



esXpress 4.0
Getting Started Guide

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www.phdvirtual.com



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Note: A valid support agreement is necessary to receive new esXpress release and software updates.

Documentation Updates

The following table contains updates made to this document. To verify that you are using the latest edition of a document, check the PHD Virtual website.

Chapter	Version	Description
All	3.6, 4.0	Updated guide formatting and editing.
All	4.0	Updated version where applicable.
1	4.0	"What's New" (on page 7): Added new 4.0 feature highlights.
2	4.0	"Implementation Planning" (on page 13): added updated information for Quorum and Change Block Tracking.
2	4.0-3	"Implementation Planning" (on page 13): updated CBT info - it is disabled by default.
2	4.0	"Installing esXpress" (on page 20): added step by step instructions for installing esXpress using the esXpress appliance deployment wizard.
2	4.0	"esXpress Setup Wizard" (on page 24): added section describing the Setup Wizard steps.
2	4.0-4	"esXpress Setup Wizard" (on page 24): section updated - the Setup Wizard now contains less required and optional steps.
2	4.0	"Using Distributed Virtual Switches" (on page 17): added new section.
3	4.0	"Using esXpress" (on page 27): added new chapter with updated overview information on using esXpress.
3	4.0	"FAQ - Change Block Tracking" (on page 33): added new section.
3	4.0	"FAQ - Change Block Tracking" (on page 33): updated with additional information about Full backups and CBT. 4/9/10
3	4.0-3	"FAQ - Change Block Tracking" (on page 33): updated CBT info.
3	4.0	"Using the DeDupe Appliance" (on page 30): added overview information for using the DeDupe Appliance. 4/22/10

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Chapter 1 - Getting Started with esXpress

esXpress provides high-availability data protection for your virtual machines using virtual backup appliances (VBAs). These VBAs, which are small virtual machines, run on each host and perform the backup processing. Backups can be stored on a number of different targets including FTP servers, Samba shares (SMB/CIFS), SSH servers, shared and local VMFS partitions, and the esXpress DeDupe Appliance. With esXpress' restoration capability, you can restore entire virtual machines or single files using the File Level Restore interface of the DeDupe Appliance.

After esXpress is installed, backups run automatically on each host based on the settings you define—there are no backup jobs to create. Using the Management Appliance, you can modify your backup window and define additional configuration settings. With esXpress X Commands, you can use the VI3 or vSphere client to perform additional backups instantly or even exclude VMs from the backup process altogether.

esXpress Licensing

esXpress is available with a Pro or Enterprise license. A Pro license allows you to run up to 4 VBAs per host. An Enterprise license allows for up to 16 VBAs per host, which dramatically increases the number of concurrent backups and restores possible. Also, with an Enterprise license, additional support options are available.

What's New

The following features are new with esXpress version 4.0.

- **esXpress Appliance Deployment Wizard** – Deploy and configure the esXpress appliances using a Windows-based executable. The deployment wizard (formerly the PHD esXpress Installer) is included in the esXpress zip file.
- **Central GUI Restores** – Restore backups directly from the esXpress Management Appliance.
- **Change Block tracking** – Take advantage of VMware's Change Tracking API to significantly reduce time and storage space required for backups.
- **Stats Updates** – DeDupe Appliance Stats page now includes a Trim Report and other tabs to organize the statistics display.
- **Add Hosts from vCenter** – Add hosts directly to the Management Appliance by importing a list of hosts from vCenter.
- **Quorum updates** – The Management Appliance Quorum now uses SSH by default for host communications. NFS is also still available.
- **System Pages** – The esXpress appliance web pages each now have a System page which displays useful information about the appliances including hostname, IP addresses, and available space.
- **Online Help** – Context-sensitive searchable help was added to both appliances and is available by clicking the help button on each page.
- **Enhanced product support** – esXpress now supports VMs with IDE disks and experimentally supports Distributed Switches with Ephemeral Ports (no binding).
- **Bug fixes and functionality improvements.**

esXpress Installation Components

PHD esXpress is available for download as a compressed zip file from the PHD Virtual Web site (www.phdvirtual.com).

After downloading and extracting the contents of the file, the following components are available:

- **deploy-appliance.exe** - (formerly PHD esXpress Installer.exe) Deployment wizard that guides you through the process of deploying and configuring the esXpress Appliances. If you use the deployment wizard, you do not need to manually deploy and configure the OVF.
- **phd-x.x.x.ovf** – esXpress appliances OVF. The OVF is used to create both the DeDupe and Management Appliances.
- **phd-x.x.x.vmdk**– VMDK file required by the esXpress OVF.
- **Documentation folder, README, and Release Notes.**
- **.dll and .config files** -- Files required by the deployment wizard to install and configure the esXpress appliances.

Note: The esXpress RPMs are also available for download separately from the web site. These files should be downloaded *only* if you will be installing esXpress *without* using the Management Appliance.

- **esxpress-x.x-x.esx.i386.rpm** – The esXpress management code for each host.

- **esxpressVBA-x.x-x.esx.i386.rpm** – The esXpress VBA.

Refer to the guide, *Installing esXpress (stand-alone)* for more information.

Figure 1 - The esXpress installation components are used to deploy both the esXpress Management and DeDupe Appliances.

