



esXpress v3.1

Installation Guide

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www.espress.com www.p2v.net

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esXpress Installation Guide

Introduction

Out of the box, esXpress provides automatic daily backups of all running virtual machines. It also allows for one-off backup jobs that can be scheduled or initiated on-the-fly. The easy installation ensures a simple but powerful backup solution for your virtual infrastructure.

esXpress is the only commercially available tool that features hot full, delta and/or encrypted backups for VMware ESX virtual machines. esXpress Delta backups capture changes at the block level of each virtual disk. It then quickly compresses, encrypts and transports each virtual machine to a VMFS LUN, or the FTP, SSH or SMB server of your choice. Or even to both network and VMFS targets simultaneously. This allows you to have the convenience of locally stored backups combined with the security of off-site storage. esXpress deltas are generally small enough to backup across even slow WAN links.

esXpress also provides in-depth reporting features including statuses, the virtual machine name and size and the effective backup speed in both GB/hour and MB/second. esXpress can automatically compile and send these reports via email to systems administrators and/or managers.

Purpose

The purpose of this guide is to detail the installation and configuration steps for a common installation of esXpress. esXpress is easy to install, modify, upgrade and uninstall. This guide will cover all necessary steps to have esXpress installed and running in minutes.

Background

esXpress is designed for the VMware administrator that has passed the VCP (VMware Certified Professional) exam or has equivalent experience. Installation and administration of esXpress requires that you have a basic understanding of configuring ESX servers, virtual machines, basic networking, and using Virtual Center.

With esXpress version 3.1-21 you need a valid license entered to run backups. There is no Free Mode in version 3.1-21. An initial evaluation license is available on your download page good for 30 days. After the evaluation period contact sales (sales@esxpress.com) if an evaluation license is extended.

With the esXpress approach each host in your farm is responsible for backing up the VMs that are currently registered to it. If a virtual machine gets VMotioned from one host to another the new host will automatically add it to its backup cycle while the original one will remove it. There is no intervention necessary. This also creates a no single point of failure environment where each host runs autonomous from each other and a failure on one host's backup has no effect on the others.

Because of this approach you will need to install and configure esXpress on each of your hosts. Each host runs their own Virtual Backup Appliances (VBAs). The installation manual describes the planning, prerequisites to consider and the configuration steps for a single host. These same steps will apply to every host. There is a built in function to copy a configuration from one host to another to simplify the setup.

Installation

esXpress is easy to download and install and takes only minutes. If you have not yet downloaded the installation program or *rpm* go to <http://www.esxpress.com>. From here you can register to download esXpress After registering you will be emailed a link to your personal download page which includes the temporary license key.

Prerequisites

Like any software, a successful esXpress implementation is directly proportional to the amount of preparation. Unlike previous versions of esXpress, v3.1 requires a certain amount of planning. Although it will run out of the box with minimal configuration, in order to install and have esXpress run efficiently you will need to decide upon many factors beforehand.

You need to decide exactly what kind of backups you want to run. Will you run Full backups, Delta backups, Encrypted, Daily, Weekly? What will be the retention time for the backups? In addition you need to decide what mode of transport you will use.

esXpress can perform network-less backups (VMFS LUN to VMFS LUN), network backups (VMFS LUN to FTP, SSH or SMB), or both simultaneously. You will need to plan and configure you target storage and supporting options.

For network-less, or VMFS LUN to VMFS LUN backups you will need the following:

- Select a VMFS LUN to store the esXpress archives. Preferably its own LUN, not one shared with running or production VMs.
- It is recommended that the LUN be local SAN, iSCSI or other high performance systems. VMFS across NFS is not recommended. This protocol is too slow and unreliable.
- If you use shared storage make sure the VMFS LUN is visible by all ESX hosts in the backup farm
- For VMFS backups you need to initially for the space of each vmdk to be backed up. With VMFS backups esXpress pre-creates the entire vmdk and then compresses it at the backup completion.

If network or FTP/SSH backups you will need to do the following:

- Have access to a running FTP/SSH server. FTP/SSH server can be Windows, Linux, or any other operating system that support large files (>4GB)
- Create or use a valid account and password. Make sure you have read, write, delete and make directory rights
- Do not use anonymous FTP account

- Have a directory on the FTP server established for your backups (e.g. **/phd/backups/**) and the proper permissions set. Make at least one subdirectory on the FTP server; do not use the server root as the backup repository.
- The backup folder entered in esXpress needs to be the absolute path, not a relative path.
- Note for Windows host servers: The FTP server included with Microsoft IIS can have issues with files larger than 28GB. It is recommended you instead use a commercial quality FTP server program, our recommendation is FileZilla.
- Note for Windows FTP servers: Only use Microsoft Server products (2000/2003 Server) as FTP/SSH target servers. Workstation products (XP, 2000 Pro) have limited large file transfer capabilities and absolutely will cause your backups to be un-restorable
- Test your FTP/SSH connection. Make sure you can log on to the FTP server and have read, write, delete and directory create permissions.
- For network backups esXpress does the compression in the same pass as the backup.

If you are going to enable email reporting, you will need to make sure of the following:

- Determine if email should be sent via the console network or from a VMNET.
- IP address, subnet mask, default gateway, DNS setting for the email virtual appliance, unless using DHCP.
- SMTP server DNS name or IP address as well as port
- If sending via console network, make sure the specified port is opened for outgoing packets in the ESX firewall.

For the Virtual Backup Helpers or VBAs, you will need to plan network and storage locations:

- IP address, subnet mask, default gateway, DNS setting for the email virtual appliance, unless using DHCP
- VMFS space for the **esXpress_helpers** folder. esXpress requires 3GB of free VMFS space to install
- It is recommended to put the esXpress helpers on a local vmfs partition (especially for ESX 3.5 hosts), if possible. While the helpers can be run from shared storage esXpress will perform much better from a local vmfs.
- Each VBA, while running, will need at least 3GB of free space.

Other requirements are:

- Virtual Infrastructure Client (VI3 client)
- Administrative permissions within the Virtual Center environment
- Root permissions on the ESX/Virtual Infrastructure 3 host
- ESX 3.0.1/3.0.2/3.5 with all recent patches installed*

Software

- The esXpress *rpm* files from www.esxpress.com. are installation programs for Linux based operating systems**.

Optional Software

- FTP server software (Windows)
 - o Filezilla <http://filezilla.sourceforge.net/>
- SCP software. To transfer the *rpm* files onto your ESX Server from a Windows host may require the use of a third party SCP utility.
 - o WinSCP©. An easy to use graphical file transfer program. It can be downloaded at: <http://winscp.net/eng/download.php>
 - o pscp. An easy to use DOS based file transfer program that can be run at the command line or can be easily scripted. It can be downloaded at: <http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html>
- SSH Terminal software. To log onto your ESX Server console from a Windows® computer, you can use PuTTY© or any other SSH client. Putty can be downloaded at: <http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html>

* At this time we do not recommend installing esXpress on any ESX 3.0.0, nor any 3.0.1 host that is not at least at the Jan 31, 2007 patch level. VMware has addressed many stability issues related to the snapshot manager, guest tools and kernel scheduler with these patch sets and they are required for trouble free operation. For ESX 3.5 we recommend to path at least to the 4/30/08.

** RPM stands for RedHat Package Manager. This is not a Real Player Movie file. If your associates the .rpm extension with Real Player files, right click on the link instead and select "Save target as"

Installing

The installation of esXpress itself is very easy and takes less than a minute. Simply download and transfer the **rpm** files to the host, or install directly from the esXpress CD-ROM, if you have one. RPM files are named similar to **esxpress-3.1-17.esx.i386.rpm** and **esxpressVBA-3.1-1.esx.i386.rpm**.

Note : This installation of the esXpress rpms is done on each host in your farm where you will run backups.

- CD-ROM (Install from ESX host CDROM drive)

```
# mount /mnt/cdrom
# cd /mnt/cdrom
# cp * /tmp
# umount /mnt/cdrom
```

- If you downloaded esXpress or have CDROM

Copy the **rpm** files to the **/tmp** directory of the target ESX server using a SCP utility.

Log on to your ESX Server either from the console via SSH and **cd /tmp**.

First, install the esXpress VBA. From the command line enter: **rpm -i esxpressVBA-3.0-0.esx.i386.rpm** (or the name/version of the release downloaded)

Figure 1 Install esXpress VBA

```
[root@esx3 tmp]#
[root@esx3 tmp]# rpm -i esxpressVBA-3.0RC-1.esx.i386.rpm

esXpress.com or backup.p2v.net, PHD Smart Delta, Patent Pending.
Thank you for installing the PHD esXpress Virtual Backup Appliance.

[root@esx3 tmp]# █
```

If the install was successful you will see a message similar to figure 1 above. Next, install the esXpress v3 code base: **rpm -i esxpress-3.0-9.esx.i386.rpm** (or the name/version of the release as downloaded)

Figure 2 Install esXpress

```
[root@esx3 tmp]# rpm -i esxpress-3-ORC-99-esx-i386.rpm

esXpress.com or backup.p2v.net, PHD Smart Delta, Patent Pending.
Thank you for installing PHD esXpress v3 backups.
Please type: phd for the menu

If this is an upgrade, goto to Config menu (phd c), then Copy to import.
Or type: phd import

If this is a new install, make you configure the VMFS and NETWORK for the VBAs

This Beta code has a compiled drop dead of: November 11, 2006

[root@esx3 tmp]# █
```

The result should look similar to figure 2. That's it!. esXpress is installed.

**** Important Note – By Default after installation esXpress will set Automatic Backups on and starting backing up all the VMs on your host. If you do not want this to occur you Must turn Automatic Backups Off. ****

Configuration

To configure esXpress, from the command line of your ESX Server, type:

phd

As this is your first time running esXpress, you will need to read through and agree with the End User License Agreement (EULA). The EULA is also included on page 3 of this guide. Press **Enter** to continue as shown below in Figure 3.

