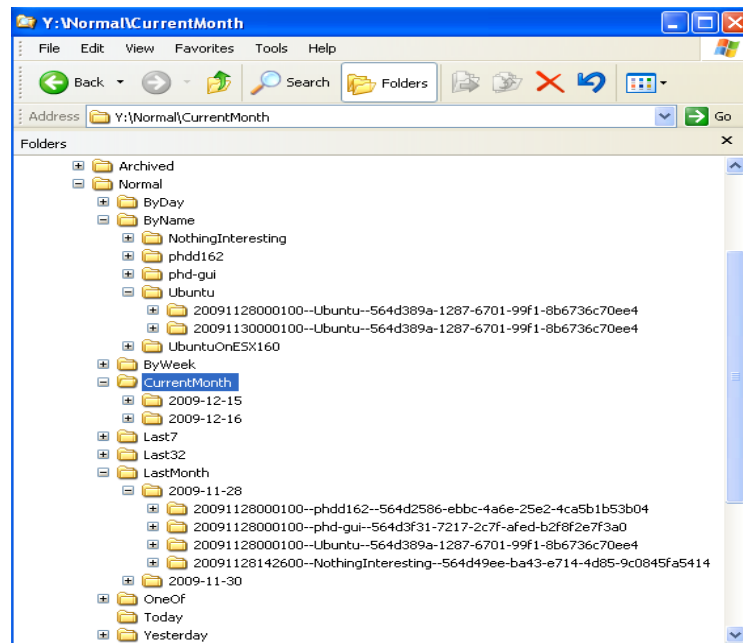


Figure 1

This directory structure is truly virtual and dynamic; while the same VM images may be visible and accessible through different paths, no data duplication exists. VM images are re-hydrated on-the-fly as they are accessed. For instance, a directory containing a backup for Ubuntu that was created on 11-28-2009 may be accessed via \Normal\ByName\Ubuntu and through \Normal\LastMonth\2009-11-28\, to name two options.

This DSDE virtual directory is provided by the esXpress DeDupe Appliance. The appliance intercepts read requests for the files in the virtual directory structure and builds the files dynamically from the blocks stored in the appliance's data repository.

The DeDupe Appliance stores the data in a remarkably compressed format without any data duplication across all ESX servers belonging to its sphere of control. esXpress delivers a powerful, best in class, "Virtual to Disk Backup" solution which, when integrated with Netbackup, creates a best-of-breed solution for Data Center DR. Another important advantage of this solution is that the Netbackup VM to Tape activities may be done during normal business hours because they will not affect production VMs; instead, the backup data is delivered by the DeDupe Appliance from its backup storage location.

### III. Integration Scenarios

There are two options for integrating DSDE with Netbackup. The first option, illustrated in Figure 2, uses a Netbackup client/agent installed within the DeDupe Appliance. This client communicates directly with the Netbackup Server running backup jobs initiated from the server side.

Installation and configuration for the embedded client option is described in [Integration Scenario 1](#) on page 4, followed by a description of how to configure the backup policy and start a backup using the Manual Backup feature on the server side, in [Configuring Netbackup Server Policy](#) on page 7.

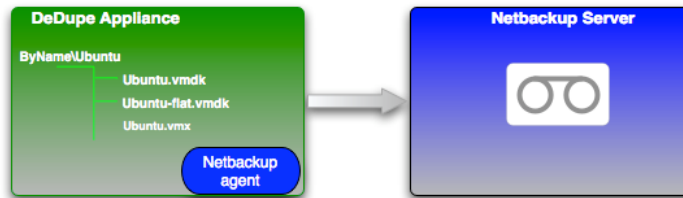


Figure 2

The second scenario involves a Netbackup client/agent running on a Windows box using a mapped drive to access the DSDE on the DeDupe Appliance (Figure 3). The configuration and backup initiation for this client is described in [Integration Scenario 2](#) on page 13.

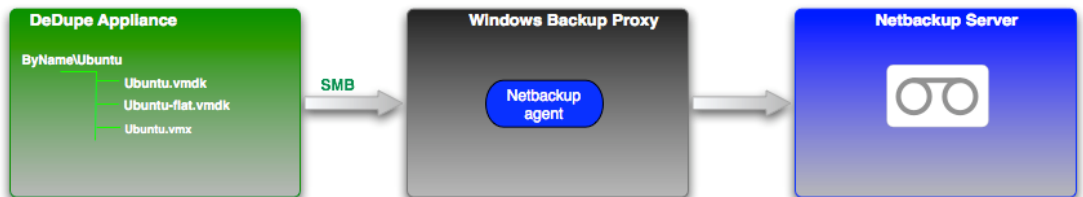


Figure 3

This method requires enablement of DSDE in the DeDupe Appliance which is discussed in [Enabling DSDE for SMB Access](#) on page 13.

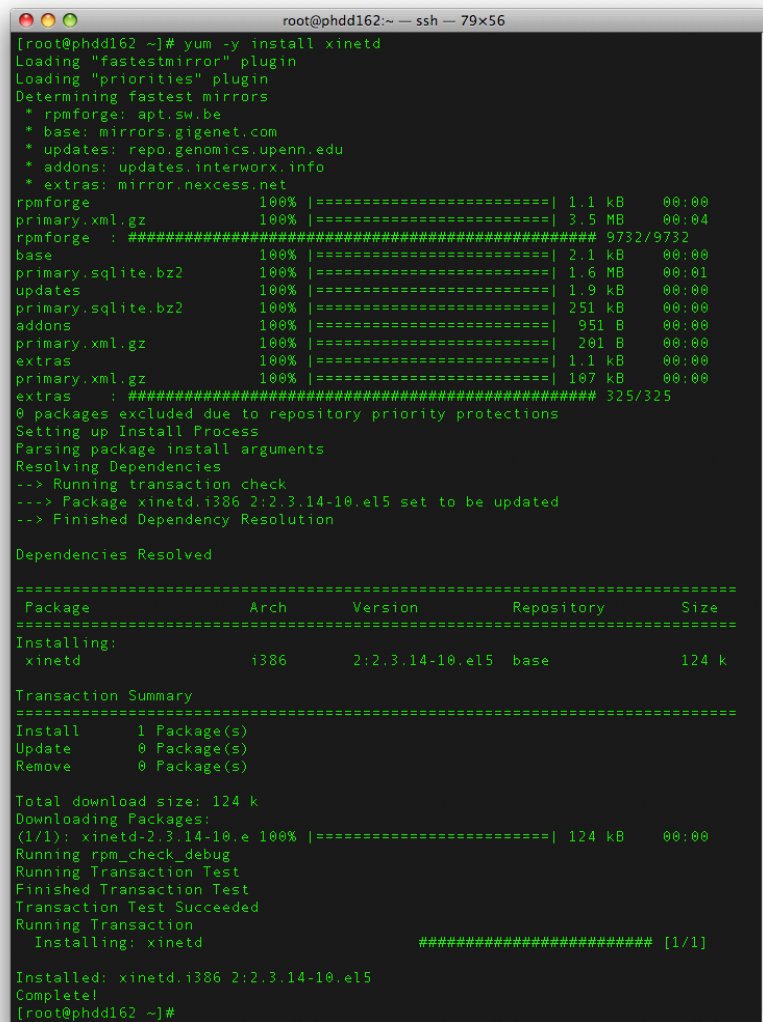
PHD Virtual recommends the first option as it does not require an additional Windows box and only transfers data once, unlike the second approach where data will have to be read via an SMB share over the network from the Windows proxy and then pushed to the Netbackup server over the network again. Despite the additional data transfer, the second option does work and may be used if the Netbackup client for Linux is not available.