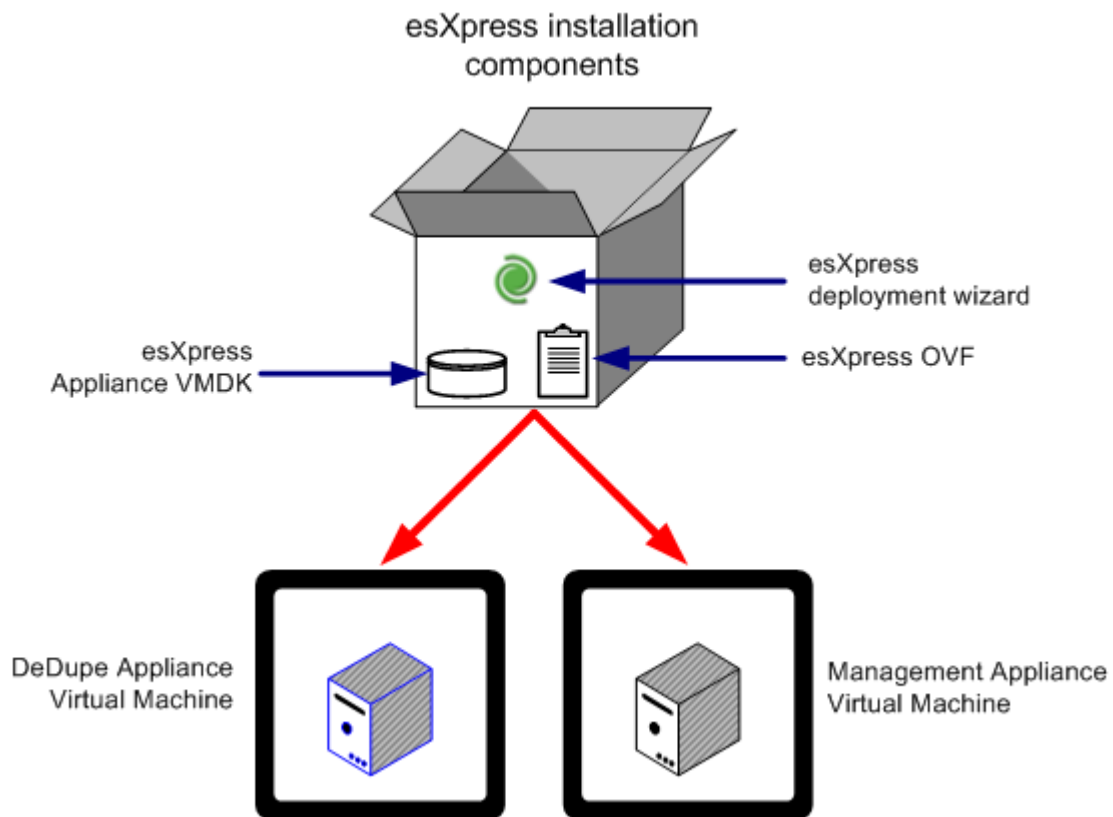
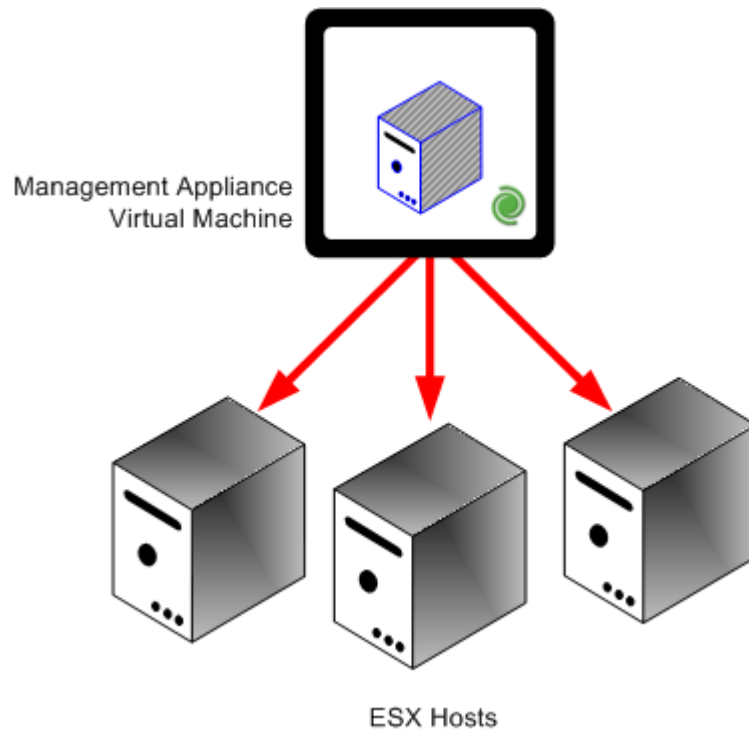


Figure 2 - After the Management Appliance is deployed, use it to install and manage esXpress on each of your hosts.



Documentation

The following documents are available for download as PDFs from the [PHD Virtual web site](#):

- **Getting Started Guide** – This guide.
- **Management Appliance Guide** – Step by step instructions for using the Management Appliance and its available appliance feature (restores, host configuration, backup targets, etc.).
- **DeDupe Appliance Guide** – Configuration information for the DeDupe Appliance as well as a review of its GUI interface which includes File Level Restores.
- **Reference Manual** – Reference manual that describes the host-side text menu options including configuration, reporting and maintenance options.
- **DR and Restoration Manual** – Configuration information and descriptions of the restore options available with esXpress, including replication.
- **Installing esXpress (stand-alone)** – A quick start guide for installing esXpress directly on each host without using the Management Appliance.
- **Commands Reference** – Reference guide describing the esXpress X Commands and the available scheduling commands.
- **Backup Reports Reference Guide** – Reference guide explaining the esXpress backup reports in detail.

Updated Release Notes are also available with each esXpress release and include details about fixes and additions made to the esXpress components .

In addition to the PDF versions, online help is available for each installed esXpress Appliance. Also, all guides are available in both PDF and html format on the PHD Virtual web site.

Chapter 2 - Installation Overview

Review the sections in this chapter for implementation considerations, system requirements, and steps for installing esXpress.

- "Implementation Planning" (on page 13)
- "System Requirements" (on page 16)
- "Upgrading esXpress from a Previous Version" (on page 18)
- "Installing esXpress" (on page 20)
- "Removing esXpress" (on page 26)

Note: The esXpress appliances are optional components. You can install esXpress manually on each host without using the Management Appliance, which may be useful in smaller environments. For stand-alone installation instructions, refer to the guide, *Installing esXpress (stand-alone)*.

Note: For instructions on deploying and configuring the esXpress appliances manually using the OVF, refer to the individual appliance guides (the *Management Appliance Users Guide* and the *DeDupe Appliance Users Guide*).

For additional configuration and installation information about the esXpress Appliances, refer to the individual appliance guides.

Implementation Planning

Before implementing esXpress, you should consider the following:

1. Will you be running the Management Appliance for deployment and configuration, or will you run your hosts stand-alone?

esXpress 3.6 introduced a Management Appliance which is simply a Virtual Machine running in your environment providing a single interface to set your esXpress configuration policies and distribute them to your hosts. Currently, the appliance can be used for esXpress configuration and deployment and restoring backups—running and monitoring backups are not yet supported. If you choose to run the Management Appliance, it will also handle the installation of the esXpress RPMs to your hosts—manual installation on each host is not required.

The Management Appliance is not mandatory for running esXpress—it does not need to be installed or running to create or restore backups. If you have only a small number of hosts, you may want to consider not using the Management Appliance and simply install and configure esXpress locally on each host.

If you choose to run esXpress without the Management Appliance, then you will have to install the two esXpress RPMs manually on each host as well as configure each host individually using the esXpress text menu. For detailed information on installing and configuring esXpress directly on each host without, see the following manuals: *Installing esXpress (stand-alone)* and the *esXpress Reference Manual*.

For detailed information on using the Management Appliance please refer the Management Appliance Guide.