Figure 3 Agreeing with the EULA

```
[root@esx01 tmp]# phd
PHD esXpress, by PHD Consulting llc, Copyright 2006, www.esxpress.com
Patent Pending.
Please read and agree to EULA if you agree to it.

Press Enter to continue █
```

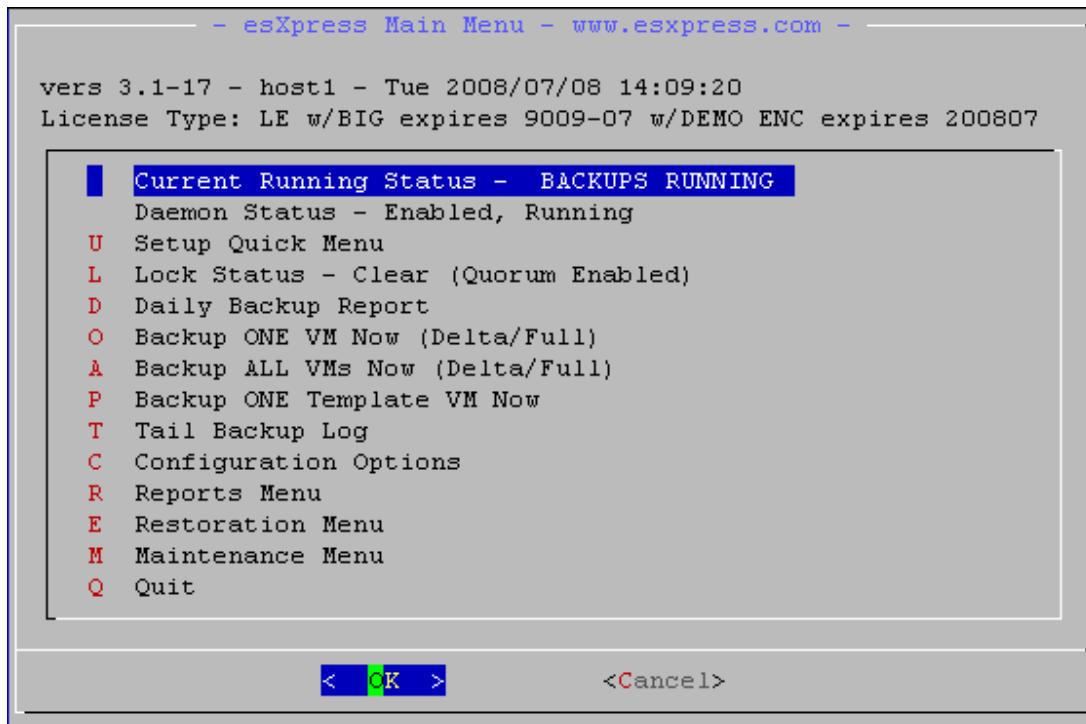
After you have thoroughly read the EULA, type **yes** to accept all of its terms. It is only after you have accepted the terms of the EULA that you will be shown the esXpress Backup Menu.

esXpress Backup Menu

When you run **phd** you are presented with a simple to use text menu (figure 4). The esXpress Backup Menu is easy to use and can be navigated either with the arrow keys on the keyboards or with the mouse.

At the top of the menu you see the name of the ESX host, the esXpress version number, license type and the expiration of your support contract if you have one.

Figure 4 esXpress Backup Menu



In Table 1 below, a brief description is given for each menu option.

Table 1 esXpress Backup Menu Options

Option	Description	Function
	Current Running Status	Informational. Indicates the running status and if any errors have occurred that day.
	Daemon Status	Informational. Indicates whether or not the esXpress background daemon is enabled and its running status.
U	Setup Quick Menu	Setup Quick Menu with options for the basic esXpress configuration
L	Lock Status	Backup lock options. Allows to you to Pause, Abort or Stop running backups.
D	Daily Backup Report	View the entire backup status report. This is reset daily.
O	Backup ONE VM Now	Start a single backup for one particular virtual machine now.
A	Backup all VMs Now	Start a backup of all registered virtual machines on the host.
S	Special Backup ONE VM Now	Start a single backup for one particular virtual machine now sending the archive to an alternate location
P	Backup ONE Template VM Now	Start a backup of a one template
T	Tail Backup Log	View the last page of the dynamically updated backup log. Watching the backup log is very helpful for troubleshooting problems.
C	Configuration Options	Set FTP, SMTP and other options for esXpress
R	Reports Menu	Provides in-depth information about each backup
E	Restoration Menu	Restore a virtual machine
M	Maintenance Menu	Perform various maintenance functions
Q	Quit	Quit the PHD application and return to the command line

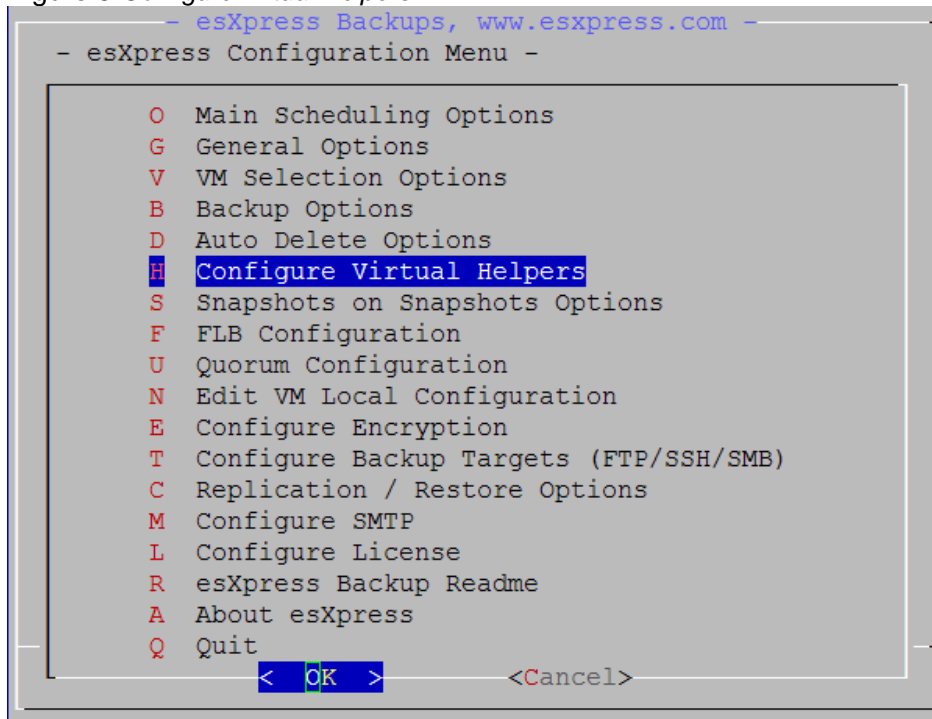
The first step is to configure the necessary options in order to start the GUI helper. Note the GUI helper is not required to run backups. It is just a configuration tool. Select **C Configuration Options** from the menu as shown below in Figure 4.

The first component you want to configure is the VMFS from which to run the virtual

Select **H Configure Virtual Helpers** as shown below in Figure 5.

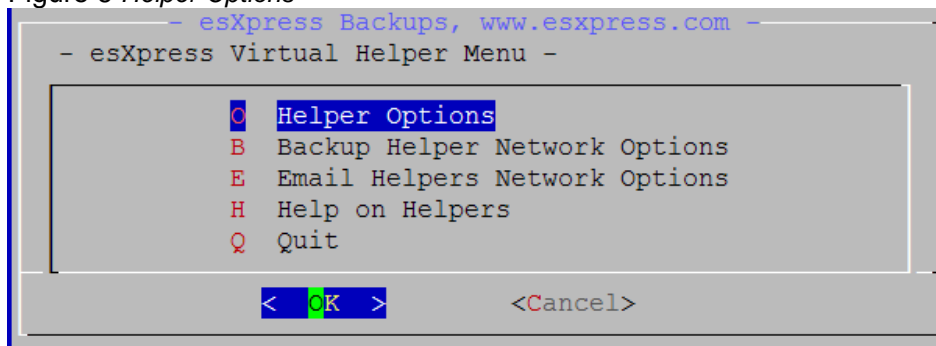
**** Note the Setup Quick Menu can also be used for configuration. It is a short cut menu to the same options as shown from the main phd menu. On it are the menu options for configuring the Virtual Helpers, Backup Targets and starting the GUI. The Setup Quick Menu is explained later in this manual.*

Figure 5 Configure Virtual Helpers



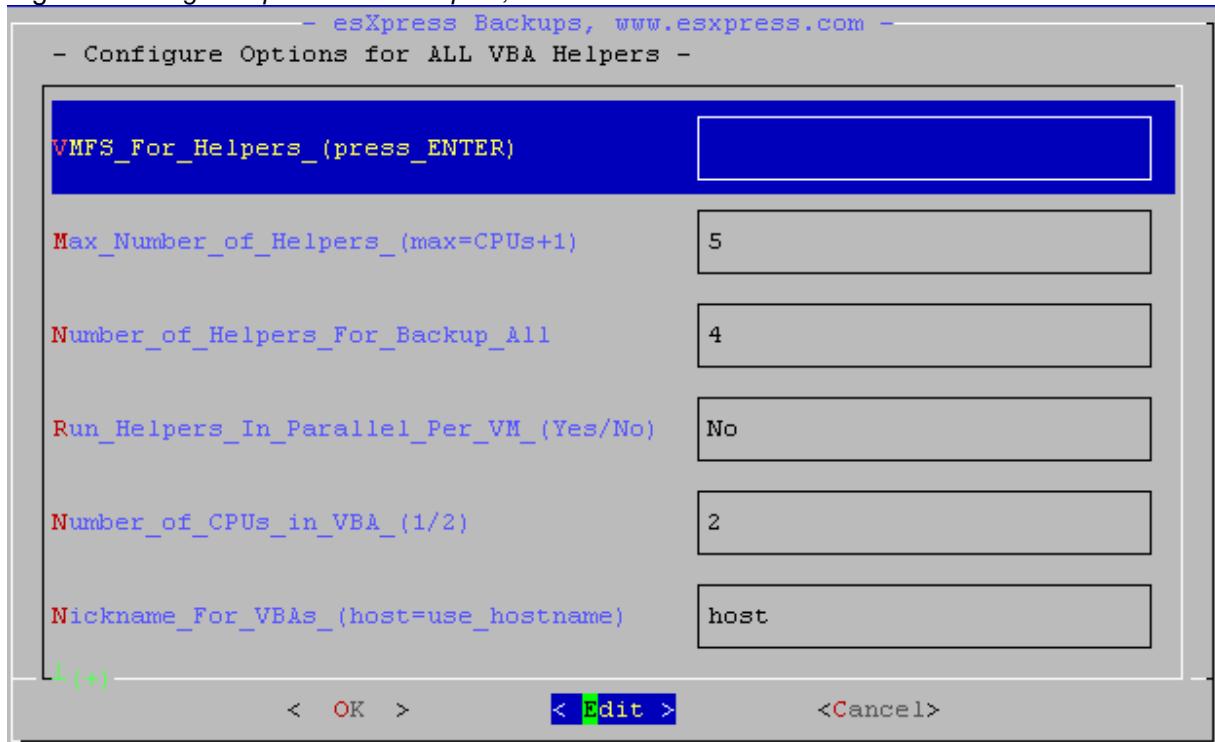
You will now be at the esXpress Helper Menu. Select **O Helper Options**.