## IV. Integration Scenario 1

### Installing the Netbackup Agent

The esXpress DeDupe Appliance is based on CentOS, a functional equivalent of Red Hat Enterprise Linux. When running on the appliance, the Netbackup client installation utility automatically selects its Red Hat Enterprise Linux compatible software. A step-by-step installation process for the Netbackup client is described below:

1. Login to the esXpress DeDupe Appliance as root using the credentials you supplied when you installed esXpress.
2. Install the **xinetd** daemon by running **yum -y install xinetd** (<http://www.xinetd.org>). This is necessary as the Netbackup client relies on this daemon to receive and process incoming requests from the Netbackup server.



```
root@phdd162:~ -- ssh -- 79x56
[root@phdd162 ~]# yum -y install xinetd
Loading "fastestmirror" plugin
Loading "priorities" plugin
Determining fastest mirrors
 * rpmforge: apt.sw.be
 * base: mirrors.gigenet.com
 * updates: repo.genomics.upenn.edu
 * addons: updates.interworx.info
 * extras: mirror.nexcess.net
rpmforge 100% |=====| 1.1 kB 00:00
primary.xml.gz 100% |=====| 3.5 MB 00:04
rpmforge : ##### 9732/9732
base 100% |=====| 2.1 kB 00:00
primary.sqlite.bz2 100% |=====| 1.6 MB 00:01
updates 100% |=====| 1.9 kB 00:00
primary.sqlite.bz2 100% |=====| 251 kB 00:00
addons 100% |=====| 951 B 00:00
primary.xml.gz 100% |=====| 201 B 00:00
extras 100% |=====| 1.1 kB 00:00
primary.xml.gz 100% |=====| 107 kB 00:00
extras : ##### 325/325
0 packages excluded due to repository priority protections
Setting up Install Process
Parsing package install arguments
Resolving Dependencies
--> Running transaction check
--> Package xinetd.i386 2:2.3.14-10.el5 set to be updated
--> Finished Dependency Resolution

Dependencies Resolved

=====
Package Arch Version Repository Size
=====
Installing:
xinetd i386 2:2.3.14-10.el5 base 124 k

Transaction Summary
=====
Install 1 Package(s)
Update 0 Package(s)
Remove 0 Package(s)

Total download size: 124 k
Downloading Packages:
(1/1): xinetd-2.3.14-10.e 100% |=====| 124 kB 00:00
Running rpm_check_debug
Running Transaction Test
Finished Transaction Test
Transaction Test Succeeded
Running Transaction
Installing: xinetd ##### [1/1]

Installed: xinetd.i386 2:2.3.14-10.el5
Complete!
[root@phdd162 ~]#
```

Figure 4

3. Copy the Netbackup Linux client installation files to the DeDupe Appliance, /tmp directory (using an scp program like winscp).

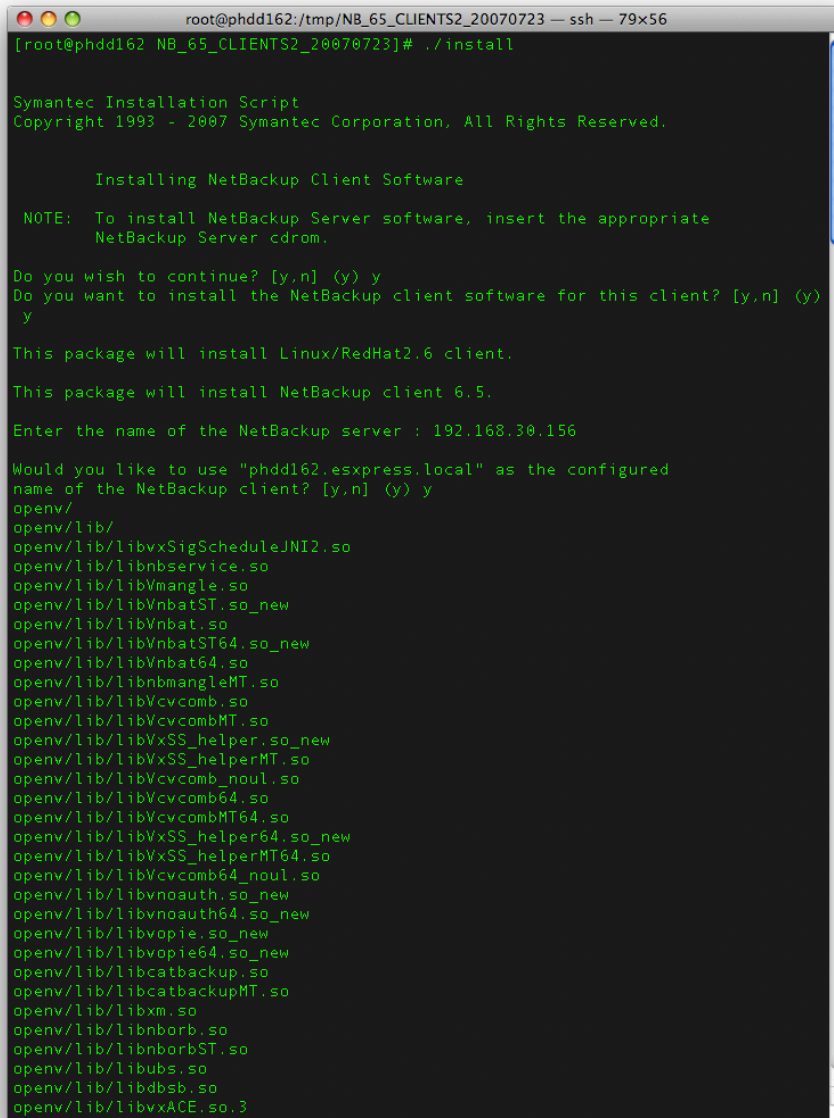
4. Prepare the installation directory. For instance, if you have a tar file, you will need to expand it by running the following command:

```
tar -zxf NetBackup_6.5_CLIENTS2.tar.gz
```

