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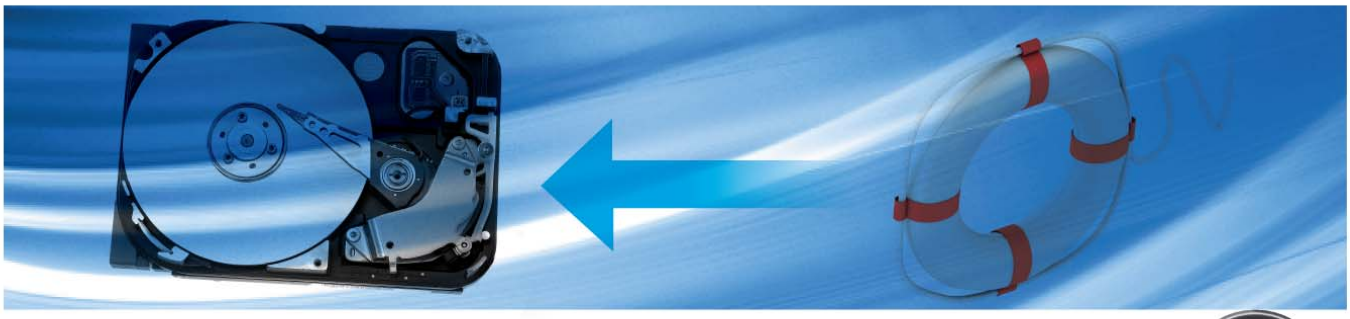
vRanger Pro™



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vRanger Pro User Manual
01/07/09
Version 3.2.8

Document Revision History

Document Version Number	Issue Date	Description of Change
3.2.3a	06/12/08	Chapter 1 • Updated the VSS section to include information on integration with VCB. • In the vRanger Pro Overview and Benefits section, added information on encryption. Chapter 2 • In the Installing vRanger Pro section, added instructions for uninstalling a previous version of the software and upgrading to a new version.
3.2.4a	07/15/08	Chapter 1 • Updated the vRanger Pro Overview and Benefits section to include information on FIPS support. Added a VCB Differentials section. • Added a FIPS and Licensing section. Chapter 5 • Updated the Options Tab section to include VCB differentials. • In the vRanger Backup Options and VCB Backup Options sections, included information on enabling VCB differentials.
3.2.4b	7/18/08	Chapter 2 • Added Guest VSS Support table.
3.2.8	01/07/09	• Updated entire document to reflect support for VMware ESXi 3.5 and minor GUI changes. • Updated Requirements section of Chapter 2. • Added Terms and Acronyms table and Appendix.

Table of Contents

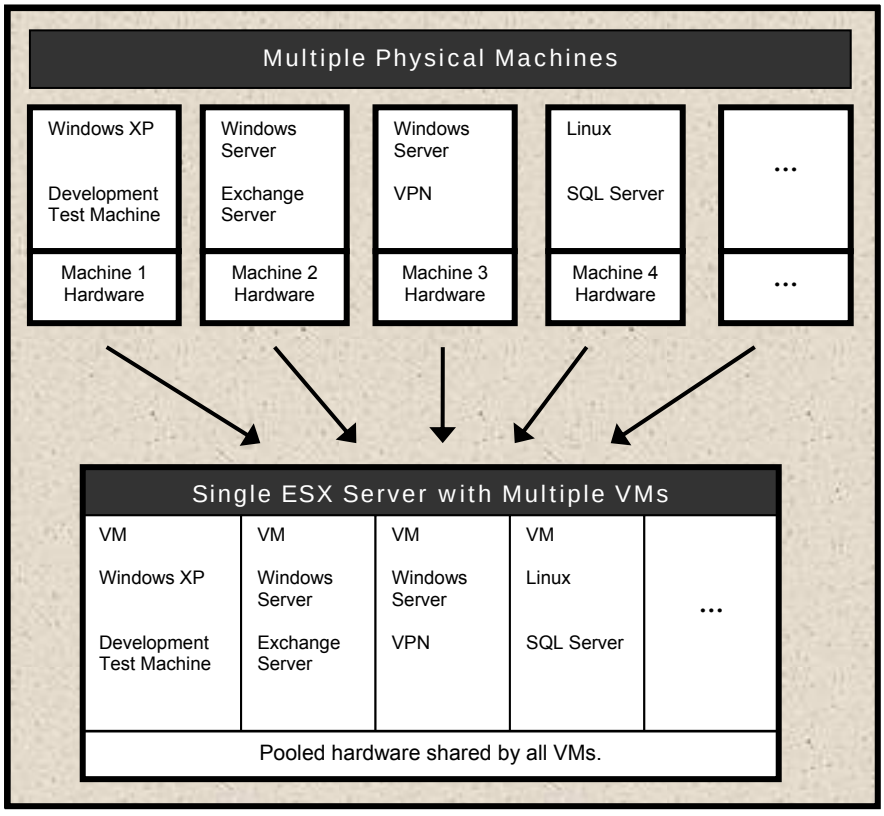
1 Introduction

vRanger Pro™ is a powerful tool that performs automated backups of VMware® ESX-type virtual machines (VMs) as well as P2V enabled backups of physical machines. vRanger Pro also manages the catalog of backup archives, and gives you the ability to quickly restore any VM from its backup.