Figure 6 Helper Options



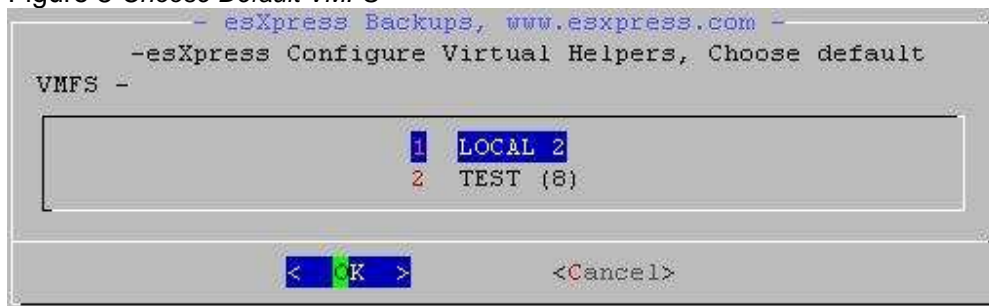
This **Configuration Options for ALL Helpers** screen allows you to configure most of the minimum requirements needed in order to install, register and power on the esXpress GUI Appliance. Once the GUI Appliance is installed and powered on, the remainder of configuration shown will take place inside the VMware Virtual Infrastructure 3 Client application. Note – all options in the GUI Appliance are also in the Text Menu.

Figure 7 Configure Options for All Helpers, before



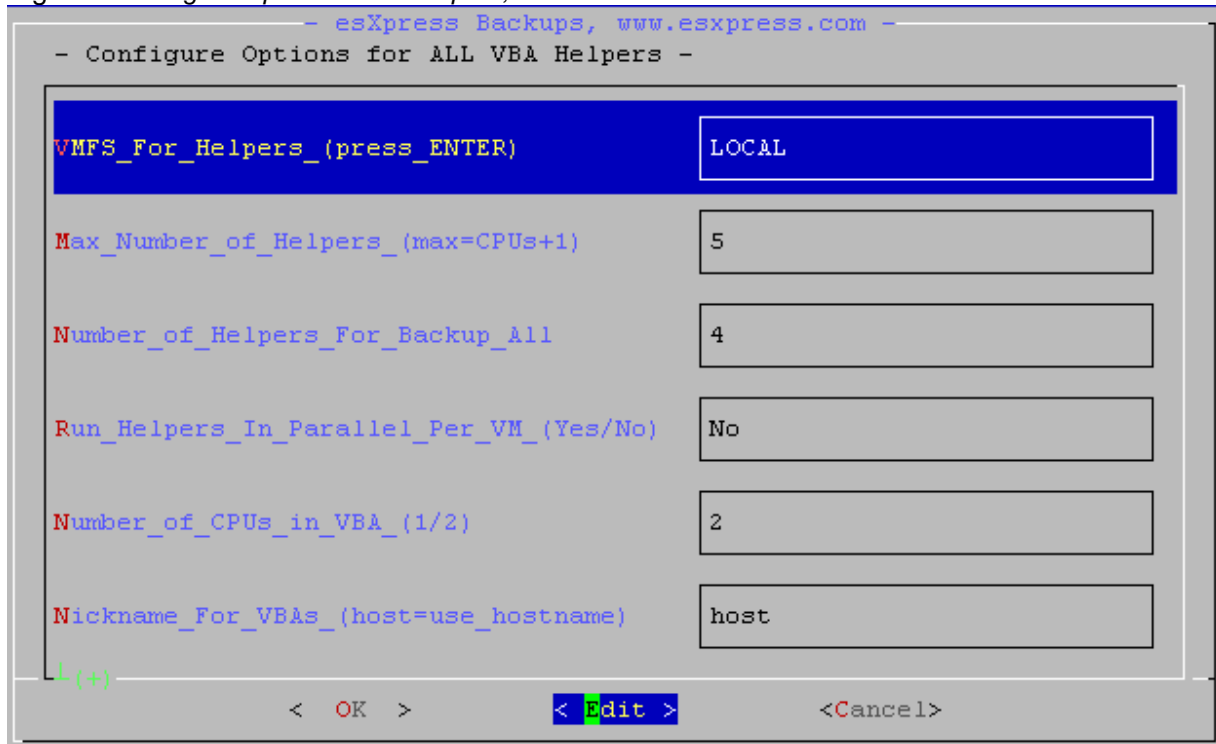
By default, the **VMFS_For_Helpers** parameter is highlighted. To select a VMFS ensure that **Edit** is also highlighted and press **Enter**. One in edit mode, press **Enter** again to see a list of available VMFS file systems. Figure 8 shows an example.

Figure 8 Choose Default VMFS



Use the arrow keys or mouse to select the VMFS volume on which to create the **esXpress_backups** folder and press **Enter**.

Figure 9 Configure Options for All Helpers, after



When done, the **VMFS_For_Helpers** field should show the entry you selected.

Important - If you are using VMware VI3 Starter Edition or do not have SMP support for the virtual machines, you **MUST** change the **Number_of_CPUs_in_VBA** to **1**. If you have a 3.5 host the CPUs per VBA can only be 1.

When finished, select **OK** and press **Enter**. You will be prompted to save the Virtual Helper Options. Select **Yes** and press **Enter**.

Figure 10 Confirm Save Changes

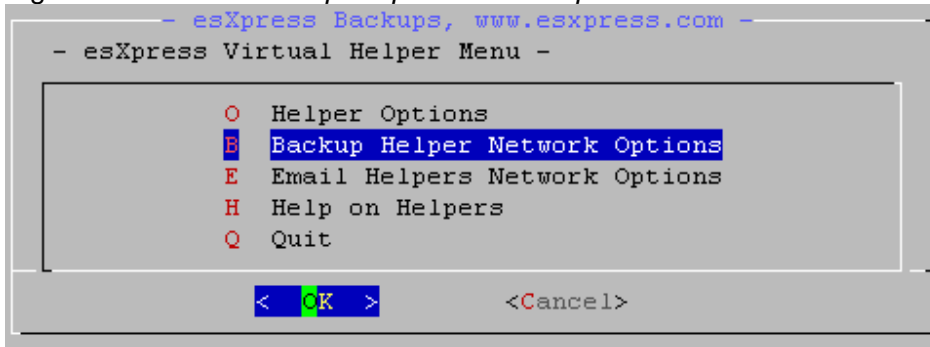


You will be returned to the **esXpress Helper Menu** (figure 6). Select **Q Quit**, to return to the **esXpress Configuration Menu**, figure 5.

You now need to configure a valid network on your host to esXpress. Without a valid network the esXpress VBAs and the GUI will not start properly.

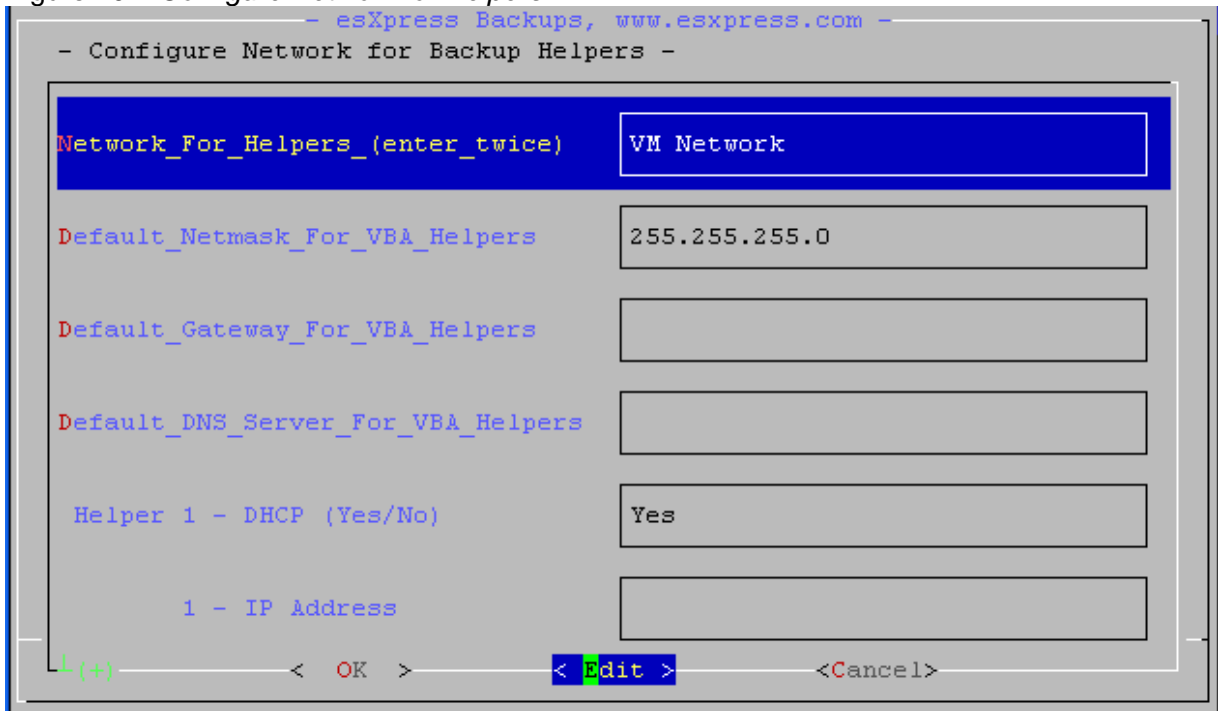
Select **(B)ackup Helper Network Options** (Figure 10.1)

Figure 10.1 Select Backup Helper Network Options



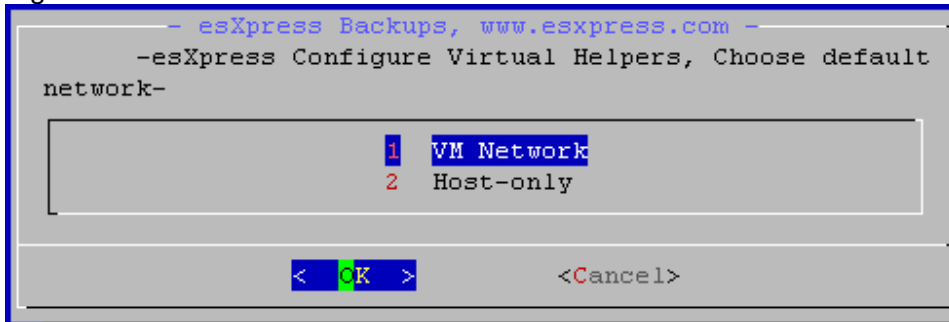
Select the 'Network_for_Helpers_(enter_twice)' option (Figure 10.2), remember to hit Enter twice.