5. This command would then produce an installation directory, in this case:

```
NB_65_CLIENTS2_20070723
```

6. Identify your Netbackup server IP address and ensure it is reachable (using ping). You will need to provide a valid Netbackup server IP address and a name for your backup client (we recommend using the default, which is the host name of the DeDupe Appliance. In our example, this would be: phdd162.espress.local)
7. Run **./install** in the installation directory. Details are shown in Figure 5.



```
root@phdd162:/tmp/NB_65_CLIENTS2_20070723 — ssh — 79x56
[root@phdd162 NB_65_CLIENTS2_20070723]# ./install

Symantec Installation Script
Copyright 1993 - 2007 Symantec Corporation, All Rights Reserved.

      Installing NetBackup Client Software

NOTE: To install NetBackup Server software, insert the appropriate
      NetBackup Server cdrom.

Do you wish to continue? [y,n] (y) y
Do you want to install the NetBackup client software for this client? [y,n] (y)
y
This package will install Linux/RedHat2.6 client.
This package will install NetBackup client 6.5.
Enter the name of the NetBackup server : 192.168.30.156

Would you like to use "phdd162.espress.local" as the configured
name of the NetBackup client? [y,n] (y) y
openv/
openv/lib/
openv/lib/libvxSigScheduleJNI2.so
openv/lib/libnbservice.so
openv/lib/libVmangle.so
openv/lib/libVnbatST.so_new
openv/lib/libVnbat.so
openv/lib/libVnbatST64.so_new
openv/lib/libVnbat64.so
openv/lib/libnbmangleMT.so
openv/lib/libVcvcomb.so
openv/lib/libVcvcombMT.so
openv/lib/libVxSS_helper.so_new
openv/lib/libVxSS_helperMT.so
openv/lib/libVcvcomb_noul.so
openv/lib/libVcvcomb64.so
openv/lib/libVcvcombMT64.so
openv/lib/libVxSS_helper64.so_new
openv/lib/libVxSS_helperMT64.so
openv/lib/libVcvcomb64_noul.so
openv/lib/libvnoauth.so_new
openv/lib/libvnoauth64.so_new
openv/lib/libvapie.so_new
openv/lib/libvapie64.so_new
openv/lib/libcatbackup.so
openv/lib/libcatbackupMT.so
openv/lib/libxm.so
openv/lib/libnborb.so
openv/lib/libnborbST.so
openv/lib/libubs.so
openv/lib/libdbsb.so
openv/lib/libvxACE.so.3
```

Figure 5

8. The installation displays output as seen in Figure 6.

```
root@phdd162:/tmp/NB_65_CLIENTS2_20070723 — ssh — 79x56
openv/resources/vxul_root.res
openv/resources/SPSV2RecoveryAsst_root.res
openv/resources/aggs_root.res
openv/resources/bmrc_root.res
openv/resources/bmrcommon_root.res
openv/resources/bmrd_root.res
openv/resources/bmrlaunch_root.res
openv/resources/bmrmedia_root.res
openv/resources/bmrpkg_root.res
openv/resources/bmrrestore_root.res
openv/resources/bmrsavecfg_root.res
openv/resources/bmrsetup_root.res
openv/resources/bmrsrt_root.res
openv/resources/ftservices_root.res
openv/resources/libraries_root.res
openv/resources/libdevicefi_root.res
openv/resources/libemccclarionfi_root.res
openv/resources/libemcsymfi_root.res
openv/resources/libfi_root.res
openv/resources/libhpevafi_root.res
openv/resources/libibmfsfi_root.res
openv/resources/libvxfsfi_root.res
openv/resources/libvxvmfi_root.res
openv/resources/libgfsfi_root.res
openv/resources/liblnxlv2fi_root.res
openv/resources/libnetappfi_root.res
openv/resources/librawprtfi_root.res
openv/resources/nbecmsg_root.res
+ /bin/cp NB-Java.tar.Z /usr/openv
Installing NB-Java.
/bin/tar: Read 4096 bytes from -
/bin/tar: Read 8704 bytes from -
+ /bin/cp ./nbj.conf /usr/openv/java
Send a SIGHUP to inetd or xinetd so the (x)inetd.conf file will be reread.
Reloading configuration: [ OK ]

The following automatic startup and shutdown scripts (respectively)
have been installed. They will cause the NetBackup client daemons
to be automatically shut down and restarted each time the system boots.

/etc/rc.d/rc2.d/S95nbclient
/etc/rc.d/rc3.d/S95nbclient
/etc/rc.d/rc5.d/S95nbclient
/etc/rc.d/rc0.d/K01nbclient
/etc/rc.d/rc1.d/K01nbclient
/etc/rc.d/rc6.d/K01nbclient

Starting nbftclnt...

LiveUpdate is not installed, skipping registration step...

File /usr/openv/tmp/install_trace.21861 contains a trace of this install.
That file can be deleted after you are sure the install was successful.
[root@phdd162 NB_65_CLIENTS2_20070723]#
```

Figure 6

All installation messages displayed are captured in **install\_trace** which may be found in the **/usr/openv/tmp/** directory. The startup and shutdown scripts that are installed during the installation process will cause the Netbackup client daemons to be started and stopped automatically when the system boots or shuts down.

9. To prevent Netbackup from resetting the file's access time, insert the keyword **DO\_NOT\_RESET\_FILE\_ACCESS\_TIME** into the **/usr/openv/netbackup/bp.conf** file (Figure 7) on the DeDupe Appliance (for more details go to: <http://seer.support.veritas.com/docs/240723.htm>).



In our example, we will define a policy to backup:

`/.export/Normal/ByName/Ubuntu/20091128000100--Ubuntu--564d389a-1287-6701-99f1-8b6736c70ee4`

This is a directory containing all necessary data for the Ubuntu VM captured on 11/28/2009, specifically, the flat raw image (flat.vmdk), metadata (vmdk), and configuration data (vmx).

To configure a policy, we need to start the Netbackup Administration Console with connection to the same Netbackup server with which the Netbackup client installed on the DeDupe Appliance was registered.

We will run the Administration Console in Windows XP by starting VERITAS, **Netbackup > Netbackup Java Version 6.5.**

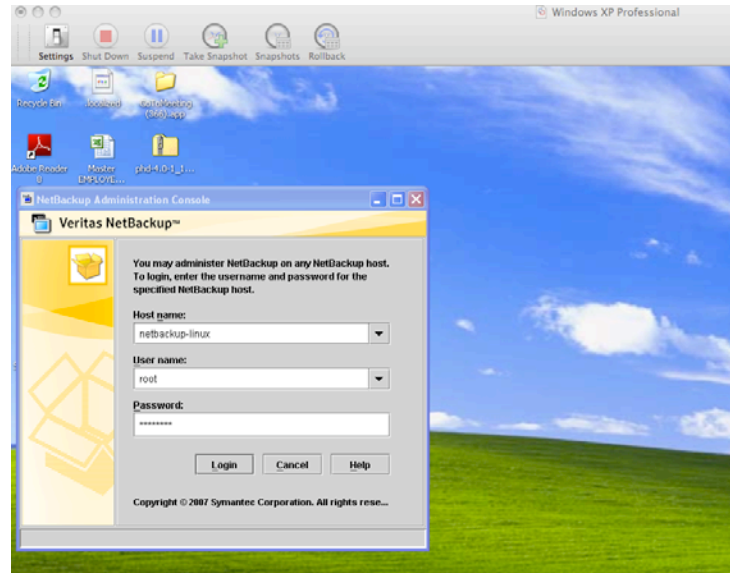


Figure 9

As the application launches you will have to enter an appropriate host name for the Netbackup server and the login credentials (Figure 9).