Virtualization and VMware Overview

As companies and industries grow, their technology needs change. These changes are often implemented within complex systems running business-critical applications. Usually there is an increased demand for shared hardware and software resources. To manage this demand, many companies establish virtual environments. Doing so can increase an organization's agility and efficiency while lowering its costs.

Most companies have a number of specialized physical servers and workstations that are underutilized. Virtualizing such an environment increases and balances utilization by consolidating the physical machines into a single physical host that runs multiple VMs. The VMs share the resources—processor, memory, network cards, and disks—of the physical host. The work that the physical machines did previously continues, but with greater efficiency. The host runs a layer of virtualization software that manages the environment. Each VM's OS—usually Windows or Linux—functions as if the hardware were physical. Guest software can see only *x* processor, *y* memory, and so forth.



The transition from physical to virtual is seamless. A virtual infrastructure affords maximum flexibility, allowing you to treat VMs as if they were physical hardware and software. VMs can be moved easily between hosts. They can be run in isolation or in groups. Their workloads can be reconfigured as demand requires. This flexibility is supported by management tools.

VMware VirtualCenter (VC) and ESX Server are, respectively, the management server and software components that lend order in a virtual environment. VC orchestrates the configuring and provisioning. VC's database stores all of the information shared between the physical hosts and the VMs. Without compromising security, VC makes it possible to connect to a host remotely from a standard Windows computer.

As its own host OS, ESX Server allows you to establish VMs, configure and manage their shared resources, and make ongoing adjustments to increase performance. Each VM is configured with its own virtual hardware—for example, central processing unit (CPU), random access memory (RAM), and universal serial bus (USB) ports. The work of the VM's physical counterpart is run in its native OS. Because VMs require neither redundant hardware nor physical space, virtualization can mean significant cost savings.

vRanger Pro Overview

vRanger Pro is a Windows-based software tool that allows you to perform automated backups of VMs. It can also restore backed up VMs if there is a disk failure or if you want to revert to a previous version of a particular VM. vRanger Pro's unique features give you additional flexibility and improve the performance of the backup and restore processes.

Support for VMware ESXi 3.5

vRanger Pro offers full support for ESXi 3.5. This allows for additional functionality, platform security, a smaller footprint, and no scripting requirement. You can back up over fiber or a network. Currently, vRanger Pro only supports the licensed version of ESXi 3.5. For additional information, see the Chapter 2, *Installation.*

Perform Hot Backups

vRanger Pro can perform backups of VMs on-the-fly while they are running, without interrupting performance. Many other tools require you to shut down a VM to back it up.

Automatic Backup Scheduling

You can use vRanger Pro to make a single backup of a VM, or schedule a VM to be backed up periodically (e.g., every day, week, or month). These backups will be performed automatically at the scheduled time. You can also specify how long backups should be retained. Old backups will be removed automatically.

VSS and VCB

vRanger Pro includes a driver that utilizes Microsoft's Volume Shadow Copy Service (VSS) to alternately freeze and thaw application writes. VSS enables quiescing—or pausing—of supported databases to provide a transactionally consistent backup image. VSS works with VMware Consolidated Backup (VCB).

Improved Performance

Using core .NET technologies, vRanger Pro improves application performance. A proprietary driver that increases write speed to VMFS means dramatically improved restore speeds. NoZip restores allow full integration with data deduplication solutions such as Data Domain. This can greatly reduce the amount of storage space required for backups.

Backup of Physical Servers

Using a proven P2V engine, vRanger Pro allows you to schedule protection of all physical servers. In spite of the capabilities of VMware ESX, there are reasons to not virtualize certain servers in an otherwise virtual enterprise. vRanger Pro now extends the DR benefits of a virtualized environment to these physical machines.

Group Backups

If you have VC, you can use vRanger Pro to schedule backups for a single VM, or for groups of them, based on VC attributes. (Custom attributes are only available when VC 1 is configured.) vRanger Pro supports the selection of separate datastores when restoring VMs with multiple Virtual Machine Disk Formats (VMDKs), allowing you to maintain best practices in the event a recovery is needed.