Figure 10.2 Configure Network for Helpers



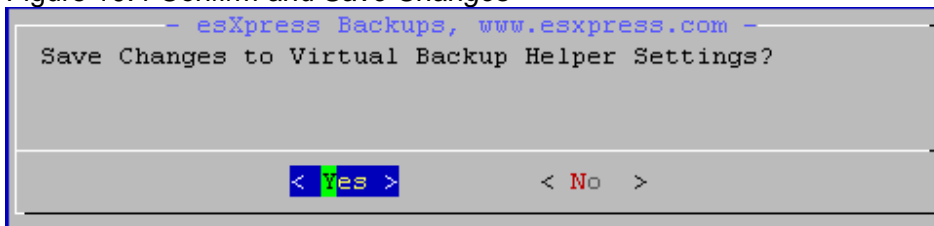
Select a valid Network from your host that you want the esXpress VBAs to use from the presented choices (Figure 10.3)

Figure 10.3 Select Valid Network



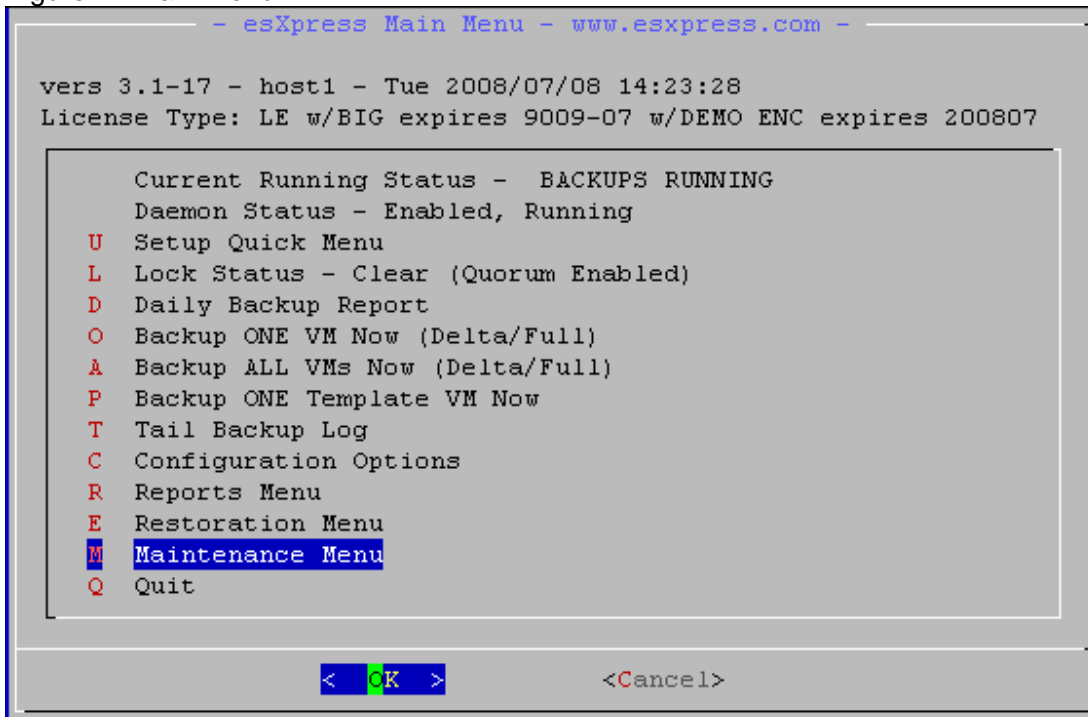
After selecting the Network then hit **OK** and save the changes (Figure 10.4).

Figure 10.4 Confirm and Save Changes



Next, again select **Q Quit** to return to the **esXpress Main Menu**, figure 11. Once back at the main menu, Select **M maintenance Menu**.

Figure 11 Main Menu



Selection the Maintenance Menu will launch the Menu as shown in *Figure 11*.

Figure 11 Maintenance Functions Menu

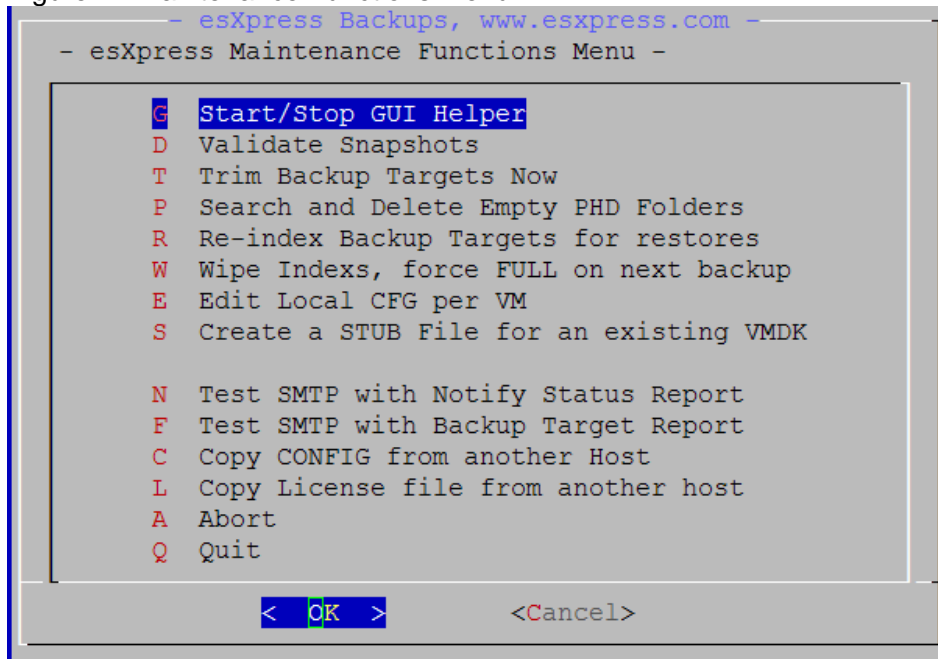
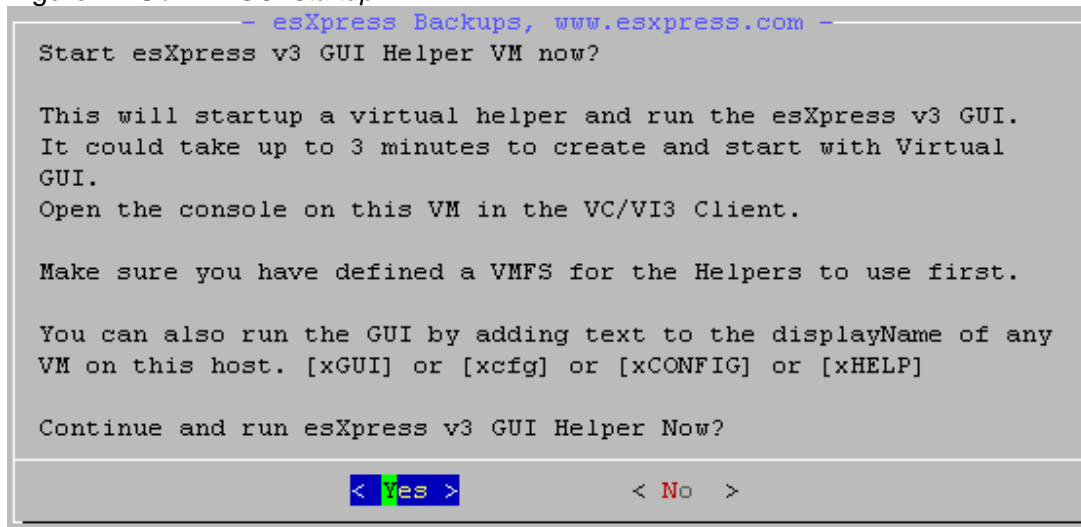


Figure 12 Confirm GUI Startup



Select **Yes** to confirm. The system will create the GUI helper, register the new virtual machine and then power it on. Depending upon your system, this process can take a few minutes to complete. The GUI helper only needs to be created the first time you launch it.

Log out of the console and/or close you terminal session.

GUI Setup and Configuration

Open Virtual Infrastructure Client and log in to the host you on which you installed esXpress. You should see an entry for the GUI Helper.