After the Netbackup Administrator Console starts, select **Netbackup Management > Policies** and on the policy window, add a New Policy (in our example, **PHDD162-VHbackup**, see Figure 10).

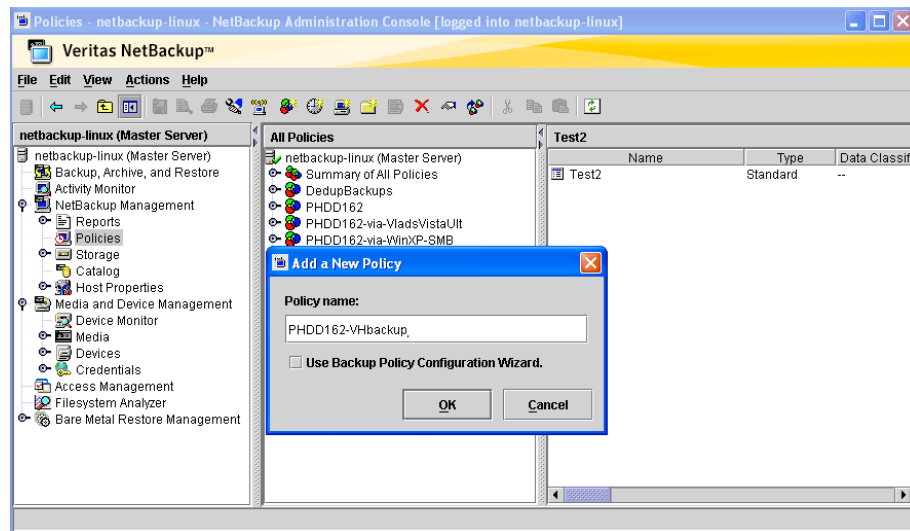


Figure 10

Next you will need to go through the steps to configure your new policy as shown in the example below:

1. Set the Policy type to **Standard**, check the compression box, and any other necessary options:

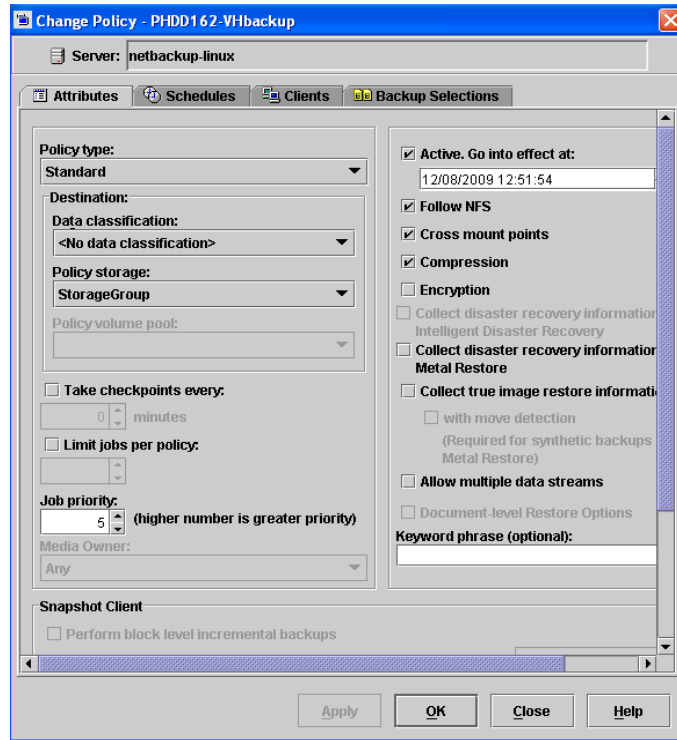


Figure 11

2. Define the backup policy Name, Frequency, and Retention:

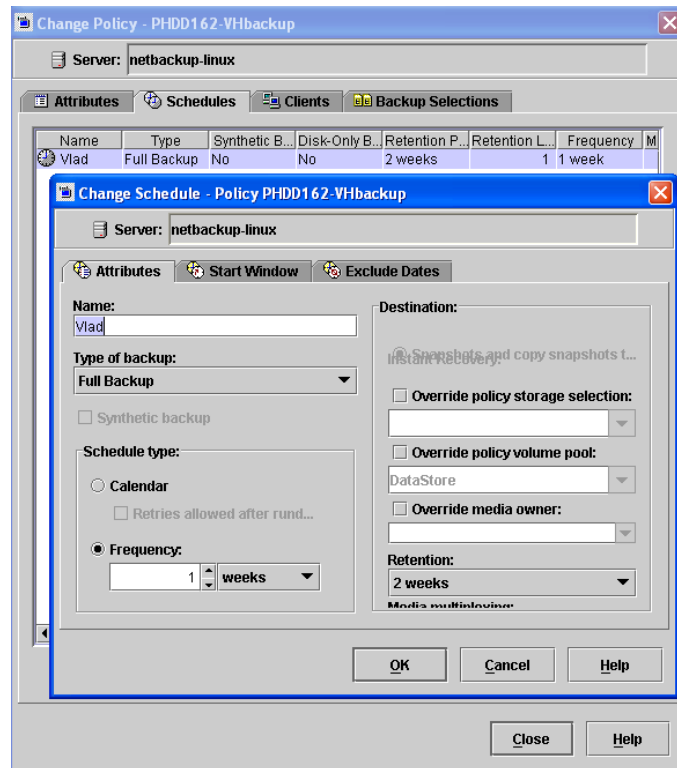


Figure 12

3. Define the Netbackup client we installed earlier as a backup agent in the **Client Name** window and specify the OS as Linux, RedHat:

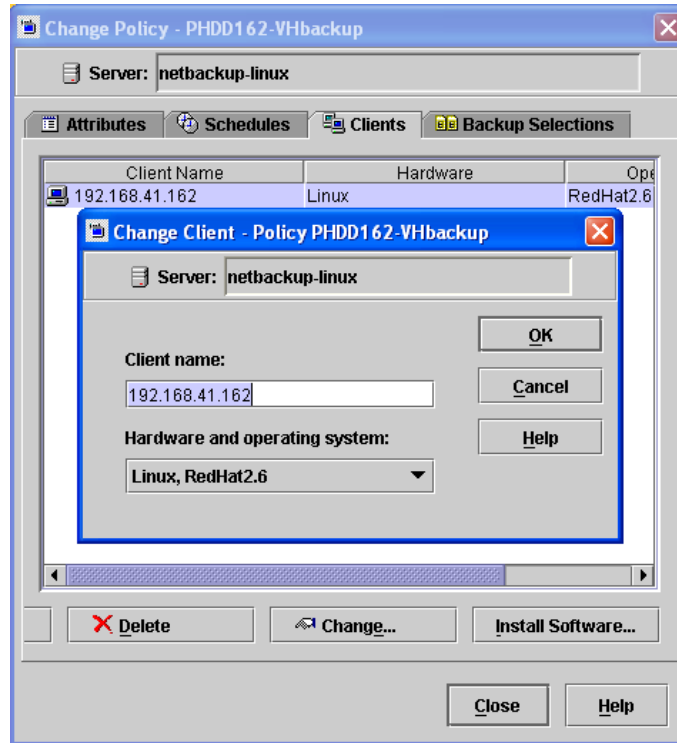


Figure 13

4. Finally, in the **Backup Selections** tab, set the path to the Ubuntu image directory that we chose for this example.

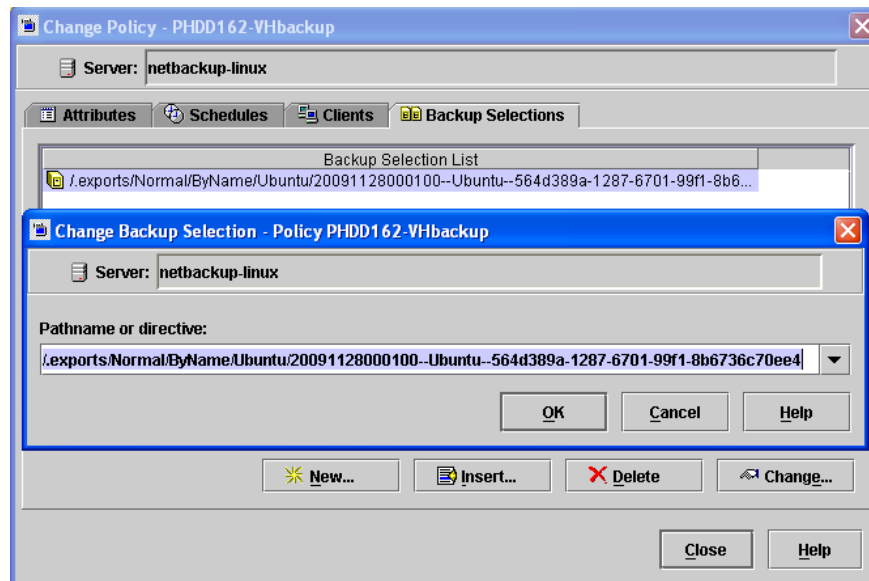


Figure 14

At this point, save the policy and it will appear in the Policy window. A job can then be started by right-clicking the policy and choosing the **Manual Backup** option from the drop-down menu.

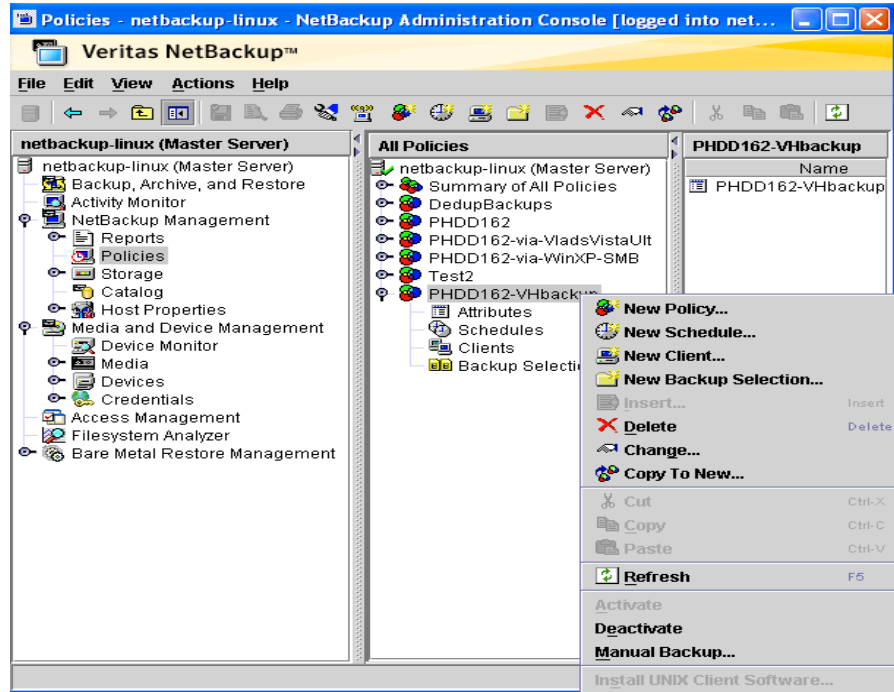


Figure 15

The job is then initiated and a backup of the image defined in the policy begins (as shown in Figure 15). You can monitor the job progress by clicking the **Activity Monitor** and choosing the appropriate job. The details of our example backup job are shown in Figures 16 and 17.