2. If you plan to run the esXpress Management Appliance, the following information should be considered for the esXpress Quorum:

The esXpress Quorum is the mechanism that the esXpress uses to communicate with your hosts. It was created to allow native ESX services handle the connection and communication for esXpress data.

The Quorum does this using a restricted SSH user account on each host, by default. esXpress uses this account to pass configuration changes from the Management Appliance to each host, as well as keep track of each host's status. This account cannot be used to log in to the host device.

If you cannot use SSH in your environment, the Quorum can be configured to use NFS, instead. This configuration requires the creation of a VMKernel IP address on each host and, the Management Appliance VM must be located on the same network with the same VLAN ID as the VMKernel. Review your network configuration on each ESX host to be managed by the Management Appliance before installing the VM and adding hosts to make sure the NFS configuration is in place for the Quorum.

For additional information on the esXpress Quorum refer to the Management Appliance Guide.

3. What type of esXpress backups will you run?

esXpress offers a number of different backup types:

- DeDupe (PHDD)
- Delta
- Full

If you choose to run DeDupe backups then you will have to install and configure the esXpress DeDupe Appliance. Please refer to the esXpress DeDupe Appliance Guide for additional information.

If you will be running Delta/Full backups then the DeDupe Appliance is not required. You cannot create DeDupe backups when running in Delta/Full mode.

Delta/Full mode will create Full VMDK backups and then Delta backups (all changes from the Full). DeDupe (PHDD) mode will create Virtual Full backups that are DeDupe backups. Also, running DeDupe backups will enable the instant File Level Restore (FLR) ability of esXpress. FLRs are not available for Delta/Full backups.

It is important to note that for the DeDupe backups, the initial load of your Virtual Machine backups will be slow as the DeDupe Appliance is seeded with your backups. This is because each Virtual Machine must first write out most of its blocks, as they won't exist on the appliance. Also, each block is verified after writing to ensure its integrity. Once you finish the initial backup of each Virtual Machine, you will start to realize the benefits of using DeDupe backups in terms of speed and the amount of data written to the appliance.

4. What type of backup target will you use for esXpress backups?

One of the key decisions to make when getting started with esXpress is, where will you send your backups? If you are running DeDupe backups, then your backup target will be the esXpress DeDupe Appliance. This is the only target that can be used for DeDupe backups.

If you are running Delta/Full backups, then your target can be an FTP server, SMB/CIFS share, SSH connection, or directly to VMFS (shared or local). For FTP servers on Windows, Filezilla is recommend.

Caution: Running anti-virus software on a backup target can result in file locking or deletions and may additionally cause issues with writing and deleting backups. PHD Virtual recommends excluding backup targets from anti-virus software scans, including the DeDupe Appliance, network shares, and directories used for backup targets (SMB, NFS, or FTP).

5. If you will run the DeDupe Appliance, which type of storage will be used (NFS, SMB, or VMDK)?

The esXpress DeDupe Appliance supports the following types of storage: an external NFS mount, an external SMB/CIFS share, or an attached VMDK residing on a VMFS partition. When you deploy the DeDupe Appliance you will need to indicate which type of storage you will be using.

The storage space requirement depends on your actual data being sent to the appliance. A best practice is to start with a 10 to 1 ratio. The disk can be extended if necessary.

6. If you will run DeDupe backups, how many DeDupe Appliances be installed?

You do not need to install the DeDupe Appliance on every host running esXpress backups - just one DeDupe Appliance is required to begin sending backups. PHD Virtual recommends starting with just one DeDupe Appliance and pointing your hosts to that appliance as their backup target.

7. How many concurrent backups per host (# of VBAs) will you run to meet your backup window requirements?

By using VBAs, esXpress can scale quickly within your infrastructure. It does this by allowing multiple concurrent backups (using the VBAs) to run on each of your hosts. The number of VBAs that should be allowed to run depends on your backup window requirements, your infrastructure (hosts, network, etc.) and also your esXpress license. Also, the number of concurrent running VBAs cannot exceed the number of cores in a host +1. Contact your PHD Virtual sales representative for licensing information.

8. What archive retention policies do you have?

esXpress can manage the backup archives it creates and automatically purge them based on configuration rules you determine. If you are running Delta/Full backups, these settings are maintained at a host level using the Auto Delete settings. If you are running DeDupe backups, this is managed on the DeDupe Appliance using the DELETE settings on the Options page..

9. Will you be taking advantage of Change Block Tracking (CBT) with esXpress?

By using CBT, esXpress can read only the blocks that have changed to determine what data must be backed up, significantly reducing the backup window. Note that enabling CBT requires VMs to be at hardware version 7 and on an ESX version 4.0 host and may slightly impact the VMs overall performance. CBT can be enabled or disabled at the per host or Global level using the Management Appliance or the PHD text menu. For additional information on CBT, see ["FAQ - Change Block Tracking"](#) (on page 33).

System Requirements

View the following table for esXpress system requirements.

Table 1 - esXpress System Requirements

VMware version	ESX Server Version 3.5x, vSphere
esXpress Appliance VM Memory	1 GB of memory allocated to each VM
Management Appliance VM Storage Requirements	A Minimum of 8 GB of disk space is required on the VMFS partition of the ESX host to import the compressed Management Appliance VMDK file.
DeDupe VM Storage Requirements	A Minimum of 8 GB of disk space is required on the VMFS partition of the ESX host for the DeDupe system data VMDK. Additional storage (NFS or VMDK) is required for your data disk.
VBA Memory Requirements	256 MB of memory allocated to each VBA
VBA Storage Requirements	3 GB minimum of VMFS space for each running VBA during backups.
Minimum supported browsers for esXpress Appliance Web Interfaces	Internet Explorer 7, Firefox 3.0.7
Other Requirements	VMware Virtual Infrastructure Client 3 (VI3), or vSphere Client. ESXi is not supported at this time.
Quorum Requirements	Traffic must be routable between the esXpress Quorum and each host. If you've configured the esXpress Quorum to use an NFS share (instead of SSH), a VMKernel IP is required for each host. The appliance VM must also be on the same network as the VMKernel with the same VLAN ID or the network traffic must be routable between the VMKernel IP and the assigned Management Appliance IP for SSH and NFS connections.
esXpress Appliances deployment wizard (deploy-appliances.exe)	Virtual Center 2.5, vCenter Server (vSphere) VMware ESX 3.5 or 4.0 (vSphere) host (formerly PHD esXpress Installer.exe)

You must have root access to the VMware hosts in order to install and run esXpress.

Like many products, esXpress transfers the backup data over the network. In an environment with many ESX hosts, network delays can occur due to the volume of data being transferred. It is suggested that you have a 2nd NIC attached to a dedicated backup network. esXpress can also copy to either the local or SAN based VMFS.