Figure 13 Virtual Center View

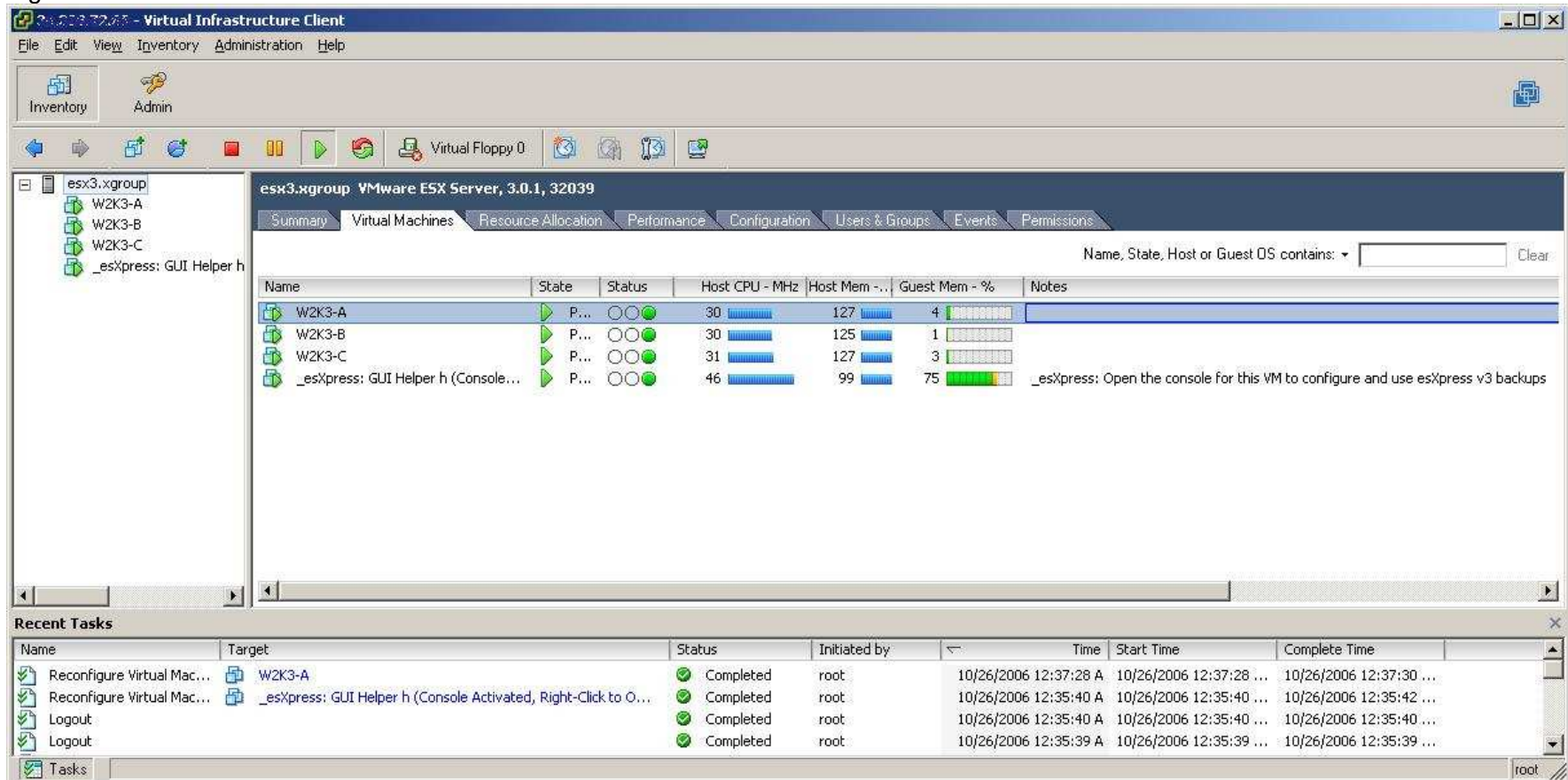
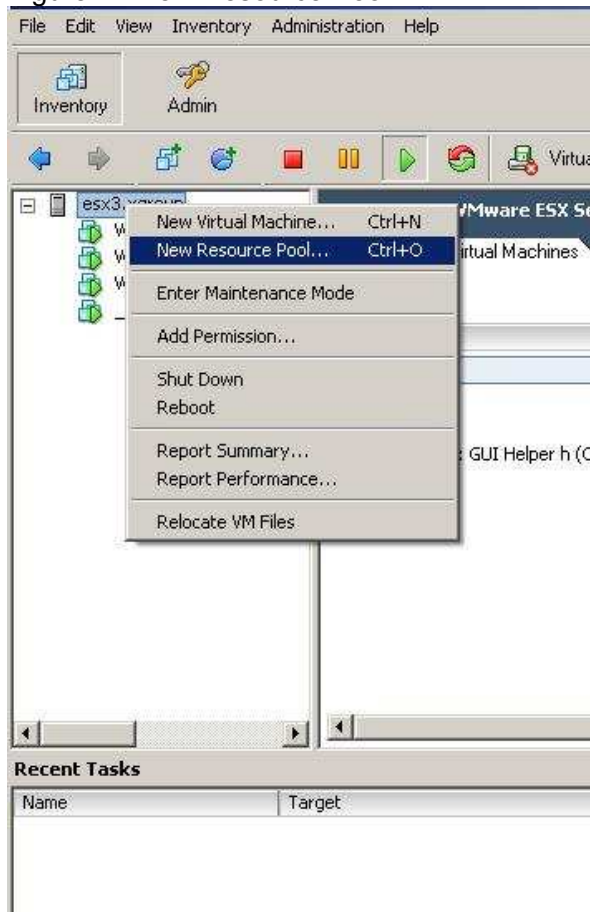
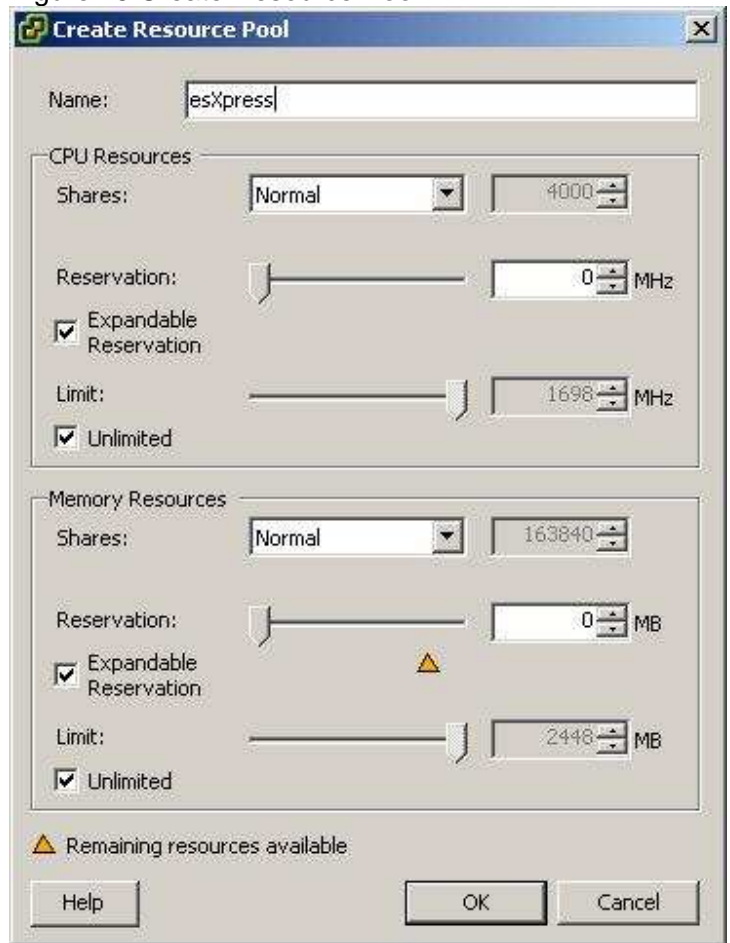


Figure 14 New Resource Pool



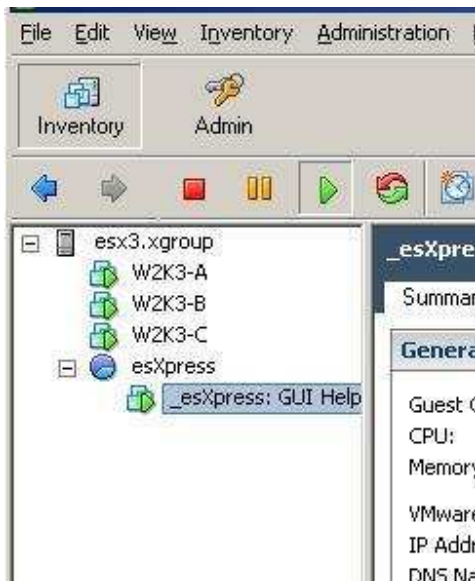
esXpress helpers should reside within a resource pool. Right-click on the ESX host and select **New Resource Pool**. Resource pools allow you to group all esXpress processes together, as well as control the system resources allocated to backup processes.

Figure 15 Create Resource Pool



Name this resource pool **esXpress**. Do not adjust the reservations until you run a backup cycle in order to create a baseline for resource usage. After you have a baseline you can adjust esXpress accordingly.

Figure 16 Create Resource Pool

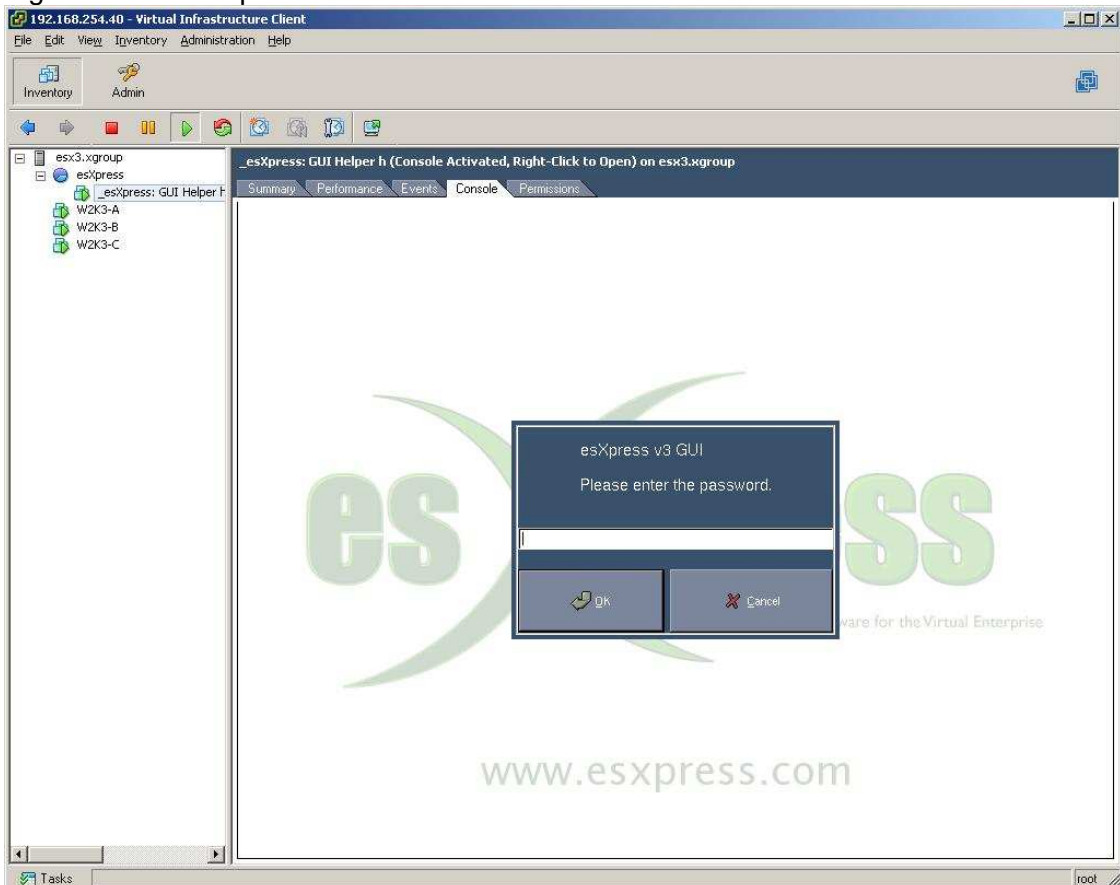


Next, move the esXpress GUI Helper virtual machine into the newly created esXpress resource pool.

Depending upon how many helpers you configure as well as whether you send email reports via the console or VMnet will determine the maximum number of virtual helper appliances. Virtual Backup Appliances or VBAs will create themselves in root of each host. You will need to move them into the esXpress resource group upon their first invocation. There after they will always reside within this group.