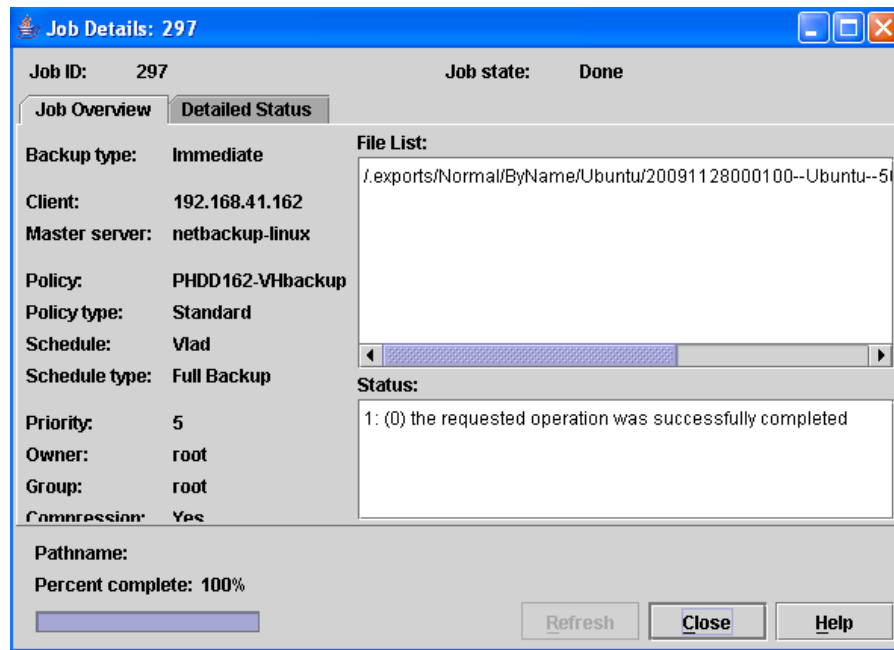


Figure 16

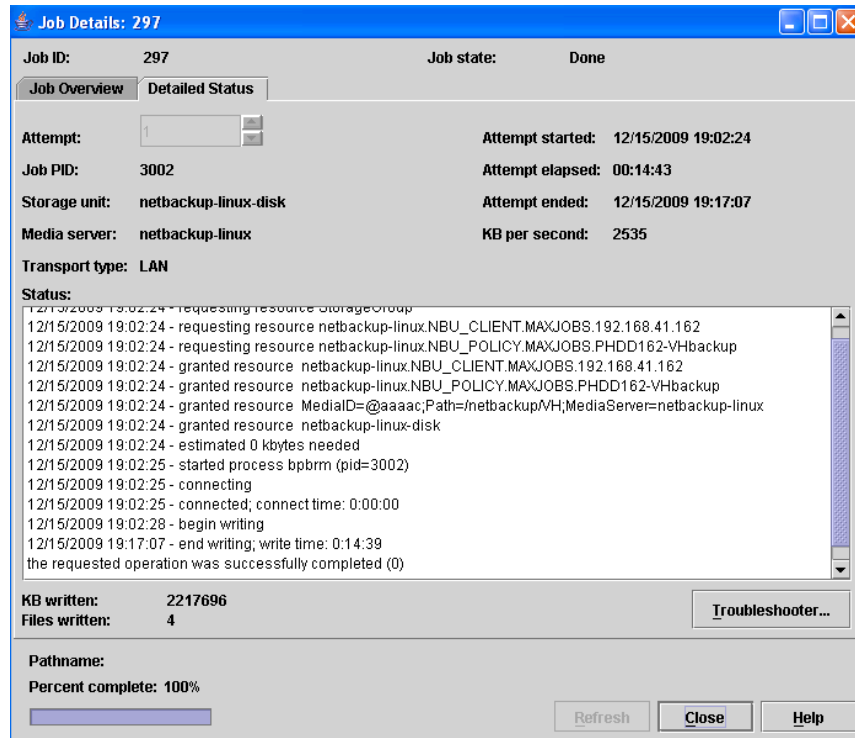


Figure 17

In our example, we have demonstrated how to add the policy to backup a directory containing a single VM and run a job to actually backup the directory. A Netbackup administrator can use this example and create much more sophisticated policies, taking full advantage of the scheduling features of Netbackup and the flexibility provided by implementing esXpress' patent-pending Date Smart Dynamic Exports.

## V. Integration Scenario 2

### Enabling DSDE for SMB Access

DSDE is provided by the esXpress DeDupe Appliance and must be enabled and configured in the appliance before it can be accessed.

In order to configure DSDE, you will first need to login in to the DeDupe Appliance web page (its IP address can be found in VMware vSphere, on the Summary tab for the appliance VM).

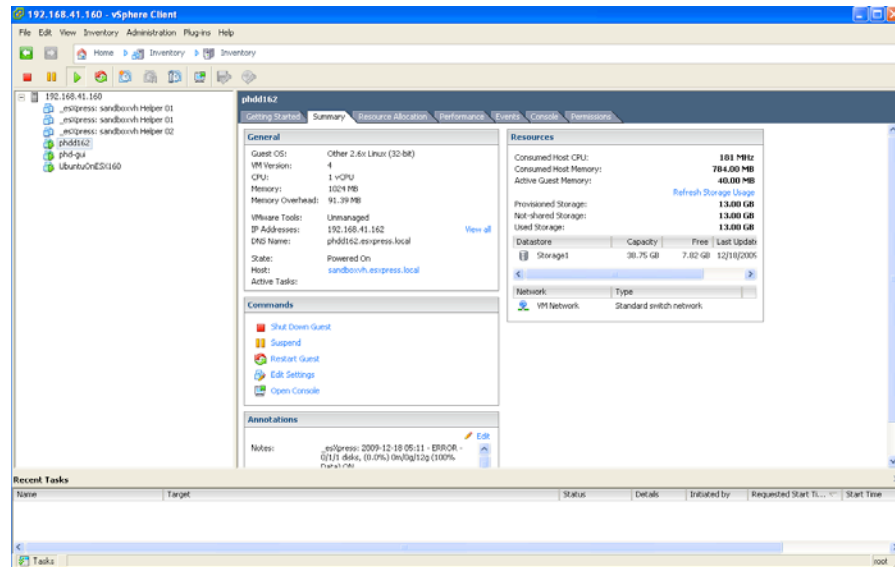


Figure 18

At the appliance login page, enter the User ID and Password (the defaults are: admin/admin). After logging in, navigate to the **Options** Tab and choose the group **SYSTEM** from the drop-down menu (to filter out unnecessary options). Select the check box to enable the SAMBA share in the Value column (the fifth row in Figure 19) and save the settings by clicking on the save icon to the right of the option.

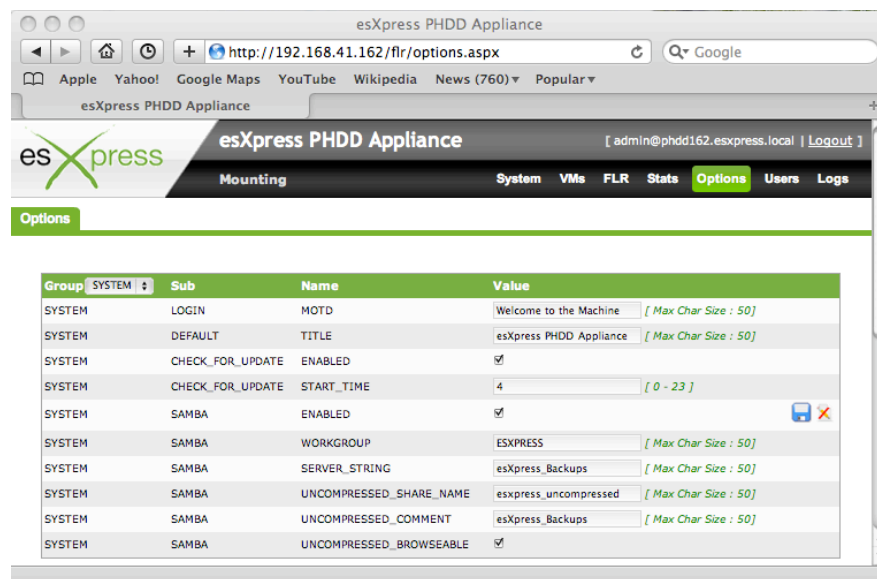


Figure 19

After you have added the SMB user, you should be able to map the Date Smart Directories from your Windows box using the credentials you added in the DeDupe Appliance. In order to do that you can use the System Explorer option, **Tools > Map Network Drive** and add a share specifying the DeDupe Appliance IP address as the server and **espress\_uncompressed** as the share name, for example, **\\192.168.41.162\espress\_uncompressed**.

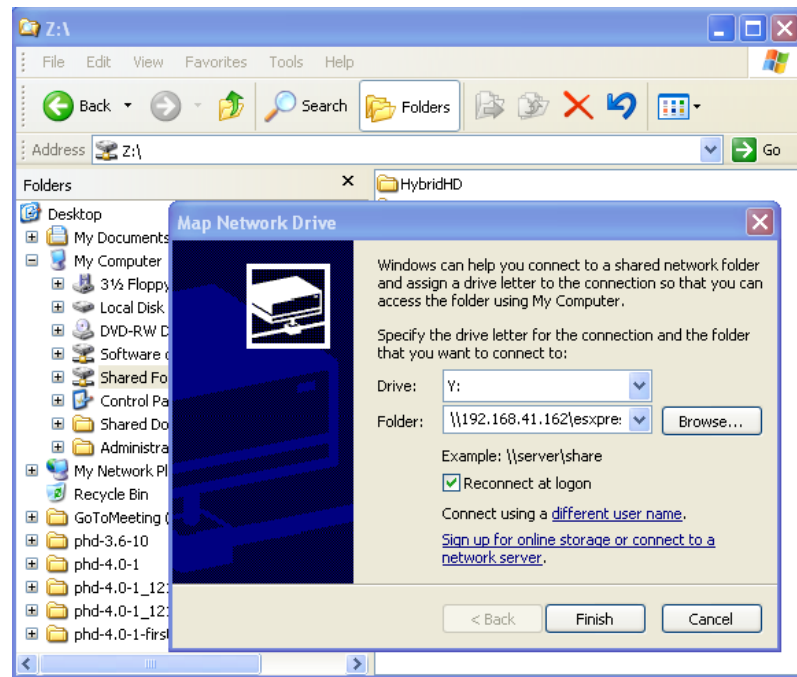


Figure 20

After providing the credentials that you created earlier, you should be able to see the mapped drive (Y: in our example on Figure 20) within System Explorer and the Date Smart Directory structure, as seen in Figure 21.