Your storage location should be, at minimum, equal to the total size of the VMDK files targeted for backup. This means that if you have 500GB of virtual machines, you should have at least 500GB of storage. This should allow, on average, a month's worth of Delta backups online, but this can be 2nd and 3rd tier space instead of your primary SAN space.

Since all backup files are compressed, on average, esXpress can store 7 days of delta backups in the space of 1 day of Full backups. Instead of keeping only 5 Full VMDK backups online using other virtual backup methods, you are able to store an entire month of esXpress backups.

Using Distributed Virtual Switches

With esXpress version 4.0, Distributed Virtual Switches with Ephemeral Ports (no binding) are experimentally supported. Using these switches with esXpress will work in some cases, but may not in others.

When the esXpress VBAs spawn, they obtain networking information based on the settings configured during installation and your virtual environment settings. This networking information is required by the VBA to perform backups.

When using Distributed Switches with Ephemeral Ports, VMware assigns a port to each VM at boot time. During internal testing, PHD Virtual found that, in some cases, this port was not assigned to the newly spawned VBA (which then prevented that VBA from obtaining the required network information, which in turn caused the esXpress backup to fail).

Note that Distributed Virtual Switches are set to Static Binding by default, and cannot be switched to Ephemeral without first removing all VMs from the switch.

Upgrading esXpress from a Previous Version

In order to update esXpress you must have a valid license installed. Also, no invalid licenses can be in use by any hosts in your environment or else you will not be able to upgrade esXpress. Contact PHD Virtual to receive an updated license.

The following methods describe how to upgrade from a previous version:

1. Using the esXpress Management Appliance

Use the Management Appliance's text menu **Check for esXpress Updates** option to download and install the latest appliance software and esXpress RPMs.

When updated, the Management Appliance will automatically upgrade your hosts - you do not need to uninstall previous versions of esXpress from each of your hosts first. The new esXpress RPMs are automatically installed to each host at the top of the next hour.

Note: After upgrading, **in order to enable Change Block Tracking**, be sure to click **Publish** on the Management Appliance web page. This will publish the latest esXpress configuration settings to your hosts. If you do not want to enable CBT, visit the **Advanced** tab and disable the CBT option (**Use Change Block Tracking to index source disk**) before your next Publish.

2. Stand-Alone Mode (No Management Appliance)

If you are upgrading esXpress directly on your hosts and not using the Management Appliance, the upgrade is the same as with prior esXpress upgrades.

After downloading the new RPMs and copying them to your host, run the following three commands as root (su – to root):

```
rpm -e esxpress
rpm -i esxpress-X.X-X.esx.i386.rpm
phd import
```

3. Stand-Alone Mode to Management Appliance

If you are currently using Stand-Alone mode (no Management Appliance) but would like to upgrade to esXpress 4.0 and begin using the Management Appliance, do the following:

1. Note any configuration settings you are currently using, including your backup mode, backup targets information, VBA IPs if used, backup start and end time, email information, and anything else that may be specific to your environment.
2. Deploy the latest Management Appliance. You do not need to uninstall your existing esXpress installation.
3. Configure the Management Appliance using the Setup Wizard which will allow you to by apply the settings you noted from your previous installation as well as add your hosts. When added, you hosts will be upgraded to the latest version.

Upgrading the DeDupe Appliance

If you are using the esXpress DeDupe Appliance as a Backup Target, use the following steps to upgrade the appliance to the latest version:

- Use the **Check for Updates** option on the DeDupe Appliance web page or use the DeDupe Appliance text menu **Check for DeDupe Appliance Updates** to download and install the latest appliance software.

Caution: If you used the Check for Updates process to upgrade to version 3.6-11 or later DeDupe Appliance, do not use the Summary page, Check For Updates button to upgrade to version 4.0, as it will fail. Use the DeDupe Appliance's text menu for the initial upgrade. After you've upgraded the appliance to version 4.0 you can then begin using the DeDupe Appliance web page to run future appliance updates.

Installing esXpress

To begin using esXpress, it must be installed on each ESX host. To do this, you can use the esXpress Management Appliance to manage the installation and configuration process. The Management Appliance is a virtual machine that is deployed to your VMware environment.

The following sections provide an overview of the steps required to install and configure esXpress.

- "Step 1 - Download esXpress" (on page 20)
- "Step 2 - Deploy esXpress Appliances" (on page 20)
- "Step 3 - Install esXpress" (on page 23)

Step 1 - Download esXpress

- Download the latest PHD Virtual esXpress zip file and extract the contents.
- Be sure you have reviewed the section "[Implementation Planning](#)" (on page 13) to determine how you will implement esXpress in your environment.

Step 2 - Deploy esXpress Appliances

The esXpress appliances are deployed using the esXpress deployment wizard (deploy-appliances.exe). After extracting the contents of the esXpress zip file, launch the deployment wizard by double-clicking this file (formerly, PHD esXpress Installer.exe).

To deploy the esXpress appliances

Note: You will run the deployment wizard for each esXpress appliance you want to deploy (Management Appliance and DeDupe Appliance).

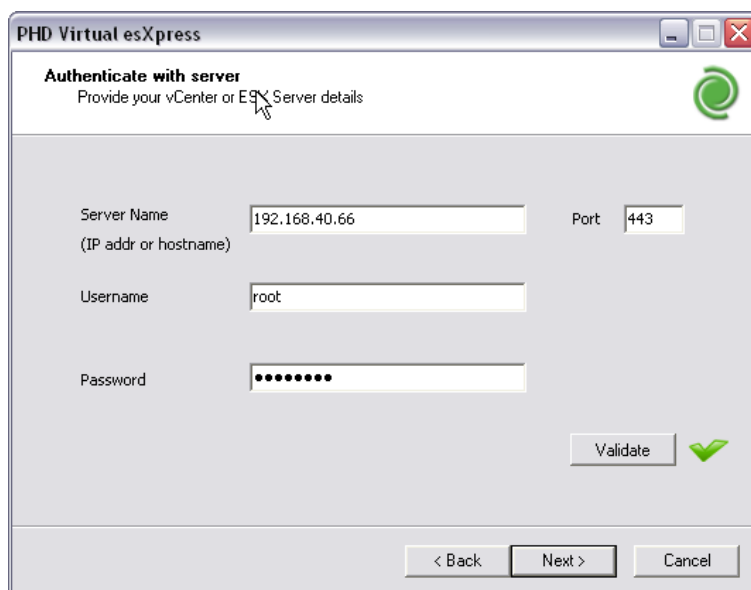
1. From the extracted zip file contents, double-click **deploy-appliances.exe**.