Now, while still having the esXpress GUI Helper highlighted, click on the Console tab.

Figure 17 The esXpress GUI



The esXpress GUI is displayed. By default, the password is blank. Click **OK** for the main menu.

Figure 18 The esXpress GUI Main Menu



Within the esXpress GUI there are 7 options off the main menu.

esXpress v3 Configuration

This is the option to view and/or modify all esXpress options and parameters.

Live esXpress Backup Log

Displays all backup processes in a live view.

Host Process Monitor

Monitor all process on host in a top view.

VI3 Command Help

Additional Help on using esXpress V3 commands from VI3.

More Help

Shows additional Help Menu with ReadMe information

Log Out

Log out of the GUI

Quit

Quit and close the GUI. This option will also shutdown the GUI helper.

To continue the software configuration, click the **esXpress v3 Configuration** button. There are ten tabs in the configuration program (figure 19). The default tab is the Summary tab. This is an overview of the major configuration options.

Options and **Options2** deal with backup mode, frequency, and retention policy.

Deletes / Folders configures target Auto-Delete options and folder setup.

Special Options deals with One-Up backups, Templates and Snap on Snap.

Backup Targets allows you to configure VMFS and network backup targets. You can enter up to nine targets. esXpress will fail over to the second, third, fourth, etc network targets if the primary should fail or become unreachable.

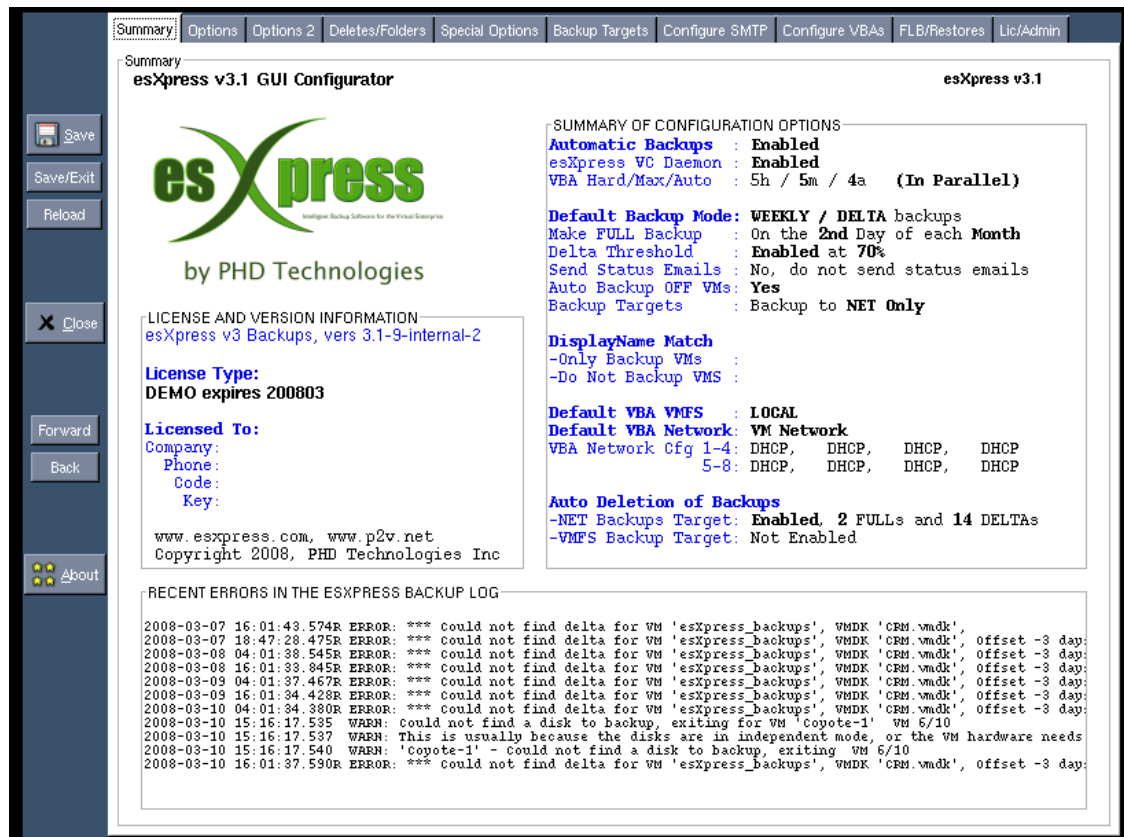
Configure SMTP allows you to tell the system the various email options.

Configure VBAs is for controlling how many virtual helpers esXpress can use.

File Level Backups/Restores config host level options for FLBs and host level configuration for Background Restores and Replication.

Lic/Admin tab allows you to enter the license information as well as set the read, write and admin passwords for accessing the esXpress GUI.

Figure 19 The esXpress GUI Configuration Program



The **Summary** tab shows all pertinent information in one screen, including license and version information, the most recent errors from the backup log files, and a summary of the 15 major option settings.

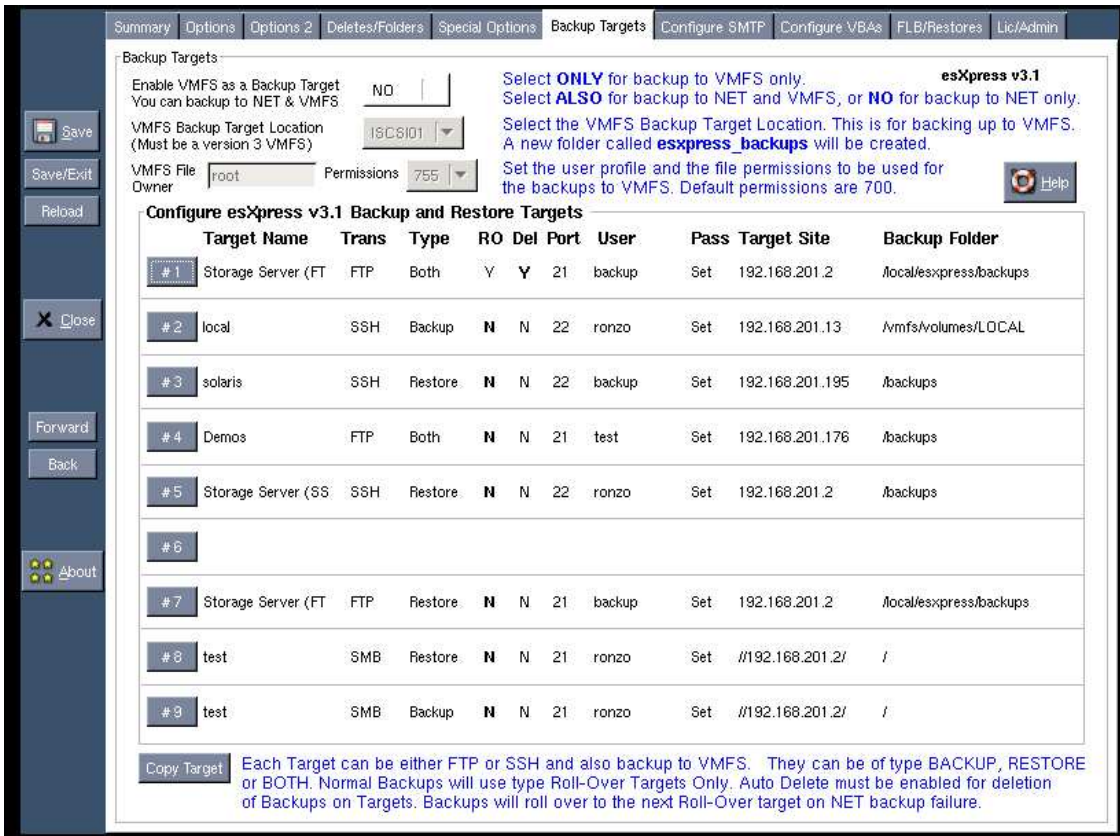
The **Options and Options 2** tabs is where you set the type and frequency of the backups. By default it is set to make full backups on the 2nd day of each month and make delta backups all other days. For an explanation of these settings or to modify the type or frequency, please see the esXpress v3 Users Manual.

The **Deletes/Folders** tab configures archive retention and archive directory options. For an explanation of these settings or to modify the type or frequency, please see the esXpress v3.1 Users Manual.

The **Backup Targets** tab is where you set whether you are backing up to a VMFS, a network target, or both simultaneously. The default is **No**. If you are backing up to VMFS only, select **Only**. For VMFS and Network FTP/SSH simultaneously, select **Also**.

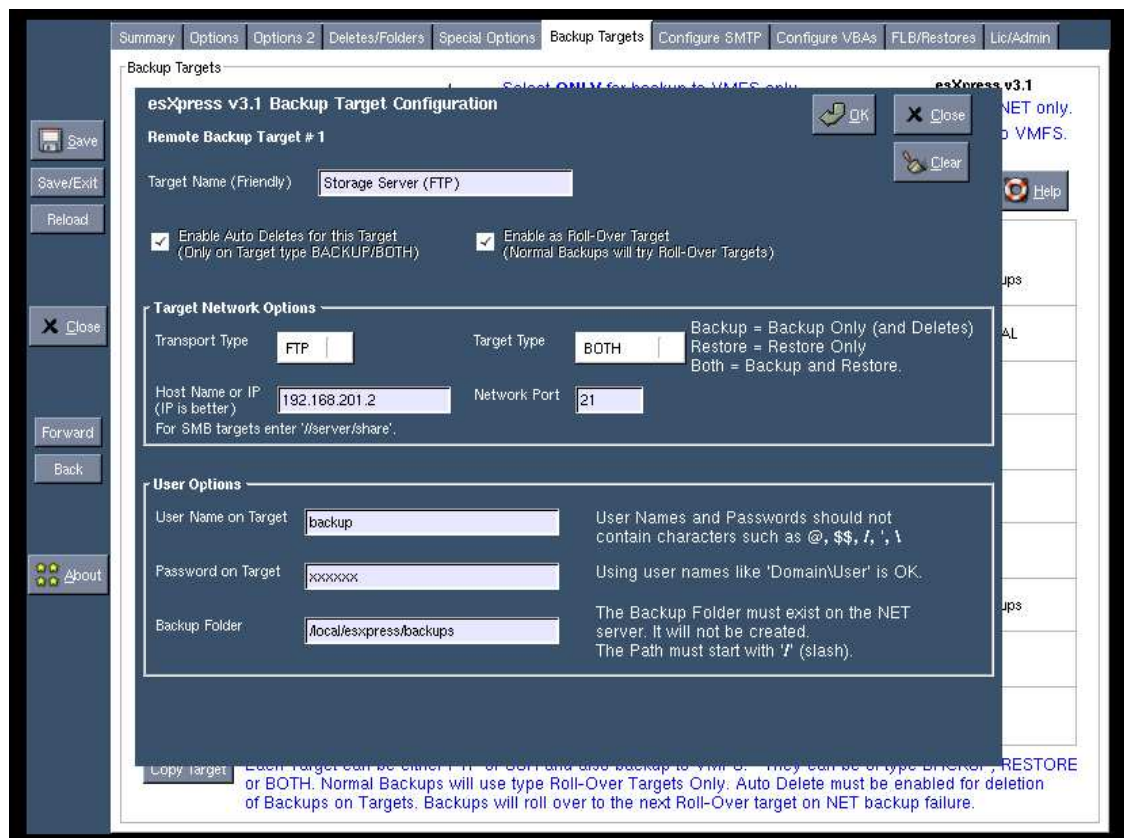
If you selected **Also** or **Only** you will next need to select the VMFS file system on which to create the **esXpress_backups** directory. This is a drop down box that will show all VMFS file systems visible to this host.