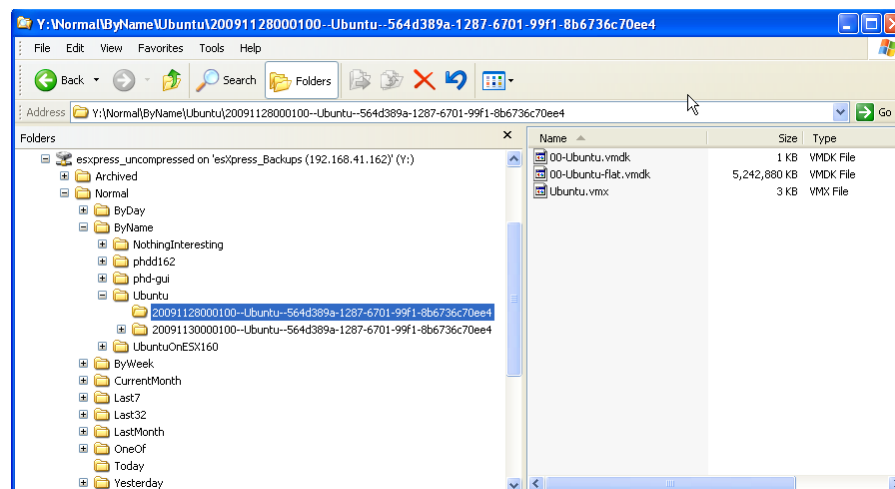


Figure 21

A detailed training video explaining how to enable and configure SMB in the DeDupe Appliance is available at the PHD Virtual Technologies Web site: [Configuring Dynamic Exports with the De-Duplication Appliance](#).

## Backing up VM Images within DSDE

As we discussed in Section II, another possible integration solution would be to use a Netbackup client installed on a Windows proxy box (Figure 3, above). In this case three components are involved, namely the esXpress DeDupe Appliance, a Windows-based Netbackup client, and Netbackup server. The Netbackup client installed on Windows will have visibility to the DeDupe Appliance DSDE via an SMB share with the credentials that you defined when enabling DSDE (as discussed in Section III). You will need the Netbackup client for Windows installed on your system and must provide the Netbackup Server IP address during that process. We will skip the description of the Netbackup client installation as it is well-documented on Symantec's Web site: <http://www.symantec.com/business/netbackup>.

In order to initiate your backup start the Netbackup client by clicking: **Start > Veritas Netbackup > Backup, Archive, and Restore**. In the Backup agent window, navigate to a DSDE location in the DeDupe Appliance and choose the image directory you would like to backup (see the example in Figure 22).

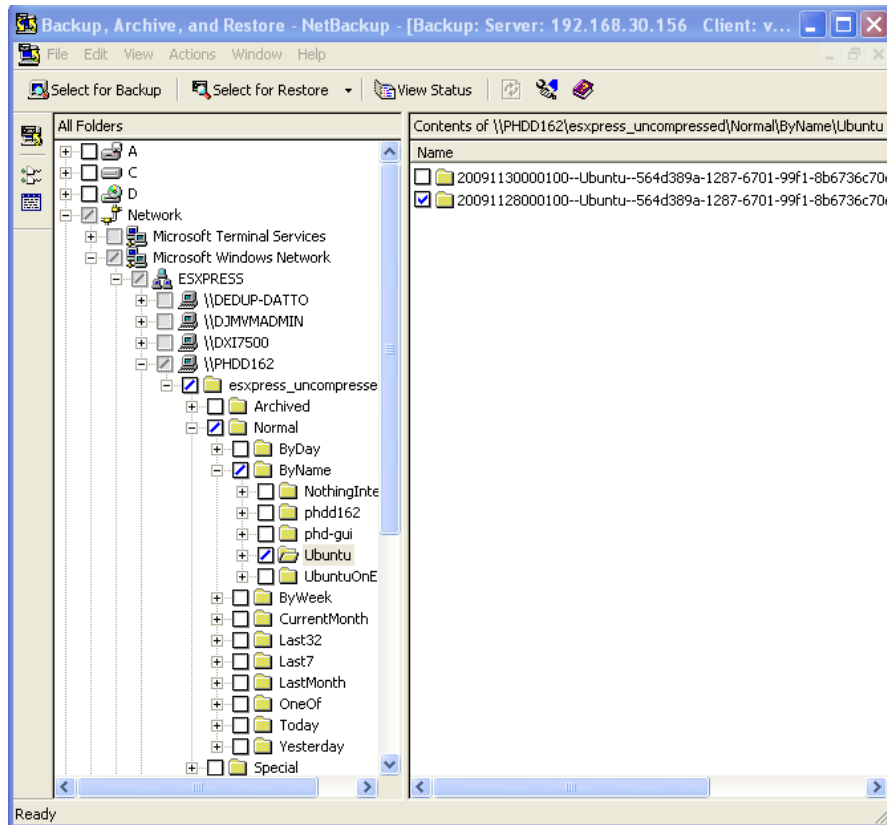


Figure 22

You may select as many directories as you want to be included in a single Netbackup job. After you have selected all of the images you plan to backup, you can initiate a backup job by selecting **Actions > Backup** on the client GUI. Add your comments and press “**Start Backup**” to proceed (Figure 23).