The esXpress Deploy and Configuration Wizard opens.

2. Click **Next**. The server authentication window opens.
3. Enter the IP address or hostname of the vCenter Server or ESX Host you want to deploy the esXpress appliance to.

Note: You can deploy the esXpress appliances to stand-alone ESX hosts or to a vCenter Server - they cannot be deployed to individual ESX hosts that are managed by vCenter.

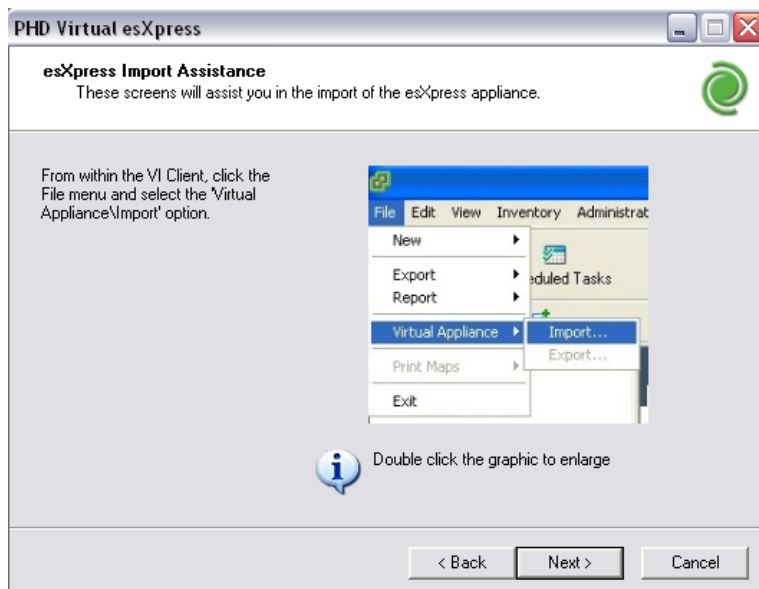
4. Enter a username and password with administrative rights on the server (able to deploy a virtual appliance).
5. Click **Validate**.



6. When validation completes, click **Next**.

If you are using vCenter or ESX 4.0 or later, continue with step 7, below.

If you are deploying to a pre-vSphere Virtual Center or ESX host, the next few steps instruct you how to import the esXpress OVF.



When finished following the steps to import the appliance, continue with the appliance configuration in the following step.

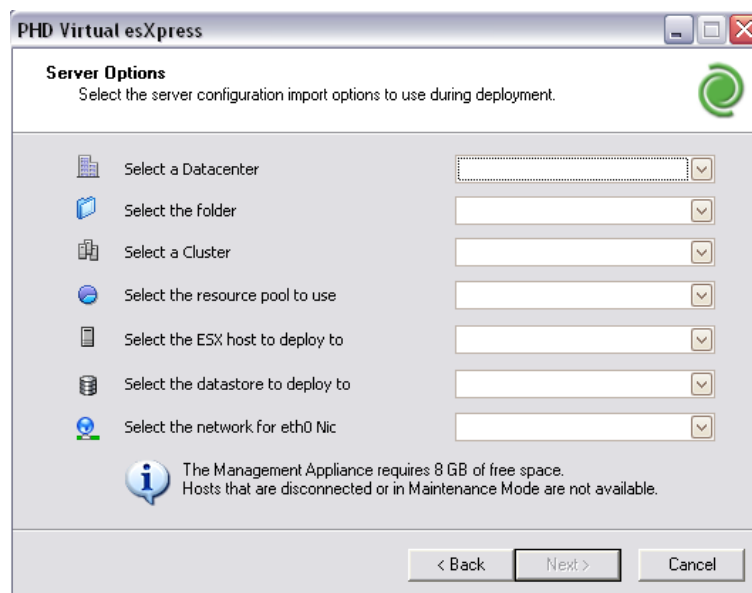
7. Select which appliance to deploy.

- The **Management Appliance** is used to configure and install esXpress on the hosts in your environment as well as restore backups.
- The **DeDupe Appliance** is a backup target for storing and managing deduplicated backups.

(**pre-vSphere**) Select the newly imported appliance, the Datacenter the VM belongs to, and a Fully Qualified Domain name for the appliance (host.yourdomain.com, for example).

(**vSphere**) Enter a display name and a Fully Qualified Domain name for the appliance (host.yourdomain.com, for example).

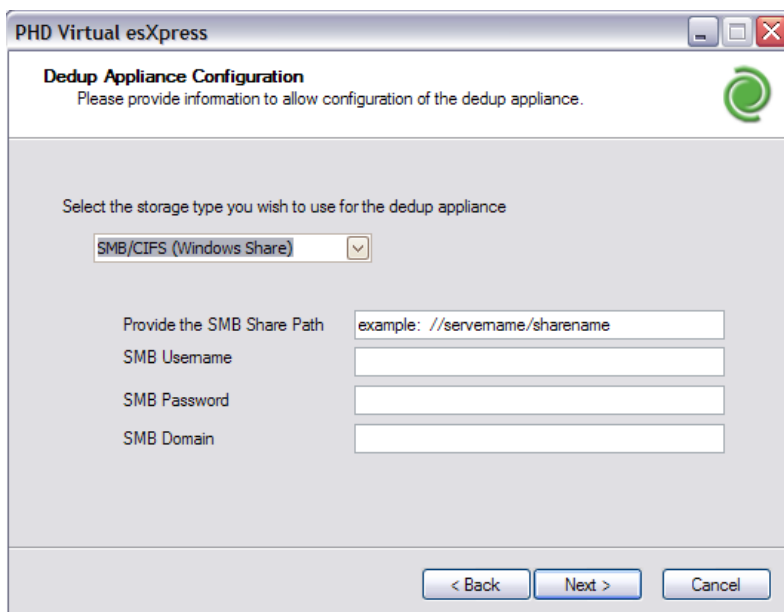
8. Click **Next**.
9. The executable will locate the required OVF and VMDK files from the extracted esXpress zip. If the files could not be found (if you are running the executable from another location) click **Browse** to select the folder that contains the OVF.
10. Click **Next**.
11. Review the End User License Agreement and select **I Agree**, then click **Next** to continue. The Options page opens.



12. (**vSphere only**) Select the import options. These options define where the new appliance VM will be deployed within vCenter or on your host server. Options that do not apply (when deploying to an ESX host, for example) are grayed out and are not available.
13. Click **Next**.
14. Enter the appliance networking information. Click **Test IPs** to validate the addresses are correct and available.
 - If you need to enable DHCP, hit **F3**. This will add the DHCP option to the **eth0** drop-down box. **CAUTION:** If you plan to use DHCP, static address reservations are required to prevent the esXpress appliance IP addresses from changing, which would prevent esXpress from working properly.
15. Click **Next**.
16. Enter time zone, NTP, and proxy details.
17. Click **Next**.