Figure 19 The esXpress GUI Configuration Program



If you selected **Also** or **No**, you will need to configure your Primary Backup Target.
 To configure the Primary Backup Target click on the # 1 target button to open that targets configuration Window.

Figure 20 The esXpress GUI – Backup Target Configuration Window



There are 10 options that need to be configured for each network target you wish to use; (figure 20)

- Specify a Friendly Display Name
- Enable the target for Auto-Delete
- Enable the target as a Roll-Over target
- Select the transport method (FTP or SSH)
- Select Target type (Backup/Restore/Both) – For the primary target setup it is recommended to set this to BOTH.
- Set host, port, user, password and folder

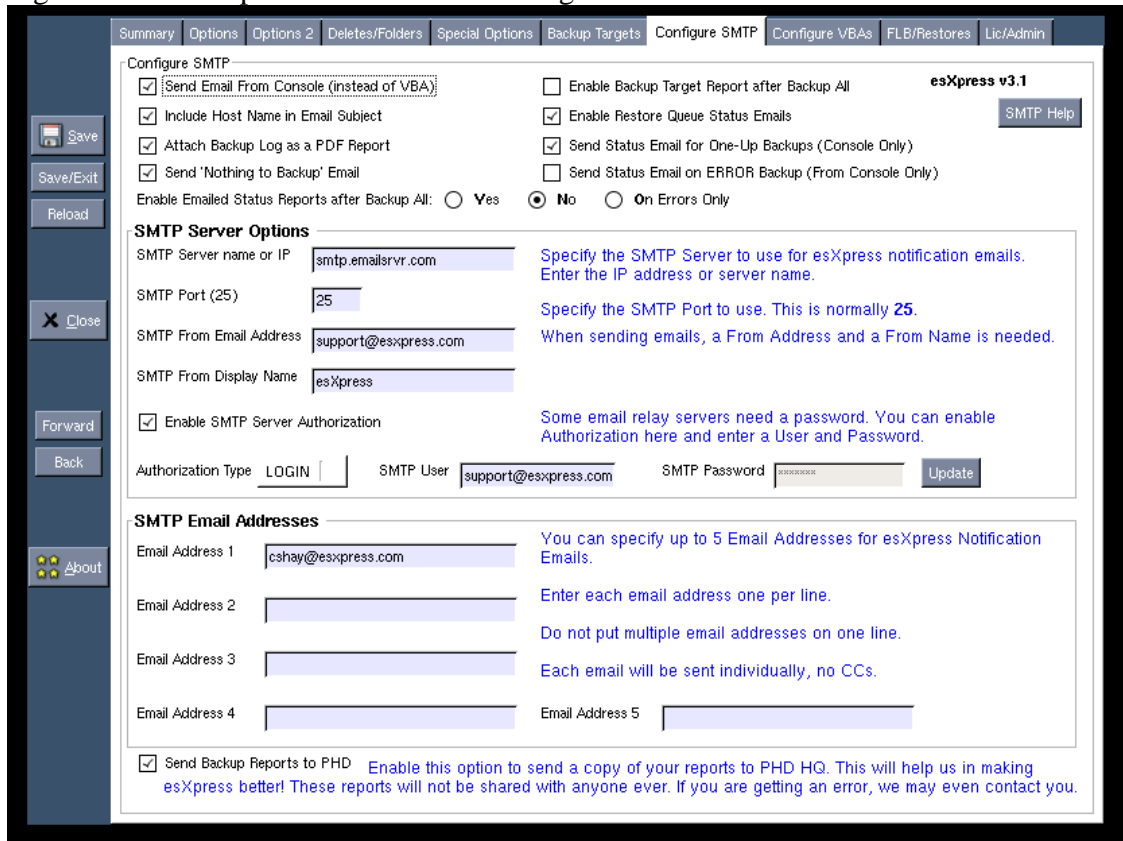
If you are using FTP, make sure the backup target exists, esXpress will not create this folder. Also, make sure not to use the FTP root folder /, as this can cause problems for some FTP programs or result in a circular reference.

You do not need to address anything initially on the **Special Options Tab**. For more information on these options see the esXpress V3 configuration manual.

The next tab to address is the SMTP Configuration tab. Configure these options if you want to be emailed a daily status report, there are 6 options at a minimum that need to be configured. See figure 21.

For information on the additional options see the esXpress V3.1 user manual.

Figure 21 The esXpress GUI – SMTP Configuration Tab



Check 'Enable Status Reports after Backup All'

SMTP Server. Enter the DNS name or IP address of you SMTP mail server.

SMTP Port. Enter the port your SMTP server uses (default is 25).

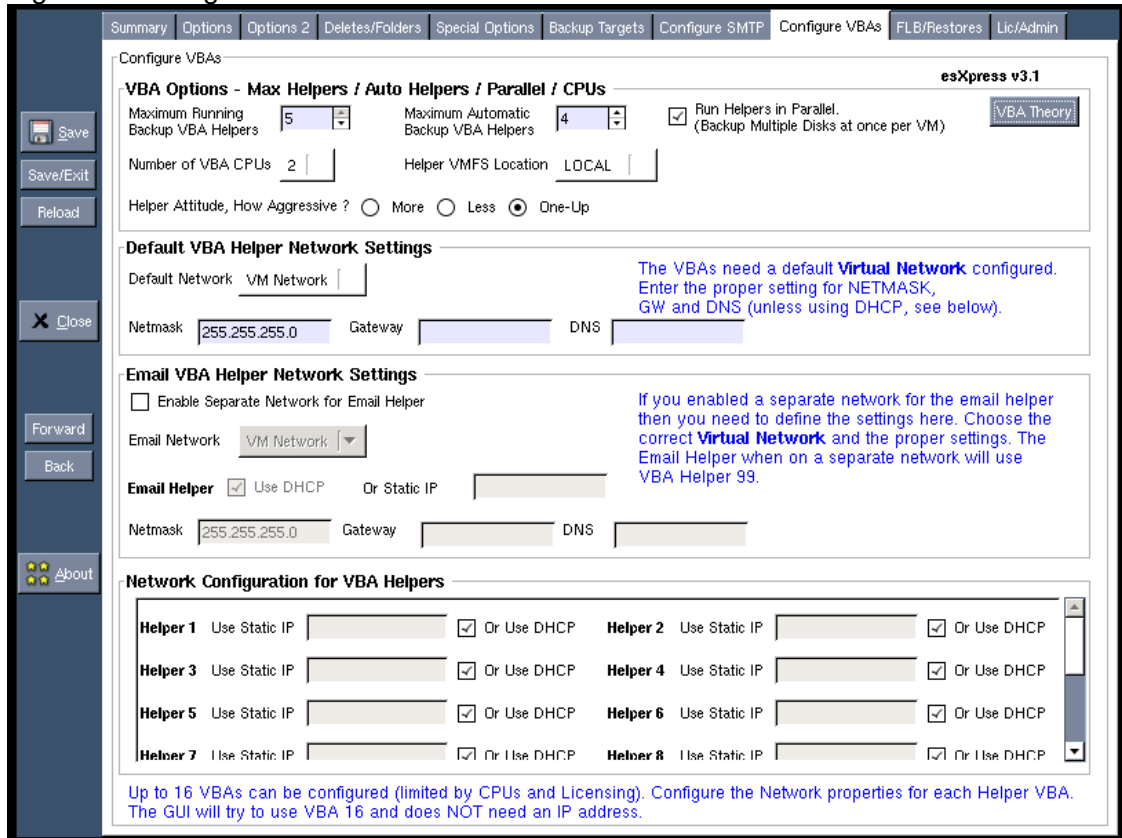
SMTP from Email. The from address for this ESX host.

SMTP from Name. The from name for this ESX host.

Status Email Address 1 – 5. These are the email addresses to send daily status reports to.

The next tab to look at during the initial configuration is the Configure VBAs tab, This is where you configure the operating parameters for the virtual helpers are defined. See Figure 22.

Figure 22 Configure VBAs



Virtual Helpers. The first three options, Maximum VBA Helpers, Maximum Auto Helpers, and Run Helpers in Parallel per VM, leave at their default settings. These options are explained further in the esXpress v3 Users Manual.

Helper VMFS Location. This is the VMFS volume that the helpers will reside on. The drop down box provides a list of all VMFS volumes available to the ESX host. EsXpress will create a folder named **esXpress_VBAs** and place all helpers within it.

Default Helper Network Settings. Here you must select the Default Network to be used by the helpers to communicate with the storage targets (other than VMFS). The drop down box provides a list of all VM Networks available to the ESX host.

Netmask. You must also enter the proper subnet mask for the network segment. If you are not sure, please check with your network administrator.

Gateway. If your target storage is not located on the same subnet as the VM Network selected, you must enter a Gateway IP address or DNS name.

DNS. If you configured your Email or FTP targets with their DNS names, then you must enter the IP address of a DNS server accessible to the selected VM Network.

Email Virtual Helper Network Settings. If you need to use a different VM Network than the Default Network, then check the Enable Separate Network for Email Helper. Again you must select the Default Network to be used by the email helper as well as valid Netmask, Gateway and DNS settings. You must also select whether the helper will use DHCP to obtain an IP address, or you can assign one here.

Virtual Backup Appliances – VBA. esXpress can use up to 16 virtual helpers to process backup requests. Each helper needs to be configured with an IP address or must be set to use DHCP. If you are backing up to VMFS only, leave set as DHCP. If you do not want to use a helper, change it to a fixed IP, and do not enter an address. The exception is VBA # 16, which is used by default for the GUI Helper. It does not need an IP address.