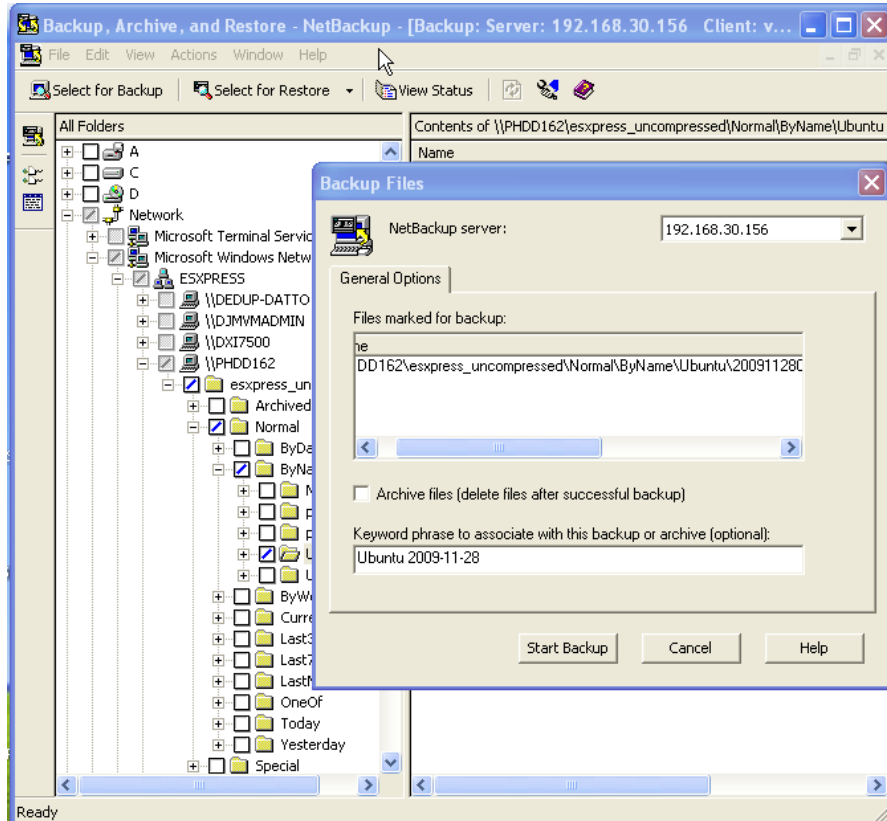


Figure 23

A confirmation window opens (Figure 24):

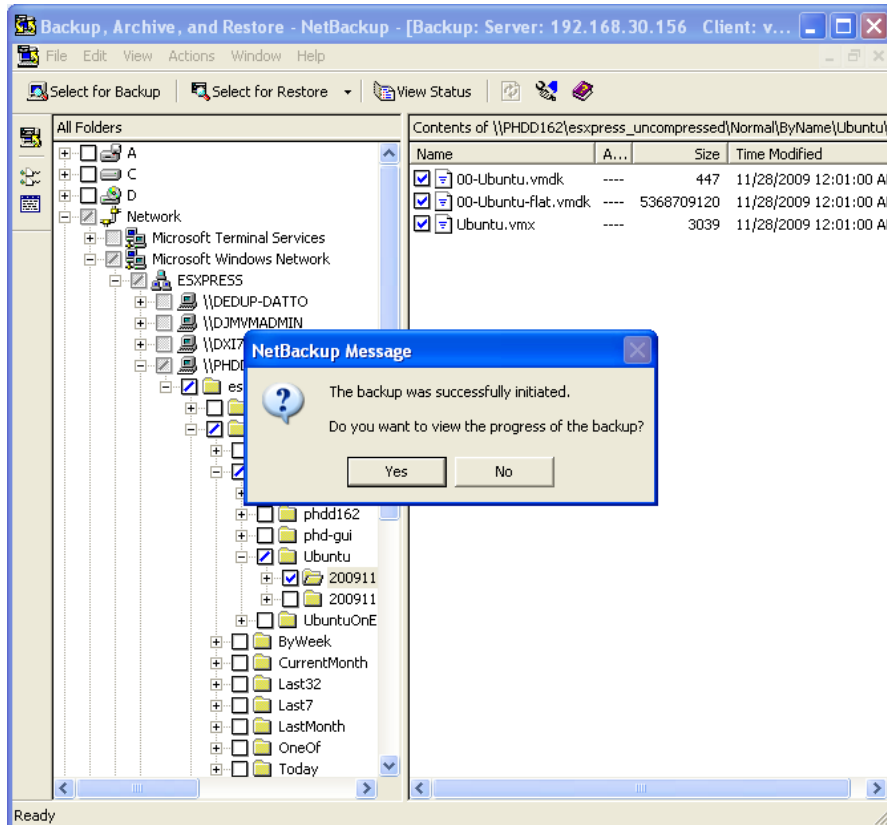


Figure 24

You will see the job status of your backup on the Status window (Figure 25)

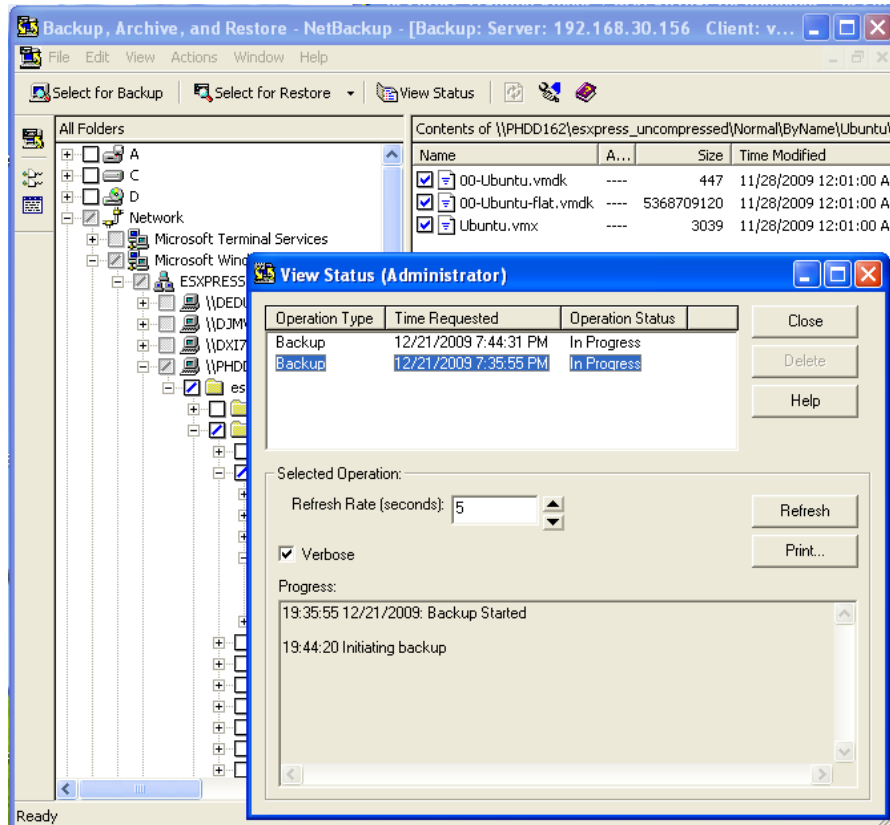


Figure 25

You may need to check with your system administrator to make sure that your firewall settings are set correctly allowing your Netbackup agent to communicate with the Netbackup server. You may also initiate backup jobs from the server side using the same approach described in Section IV.

## About PHD Virtual

As the pioneer of virtual backup appliances (VBAs), PHD Virtual Technologies has been transforming data protection in virtual IT environments since 2006. Its award-winning data protection solution for virtual infrastructures, esXpress, is used today by more than 2000 enterprises worldwide to achieve unlimited dynamic growth, high availability, no single point of failure and scalable performance. PHD Virtual is committed to helping our customers and provides free, easy-to-use virtualization utilities to assist with the administration and management of virtualized environments.

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