If you are deploying a DeDupe Appliance, the **DeDupe Appliance Configuration** window opens next. If you are deploying a Management Appliance, you will not see this window, skip to the next step.

18. **(DeDupe Only)** Select the type of storage to use for the DeDupe Appliance. You can use an attached VMDK, or an external SMB or NFS share. After selecting the type of storage, enter the storage details, including the path and required credentials. For more information about selecting DeDupe Appliance storage, refer to the DeDupe Appliance Guide.



19. Click **Next**.
- The appliance is deployed.
20. When complete, if you deployed to a stand-alone ESX host, the appliance will power on. Note that it may take a few minutes to power on and finish loading.
If you deployed to vCenter, you will need to log in to vCenter and power on the appliance manually.
21. To deploy another esXpress appliance (the DeDupe Appliance, for example) select the check box, **Install another Virtual Appliance**.
22. Click **Finish** to exit the wizard. If you selected to deploy another appliance, the application will restart from the beginning. Complete the steps again to deploy another esXpress appliance.

After the appliances are configured, you can use each appliance's Check For Updates option to install the latest esXpress updates.

Step 3 - Install esXpress

After you have deployed the esXpress appliances, use the Management Appliance's Setup Wizard to finish the configuration and install esXpress on each host.

1. Open a Web browser and use the Management Appliance's IP address to connect to the appliance web interface. If you used DHCP, you can find the appliance IP address in the Summary tab of the vSphere client. Log in with the default username, **admin** and default password, **admin**.
2. When logged in to the Management Appliance web page, follow the steps in the **Setup Wizard** to finish the configuration and to install esXpress to each of your hosts. See "[esXpress Setup Wizard](#)"

(on page 24).

If you deployed a DeDupe Appliance, you can use a Web browser to log in to the DeDupe Appliance web page with the default username, **admin** and default password, **admin**. There you can view and modify the DeDupe Appliance settings, view backups, statistics, and perform file level restores. See the DeDupe Appliance guide for additional information.

esXpress Setup Wizard

The first time you log in to the Management Appliance web page, you are presented with the Setup Wizard which will guide you through the steps needed to finish the appliance configuration and install esXpress to your hosts.

You can click the link for any completed step to jump directly to that step's page. Optional steps can be bypassed by clicking **Skip**. To exit the wizard at any time, click **Stop**. You must complete each required step to move on.

Step 1 - License

1. At the Licensing page, click **New License**.
2. Enter your license information and click **OK**. For each additional license you want to enter, click **New License**. Use **Import License File** to add your license information automatically. At least one license is required.
3. When the license is validated (the text color will change from gray to black), click **Next**.

Step 2 - Backup Target

1. Backup Targets store the esXpress backup data. At the Backup Target page, click **New Backup Target** and enter the information for the backup targets you will be using. Click **OK** when you are finished entering the target information. All backup targets created during the Setup Wizard are automatically added to the default Target Team.

Note: If you plan to backup to VMFS only, a backup target is not required. However, you will need to create a placeholder backup target to advance past this step of the wizard.

2. Click **Next**.

Step 3 - Email

1. On the Email Server page, you can optionally define an email server to receive email updates from esXpress. Click **New Email Server**.
2. Enter the email server information and click **OK**. Use the Global Settings, Email tab to enter up to five email addresses where you would like to receive esXpress notifications
3. Click **Next**.

Step 4 - Global Settings

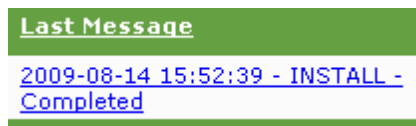
1. The **Global Settings** page is optional: you can review these settings now and make any changes, or you can accept the defaults and make changes later.
2. If you made any Global Settings changes, click **Save**.
3. Click **Next**.

Step 5 - Hosts

1. At the Hosts page, define all of the ESX or vSphere hosts that will be running backups. At least one host is required to complete the wizard. To add a single host, click **Add Host**. To add multiple hosts from vCenter, click **Add Hosts from vCenter**.
2. When adding a single host, enter the IP address and description, assign the host to a target team and host group (optional) and enter the host credentials. Be sure to select **Enable scheduled backups** to allow esXpress to run on the device. Click **OK** when complete. To add additional individual hosts, Click **Add Host** again and enter the host's information.

If adding multiple hosts from vCenter, enter the vCenter information then select the hosts to install esXpress to, and enter the credentials to use, then click **Submit**.

3. Hosts are added to the list and the esXpress RPM files are installed. This may take a few moments. The esXpress files are installed and the hosts are ready when the **Last Message** column displays the message, **Install Completed**.



4. Click **Next**.

Step 6 - Host Configuration

1. On the Host Configuration page, define any additional settings or accept the defaults and click **Save**. The **VBA Location** is where the VBAs will be stored. Each VBA requires 3 GB of space. **Network** defines the network the VBAs will use when they are created to run backups. This network should be routable to the backup location.

Note: If the VBAs are stored on a VMFS volume with the default formatting of 1 MB block sizes, you will be able to backup VMDK files up to 256 GB, only. If you need to backup VMDK files larger than 256 GB, you will need to store them on a VMFS volume formatted with larger block sizes. The VBA Location displays the maximum VMDK size allowed for each storage volume available.

- 1MB block size = 256GB max file size
- 2MB block size = 512GB max file size
- 4MB block size = 1024GB max file size
- 8MB block size = 2048GB max file size

2. Click **Next**.

Step 7 - Publish

1. The configuration settings are automatically published to your hosts. When publishing completes, click **Next**.
2. Click **Finish** to exit the wizard.

Automatic backups are configured and will begin based on the schedule and settings you defined.

After completing the wizard, the Setup Wizard link is removed from the Management Appliance menu.

View the Global Settings page to see additional configuration options, add additional hosts, enter email addresses for esXpress notifications, or perform restores.

Removing esXpress

Before removing the esXpress software, you can use the [xALLNOTES] command within vCenter to remove any esXpress information from the Notes fields for all VMs. For information on using esXpress X Commands, see the Commands Reference guide.

To remove esXpress from an individual host there are two methods:

1. If you are using the Management Appliance, delete the host from the Hosts page. This will remove esXpress from that host.
2. If you are running a stand-alone host, run the following commands to remove the esXpress software:

```
rpm -e esxpress  
rpm -e esxpressVBA
```

After the esXpress software is removed, some files are left behind on each host. To completely remove these files, log in to the host as root and run the following commands to locate any remaining files:

```
find / -print | grep esxpress  
find / -name esxpress -print
```

Delete any esXpress files found.