Flexible Backup Destination

You can back up VMs to Windows or Linux machines, or even to other ESX Servers.

Differential Backups

You can configure vRanger Pro to perform differential backups to record only the changes since the last full backup. This saves both time and disk space that otherwise would be required to copy an entire VM.

VCB Differentials

vRanger Pro's differential backup capability has been extended to include the VCB framework. vRanger Pro can now access Virtual Machine File System (VMFS) data stores on the Storage Area Network (SAN). As with differentials done through the IP network, VCB differential files include only data blocks that have changed since the last full backup.

File-Level Restore

vRanger Pro lets you recover and restore an individual file from a backup rather than having to revert to a previous version.

Encryption

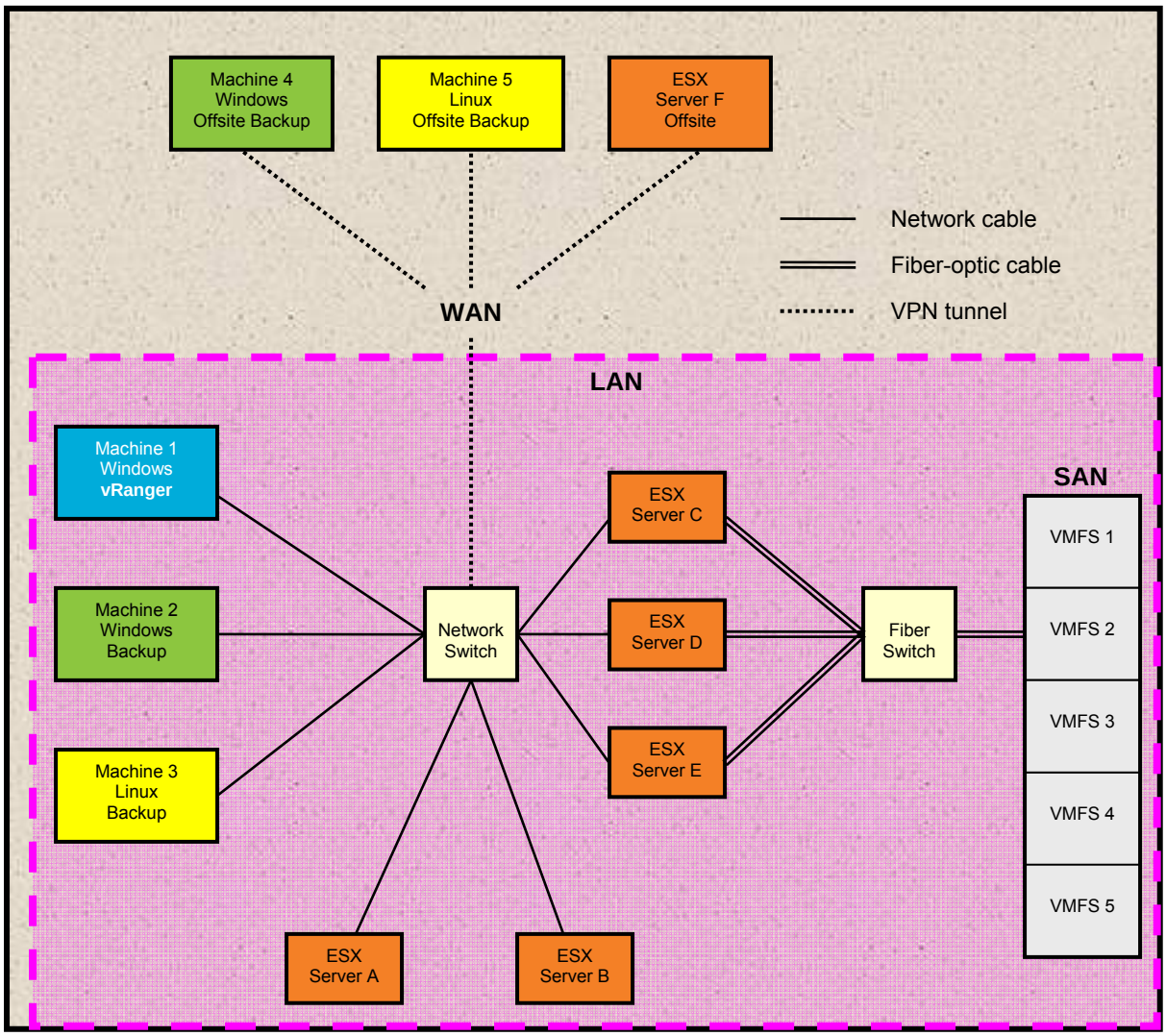
vRanger Pro uses an encryption technology called Triple DES to provide security for VM hosts, physical machines, user names, passwords, and email settings. Triple DES is Federal Information Policy Standard (FIPS) compliant. You enable FIPS encryption through Control Panel→Local Security Settings. All configuration settings are encrypted automatically. The archive file is not encrypted. The Encrypt Data Transfer option on the Backup Options screen uses Secure Shell Access (SSH) encryption. If you select this option, vRanger Pro will use secure data transfer with encryption.