The next tab, File Level Backups is for the Host Level FLB options. These options are only required if you are going to do File Level Backups. See the configuration or users manual for more detail.

Next is the **Lic/Admin** tab. This tab allows you to enter license information as well as set the Read, Write and Admin passwords for the esXpress GUI.

At this point basic configuration is complete. Backups will start automatically at mid-night, every night. The first night's backup will be a FULL backup. All subsequent backups will be DELTA until the 2nd of the following month.

After a system backup has started, the newly created VBAs will show as **_esXpress: Helper 1**, **_esXpress: Helper 2**, etc. As you did with the GUI Helper, move these VBAs into the esXpress Resource Pool.

Uninstall esXpress

To uninstall esXpress is very simple. From the command line of the service console of your ESX Server type the following command:

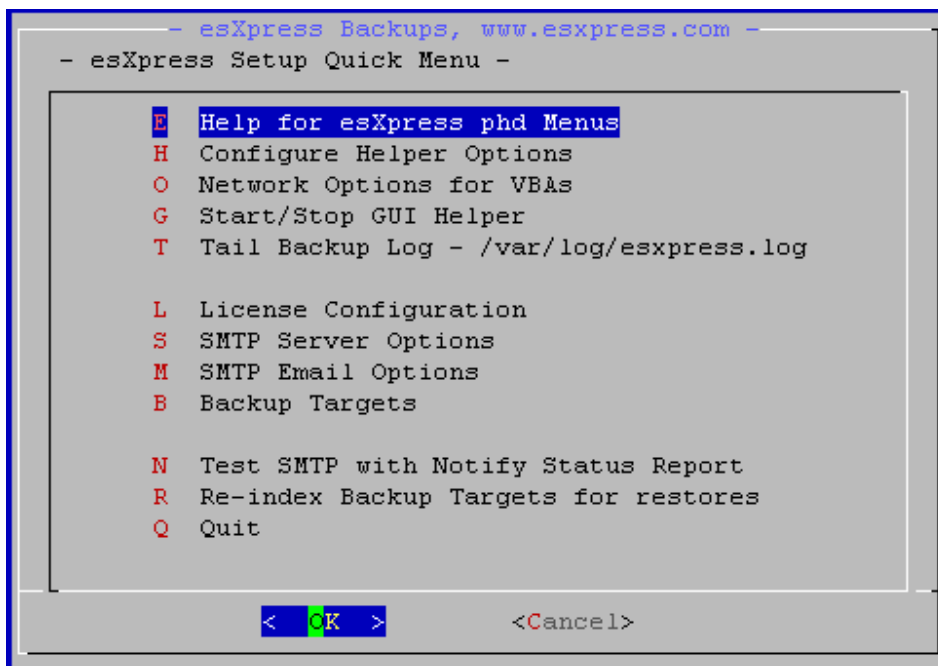
```
rpm -e esxpress  
rpm -e esxpressVBA
```

The command above will remove the application but not delete your full or delta backups.

The esXpress Setup Quick Menu

The esXpress Setup Quick Menu provides a shortcut method for the initial configuration and setup needed to get esXpress up and running. All of the options on this menu are duplicates from other phd menus and are explained in further detail in the sections of this manual for those options.

Figure 1.1: esXpress Setup Quick Menu



Key areas of this the Quick Menu are :

- Configure Helper Options to set the vmfs for the VBAs to live on.
- Setting the Default Network for the VBAs
- Configuring the VBA helpers to use DHCP or assign static IPs
- Starting and stopping the GUI helper
- Backup Targets to setup your initial backup target for esXpress backups
- Tailing the esXpress backup log
- setting up and testing smtp for esXpress backup reporting
- re-indexing your backup targets to provide current backup information for restores

Table 1.1: esXpress Setup Quick Menu Options

Option	Function	Description
E	Help for esXpress PHD Menus	phd text menu navigation and usage help
H	Configure Helper Options	Configure the VBA helpers.
O	Network Options for VBAs	Set the Network settings for the VBAs.
G	Start/Stop GUI Helper	Starts and Stops the esXpress GUI Helper.
T	Tail Backup Log - /var/log/esxpress/log	Display the running esXpress backup log
S	SMTP Server Options	Configure the SMTP server.
M	SMTP Email Options	Configure esXpress email options
T	Backup Targets	Configure Backup Targets
N	Test SMTP with Notify Status Report	Test the smtp setup
R	Re-index Backup Targets for restores	Re-index the Backup Targets.
Q	Quit	Quit the PHD esXpress application.

Snapshots and esXpress

Snapshot Overview

When a snapshot is taken of a virtual machine it is basically taking a point in time picture of that particular VM. VMware snapshots save the virtual machines disk data, configuration data and even the memory state if selected when taking the snapshot.

Once a snapshot is taken, you will see a number of new files created on your disk which contain all the changes to the virtual machine since the snapshot was taken. These files normally will be created where the .vmx file for the VM is located.

Snapshot Files : (using a VM called RedHat_VM1 with a single vmdk as an example)

RedHat_VM1-000001-delta.vmdk - The delta file is where all the disk changes since the snapshot was taken are stored. It is like a redo log file. The "000001" number represents the disk number.

RedHat_VM1-000001.vmdk – This is the disk description file for the delta file.

RedHat_VM1_Snapshot34.vmsn – This vmsn file stores the state of the Virtual Machine when the snapshot was taken. The "34" in this example is the snapshot number.

Another file to note when looking at snapshots is the vmsd file. In this example it would be called RedHat_VM1.vmsd. This file stores information about the snapshots for this virtual machine.

Sample vmsd file :

```
snapshot.lastUID = "34"
snapshot.numSnapshots = "1"           ( This means the VM has 1 snapshot )
snapshot.current = "34"               ( Current snapshot number is 34 )
snapshot.uid = "34"
snapshot0.filename = "RedHat_VM1-Snapshot34.vmsn" ( current snapshot file )
snapshot0.displayName = "test snap"
snapshot0.description = "test snap"
snapshot0.createTimeHigh = "279513"
snapshot0.createTimeLow = "1697685141"
snapshot0.numDisks = "1"
snapshot0.disk0.fileName = "RedHat_VM1.vmdk"
snapshot0.disk0.node = "scsi0:0"
snapshot.needConsolidate = "FALSE"
snapshot0.type = "1"
```

esXpress Backups and Snapshots

In order to take an image level backup of a Virtual Machine esXpress needs to create a snapshot. This is an important step as it ensures take that the backup is a consistent, point in time backup archive of the virtual machine. Once the snapshot is created esXpress will backup the frozen vmdk file or files and create the backup archives. Once the backup is completed, the snapshot will be removed causing VM changes made while the backup was occurring to be committed.

When creating and removing snapshots esXpress is using normal VMware supplied commands to handle the snapshot management. Nothing is done differently than what would be done manually when someone creates, reverts or deletes snapshots from within the VI3 client.

Disk Free Space and other Snapshot Considerations

Before running esXpress backups there are a couple of considerations to review in relation to snapshots. One is the amount of free space on your vmfs for your snapshot files.

A number of considerations go into how much free space is needed to account for snapshot growth during your backups. Some factors would include the size of the VM, the estimated time the backups will take and the amount of expected activity that will occur during the backup cycle. Remember, the snapshot is tracking the changes occurring in your Virtual Machine. So, if you're VM is not active during the backup cycle the snapshot files won't grow that large while a high transaction rate in the virtual machine during the backup may have a much larger snapshot growth.

There has been a lot of discussion on what is the optimal amount of free space to keep on your vmfs partitions. A good rule of thumb is between 10 and 20% of free space to account for overall virtual machine growth and for snapshot creation. Every environment is different so testing and monitoring up front is recommended to determine your optimal configuration.

EsXpress provides a key configuration option which should be setup initially to ensure you don't have a space issue on your vmfs because of backups and snapshots. The option is :

Available Free Space Before Aborting Backup – This is a value set in gigabytes (GBs). When the amount of free space falls below the value set here the esXpress backups will abort. It is better to abort the backup than to blow space on your vmfs. An error message will be written to your log when this occurs.

If you do not have a lot of free space on your vmfs partition one possibility is to move the vmx file to another vmfs where there is enough space for snapshots. To do this you need to shut the Virtual Machine down move the VMX and then re-point the disks to the correct location.

Troubleshooting Snapshots

From the esXpress FAQ Section on the web page <http://www.esxpress.com/faq.php> :

- **Q: I get the following error in my logs, ERROR:vmware says no snapshot, but VMX appears to have one, ERROR: This VM will be skipped, what does this mean?**

A: This means that when esXpress call vmware-cmd hassnapshots command it returns NO SNAPSHOT, however when we check the VMX file it shows an entry which appears to have a snapshot.

- **Q: What can I do if esXpress says that there's already a snapshot of this machine? For example, "- Already has a snapshot, it will be skipped -"**

A: In esXpress v3 this is because we have to go through the ESX snap manager to add/remove snaps, any problems with the snap manager WILL affect backup operations. However with the release of esXpress v3.1 we can now backup virtual machines with existing snapshots.

- **Q: Virtual Center does not show a snapshot yet there are snapshot files remaining, how do I resolve this ?**

A: The best method to address this is to shutdown your Virtual Machine. Then add a snapshot while it is powered off, then delete (commit) the snapshot. You can then power the VM back on and that will safely remove the snapshot files.

- **Q: Somehow we created a snapshot not sure why but its the only one and I would like this backed up file to be just like the rest.**

A: From within the VI3 client, select the VM, then choose from the top menu, "Inventory->Virtual Machine->Snapshot->Snapshot Manager". This will show you the snapshots on the VM and allow you to commit them.

Before adding a snapshot and possibly breaking the VM, lets make sure the "vmsd" file is valid. Usually, when a problem occurs, this file is out of sync causing VMware to report a snapshot when none exist. Then the simple act of adding a snapshot can break a VM. On these VMs, can you manually add and remove snapshots OK? After you add one, give it a little time, then remove it.

Try it again, without the save memory box being checked.

- **Q: In my log i have the following error WARN: VBA 0, Snapshot Remove Failed for xxx, WARN: No Snapshot defined, but VM xxx is using one. What do these errors mean ?**

A: esXpress went to remove the snapshots and VMware failed to do so. Now these VMs are left with partial snapshots.

To resolve try to add a new snapshot, then select remove all, that normally cleans up the issue.

- **Q: I have a VM with multiple VMDKs, it looks like the VBA snapshots each VMDDK one a time and backs it up before on to the next one, is that correct ?**

A: No that is not correct, We add ONE snapshot to the VM, then backup each VMDK with a different VBA. So while all VMDKs are being backed up it is from a single snapshot.