Chapter 3 - Using esXpress

After esXpress is installed and configured, backups will begin automatically, based on the schedule and settings you defined. For more information about configuring the automatic backup schedule, refer to the Management Appliance Guide.

The following sections provide an overview of the basic features available with esXpress:

- ["Running Backups" \(on page 28\)](#)
- ["Restores/Replication" \(on page 29\)](#)
- ["Using the DeDupe Appliance" \(on page 30\)](#)
- ["Support File" \(on page 32\)](#)
- ["FAQ - Change Block Tracking" \(on page 33\)](#)

Running Backups

How do I run a backup?

By default, once esXpress is installed on your host, all of the Virtual Machines registered to that host will be backed up automatically during the nightly backup window. With esXpress, all of your virtual machines are backed up unless you indicate otherwise.

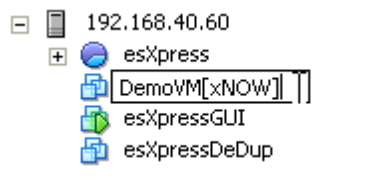
In addition to the automatic backups you can run individual backups in a few ways.

- Using esXpress X Commands. These are special esXpress commands you can append to a Virtual Machine's display name or add to the VM notes that tell esXpress to carry out a specific action.
- From the PHD text menu on each host, for example, using the **Backup One VM Now** option. See the Reference Manual for details on the text menu options.

After installing and configuring esXpress, you can choose to wait for the automatic backups to run or you can run a VM backup immediately using X Commands.

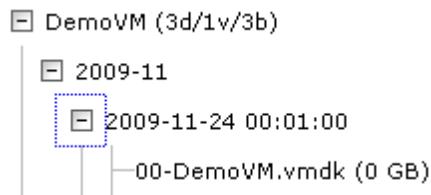
To run a backup

1. Within a vSphere or VI3 client, locate the VM you'd like to backup and modify the VM name by adding [xNOW]. For example, if the VM name was DemoVM, rename it to DemoVM[xNOW], as shown in the following image.



esXpress monitors the VM names and VM notes and when it finds a valid command, it will kick off the appropriate action. For more info on the available commands, refer to the X Commands Reference.

2. In this example, esXpress renames the VM to its original name, then begins the backup process. To monitor the process, log in to your host device and view the backup log by running the command **phd t** on the command line. For more information on the backup log and reports, see the Backup Report Reference Guide on the [Knowledge Center web site](#).
3. When finished, you can go to your backup target to view the new backup files. If you ran a DeDupe backup, you can log in to the appliance web page, click the **VMs** link and view the backups. The following image shows a backup in the DeDupe Appliance VMs page.



All of the esXpress backup processing occurs in the Virtual Backup Appliances (VBAs) which will run on each of your hosts. Because multiple VBAs can run concurrently on each host, esXpress can scale with your environment and since the VBAs are virtual machines, they can be controlled in resource pools, if needed.

Restores/Replication

With esXpress, you have the freedom to restore your data at the file level, by individual VMDK, or restore an entire Virtual Machine and re-register it automatically with the host or Virtual Center. For the entire VM, each VMDK does not need to be restored separately.

Instant File Level Restore for Linux and Windows VMs is available directly from the DeDupe Appliance web interface.

Replication gives you exact copies of your backed up VMs ready to be registered and powered on. esXpress leverages its powerful backup engine to provide VMDK replication (simple and incremental).

Methods of Restoration available:

- Text Menu Restore (VMDK and VMX).
- Restores without esXpress installed—Delta backup archives are self-executing.
- Instant File Level Restore for DeDupe backups.
- Restores from the Management Appliance.

For detailed information on restoring esXpress backups, doing File Level Restores, and configuring and running esXpress replication, refer to the DR and Restore Guide. Running restores from the Management Appliance web interface is detailed in the Management Appliance guide.

Using the DeDupe Appliance

If you deployed and configured an esXpress DeDupe Appliance to store your backups, you can use the DeDupe Appliance web interface to view your deduplicated backups, perform File Level Restores, view backup statistics and modify backup retention settings.

For complete information about the esXpress DeDupe Appliance, including additional configuration information and instructions for using the web interface, refer to the DeDupe Appliance Guide.

Logging in to the DeDupe Appliance web page

Log in to the DeDupe Appliance web interface with the default username **admin** and default password **admin**.

Viewing backups

Use the DeDupe Appliance web interface **VMs** page to view your stored DeDupe backups.

The screenshot shows the esXpress DeDupe Appliance web interface. The top navigation bar includes 'System', 'VMs' (selected), 'FLR', 'Stats', 'Options', 'Users', and 'Log'. The main content area is titled 'Virtual Machine Backup Management' and shows a tree view of virtual machines on the left and a table of backup entries on the right. The table has columns for 'Archive', 'Special', 'Delete', 'Bad', 'Date/Time', 'Display Name', and 'VMDK'. The 'Selection' is set to 'Ubuntu'.

Archive	Special	Delete	Bad	Date/Time	Display Name	VMDK
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2010-04-22 00:01:00	Ubuntu	00-Ubuntu.vmdk
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2010-04-22 00:01:00	Ubuntu	01-Ubuntu_1.vmdk
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2010-04-21 15:26:00	Ubuntu	00-Ubuntu.vmdk
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2010-04-21 15:26:00	Ubuntu	01-Ubuntu_1.vmdk
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2010-04-21 14:14:00	Ubuntu	00-Ubuntu.vmdk
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2010-04-21 14:14:00	Ubuntu	01-Ubuntu_1.vmdk
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2010-04-21 00:01:00	Ubuntu	00-Ubuntu.vmdk
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2010-04-21 00:01:00	Ubuntu	01-Ubuntu_1.vmdk
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2010-04-20 11:25:00	Ubuntu	00-Ubuntu.vmdk
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2010-04-20 11:25:00	Ubuntu	01-Ubuntu_1.vmdk

File Level Restores

Use the DeDupe Appliance web interface **FLR** page to perform file level restores from your VM backups.

DeDupe Statistics

Use the DeDupe Appliance web interface **Stats** page to view detailed statistics about your deduplicated backups, including information about backup data blocks and trim settings.