vRanger Pro and vReplicator

Through the use of an intelligent file locking mechanism, vRanger Pro and vReplicator work together error-free.

System Architecture

There are many different ways to set up your ESX Server. This section contains a sample system architecture. Some of the options in vRanger Pro apply only to certain situations. This example covers the majority of those situations.



On the LAN

Contains three workstations and five ESX Servers:

- **Machine 1** runs MS Windows. vRanger Pro is running on this machine.
- **Machine 2** runs MSWindows. This is used as a backup location.
- **Machine 3** runs Linux. This is used as a backup location.
- **ESX Servers A and B** are ESX Servers. They may be used as sources and backup locations.

- **ESX Servers C, D, and E** are ESX Servers with local hard drives from which ESX Server is running. They are attached to a SAN via fiber-optic cable, with five VMFS volumes. They may be used as sources and backup locations.

Offsite Machines

Contains two workstations and one ESX Server; connected to the Local Area Network (LAN) via VPN tunnels.

Machine 4 runs MS Windows. This is used as a remote backup location.

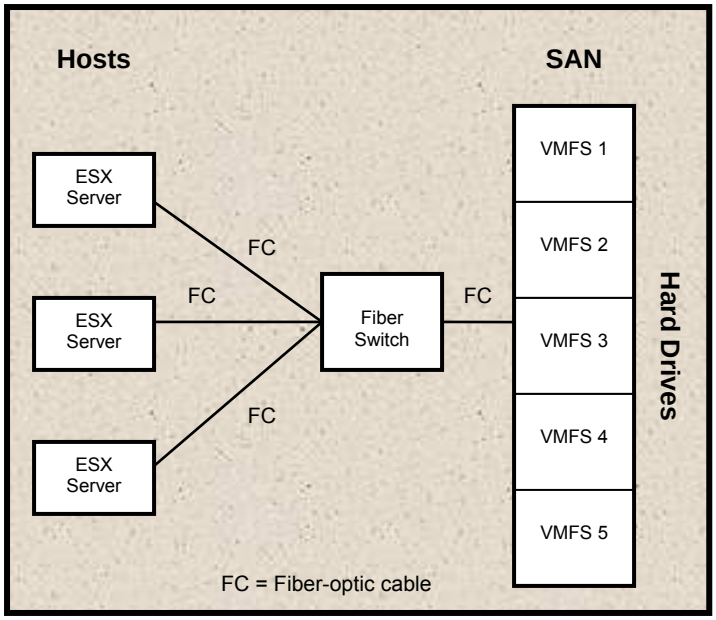
Machine 5 runs Linux. This is used as a remote backup location.

ESX Server F is an ESX Server. It may be used as a remote source and remote backup location.

Storage Area Network

A SAN is sometimes used to consolidate data from multiple physical server machines into one location. When used with ESX Servers, the individual server machines do not contain hard drives but are connected (usually by fiber-optic cable) to an array of hard disks. This gives each server access to all of the data on a SAN, facilitating fast data transfers between machines that are connected to the SAN.

When used with vRanger Pro, SANs also make it possible to perform faster backups (LAN-free) by confining the scope of the data transfer to the fiber-optic network.



Virtual Machine File System

VMware VMFS is a storage system for VM files on physical hard disks and partitions. VMFS has several features that lend themselves to clustering—with SANs, for example.

Using this Manual

Terms and Acronyms

This is a list of terms and acronyms that are used in this manual.