Backup Statistics

Trim Report **By Date** By VM Name By Display Name By VMDK

ReCalc Last Updated: 2010-04-22 10:03:48

esXpress PHDD DeDupe Stats

Stat Value	in Megabytes	Ratio
All Blocks of All VMs	137,664	138:1
Null Blocks	76,922	56%
Real Data Blocks	60,742	61:1
Total Unique Blocks	4,336	4:1
Total Unique Blocks Compressed	1,000	1:1

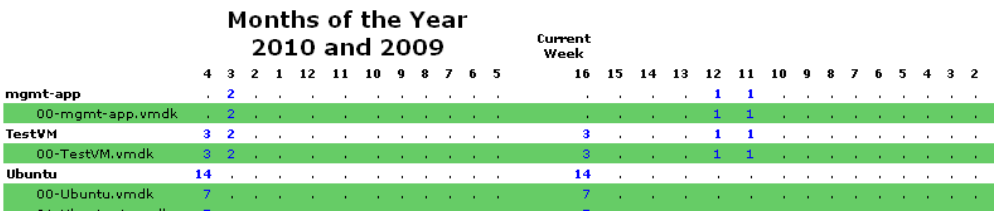
Backup Counts

Stat Value	Total Count
Blocks of All VMs	137,664
Total Backup Count	26
Total Unique Dates	7
Total Unique VMDKs	5
Total Virtual Machines	4

Other C

Stat Value	Total Count
Bad Bac	
Bad Blo	
Backups	
Blocks t	
Size of	

Number of Backups per VMDK by Trim Months and Weeks, Thin after 1 Week and Keep 1 Backup (ORANGE = Partially in t



DeDupe Options

Use the DeDupe Appliance web interface **Options** page to modify the DeDupe backup retention policies, enable Date Smart Dyanmic Export, and manage DeDupe statistics.

Support File

When working with the PHD Virtual support staff, it is normally requested that you send a support file. These support files gather all the important log and configuration information from your server which will enable the support engineers to troubleshoot the problem.

Depending on where your issue is occurring (ESX host or esXpress appliance), log in to the console of the device and run the following command:

```
phd-support
```

A script will guide you through an automated process collecting the required data. This data is automatically transmitted to our support site provided that Internet access is available. Otherwise, support data can be transmitted manually via the process below.

The support file is created in the /tmp directory and will have a .tgz extension.

To send support files manually, run the following commands:

```
ftp www.esxpress.com
login: anonymous
password: your_email_address
cd /pub/upload
bin
put the_file
```

FAQ - Change Block Tracking

"What is Change Block Tracking?" (on page 34)

"What are the requirements for using Change Block Tracking?" (on page 34)

"How do I enable Change Block Tracking with esXpress?" (on page 34)

"Do I need to enable CBT on each of my VMs?" (on page 34)

"I reverted my VM snapshot, how come CBT does not seem to be working anymore?" (on page 34)

"I restored a VM and now CBT is not working. What happened?" (on page 35)

"I configured esXpress to backup powered off VMs, how come CBT does not work for these?" (on page 35)

"How will enabling CBT affect my storage?" (on page 35)

"Do all of the VMs on my host need to be upgraded for CBT to work?" (on page 35)

"How does CBT work with Full/Delta backups?" (on page 35)

What is Change Block Tracking?

As of version 4.0, esXpress includes the ability to enable Change Block Tracking (CBT) to greatly improve VM backup performance. CBT allows esXpress to use the VMware Change Tracking API to keep track of only the disk sectors that have changed in a VM between backups. Instead of reading the entire VMDK each time to discover what has changed, only the changed blocks are read to establish backups, saving significant time in the process. Note that once CBT is enabled, the first backup made with CBT enabled will build the change block table for that VM - you'll begin to notice the improved performance with each subsequent backup as only the changed blocks will be read thereafter.

What are the requirements for using Change Block Tracking?

Change Block Tracking requires the latest version of VMware Tools installed on each VM, VMs must be at hardware version 7, and they must be running on a version 4.0 or higher ESX host. To upgrade existing VMs to hardware version 7, refer to the following [VMware article](#).

In order for esXpress to retrieve CBT data from each backup target, port 80 on the ESX hosts must be open for outgoing traffic.


The following features/configurations **do not support** CBT:

- Templates - CBT is not supported when backing up VM Templates.
- Snapshots - CBT is not supported for VMs with pre-existing snapshots. After an initial backup with CBT enabled is taken, snapshots can then be added and CBT will continue to work as normal.
- Independent disks
- RDM LUNs

How do I enable Change Block Tracking with esXpress?

To enable or disable CBT, use the Management Appliance, Global Settings. On the **Advanced** tab, In the **Backup Index Mode** section, select **Use Change Block Tracking to index source disk**.

Backup Index Mode

Use Change Block Tracking to Index source disk 



Note that when enabled, CBT may slightly impact VM performance. For more information about this impact, refer to VMware's web site. When upgrading from version 3.6x, CBT is disabled, by default.

Do I need to enable CBT on each of my VMs?

No. esXpress will automatically enable CBT on the VMs that meet the minimum requirements (hardware version 7 and running on vSphere 4 host). You do not need to manually enable CBT on each VM.

I reverted my VM snapshot, how come CBT does not seem to be working anymore?

When you revert a snapshot, VMware 'resets' CBT on the VM. Subsequent backups of the VM will begin to use the changed blocks to determine what needs to be backed up.

I restored a VM and now CBT is not working. What happened?

When a VM is restored or moved via Storage vMotion, the change block tables are reset - they must be built again when the first backup is made. Subsequent backups will then use the change block tables to determine what needs to be backed up.

I configured esXpress to backup powered off VMs, how come CBT does not work for these?

VMs must be either powered on at least one time when CBT is enabled (or powered on at least one time since CBT was enabled) in order for CBT to be activated on the VM. After this initial CBT backup, the VMs can be powered off and CBT will continue to work as normal.

How will enabling CBT affect my storage?

When CBT is enabled, VMware adds a single, small, file (*.ctk.vmdk) to each VM directory on the VMFS. This file is used to keep track of the changes for that VM. Typically, these files are only a few MB in size. There is no impact to your backup storage.

Do all of the VMs on my host need to be upgraded for CBT to work?

No. Although CBT can only be enabled for VMs that are at hardware version 7, the VMs in your environment can be any version. CBT backups will be run only for those VMs that meet the minimum requirements for CBT. For the VMs that do not meet the CBT requirements, normal esXpress backups will be run.

How does CBT work with Full/Delta backups?

When running Full/Delta backups, CBT backups will not begin until *after* the next Full backup (after CBT was enabled). Enabling CBT will not automatically force a Full backup - the Full will be taken whenever the next Full is scheduled and then CBT backups will begin with the Delta backups between each Full thereafter.

If you are running **Fulls only** (no Deltas) CBT backups will not occur because they rely on the Delta backups taken between each Full. Regular Full backups will still be run as scheduled, they will just not be CBT backups. To take advantage of CBT backups, you must be running either **Fulls with Deltas** or **DeDupe** (PHDD) backups.

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