Term or Acronym	**Definition**
API	Application Programming Interface
CLI	Command Line Interface
COS	Console Operating System
CPU	Central Processing Unit
DR	Disaster Recovery
ESX 2.x	Version 2.x of ESX Server
FIPS	Federal Information Policy Standard
FQDN	Fully Qualified Domain Name
GB	Gigabyte
Guest	A VM that runs on an ESX Server.
Host	A physical ESX Server that runs VMs.
iSCSI	Small Computer System Interface
IO	Input/Output
IP address	Internet Protocol (address)
LAN	Local Area Network
LUN	Logical Unit Number
MB	Megabyte
Mb	Megabit
MS VSS	Microsoft Volume Shadow Copy Service makes remote API call communication possible. Works to freeze and thaw application writes during conversions.
NIC	Network Interface Card
OS	Operating System
P2V	Physical to Virtual

Term or Acronym	Definition
RAM	Random Access Memory
SAN	Storage Area Network
SMTP	Simple Mail Transfer Protocol
SSH	Secure Shell Access; a network protocol used to exchange data between CPUs across a secure channel.
su	switch user
TFTP	Trivial File Transfer Protocol
V2V	Virtual to Virtual
VC	VMware VirtualCenter; a management server within a virtualized environment.
VCB	VMware Consolidated Backup
VDD	Virtual Disk Driver
VHD	Virtual Hard Disk
VIC	Virtual Infrastructure Client
VI3	VMware Infrastructure 3 (including ESX Server v3.x)
VM	Virtual Machine
VMDK	Virtual Machine Disk Format; a disk file that stores a VM's hard drive contents.
VMFS	Virtual Machine File System; VMware's cluster file system, which stores VM disk images.
VMX	VMware Virtual Machine Configuration
VMXNET	A driver that increases networking performance.
vzBoost	An optional driver installed on the target ESX host; improves write speeds to the VMFS. This module will only manage traffic within the Service Console and will not impact IO operations for running VMs.
WAN	Wide Area Network

Notes: Within the application, click this icon  to access additional information about the adjacent topic. Click the

icon to move between tabs in Backup and Restore mode. You can also click directly on the tabs.

vRanger Pro Licensing

A license for vRanger Pro controls the number of source CPUs you can configure to be backed up. For instance, if you purchase a 50-CPU license, you can back up VMs running on a list of ESX Servers, so long as the total number of CPUs in those servers does not exceed 50. For licensing purposes, vRanger Pro counts dual-core processors as a single CPU—so one ESX Server with two dual-core processors would use two CPUs of your license.

If you do not have a permanent license, an evaluation license is automatically generated for you. Every time you use vRanger Pro to perform a backup using the evaluation license, your internet browser will open to the Vizioncore website. After you install a permanent license, the evaluation message will no longer display.

FIPS and Licensing

For FIPS encryption to work properly in vRanger Pro, you will need a FIPS registry key compliance license file. When you request a license, make certain that you secure a license file as well. If you already have a license for vRanger Pro, you can exchange it for one that allows you to enable the FIPS registry key.

P2V DR Licensing

P2V backups are licensed differently than conventional backups. Rather than the typical per CPU license, a physical machine backup is licensed by configured server. For example, to protect three physical servers with vRanger Pro's P2V DR functionality, the enterprise will require three P2V licenses, regardless of the number of CPUs on those physical servers.

See the Vizioncore website for general information on licensing. Contact Customer Support for instructions on purchasing or upgrading a vRanger Pro license.

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	U.K. Customer Service (dealing with U.K.only)	0870 906 0010
	Corporate Customer Service (dial within U.K. only)	0870 907 4499
	U.K. Sales (dial within U.K. only)	0870 907 4000
Italy (Milan) International Access Code: 00 Country Code: 39 City Code: 02	Web Address	Support.euro.dell.com
	Home and Small Business	
	Technical Support	02 577 826 90
	Customer Service	02 696 821 14
	Fax	02 696 821 13
	Switchboard	02 696 821 12
	Corporate	
	Technical Support	02 577 826 90
	Customer Service	02 577 825 55
	Fax	02 575 035 30
	Switchboard	02 577 821

Jamaica	E-mail Address Technical Support, Customer Service, Sales (dial from within Jamaica only)	la-techsupport@dell.com 1-800-440-9205
Japan (Kawasaki) International Access Code: 001 Country Code: 81 City Code: 44	Web Address Technical Support - Dimension and Inspiron Technical Support outside of Japan - Dimension and Inspiron Technical Support - Dell Precision, OptiPlex, and Latitude Technical Support outside of Japan - Dell Precision, OptiPlex, and Latitude Technical Support - Dell PowerApp™, Dell PowerEdge™, Dell PowerConnect™, and Dell PowerVault™, Technical Support outside of Japan - PowerApp, PowerEdge, PowerConnect, and PowerVault Technical Support - Projectors, PDAs, Printers, Routers Technical Support outside of Japan - Projectors, PDAs, Printers, Routers Faxbox Service 24-Hour Automated Order Status Service Customer Service Business Sales Division - up to 400 employees Preferred Accounts Division Sales - over 400 employees Public Sales - government agencies, educational institutions, and medical institutions Global Segment Japan Individual User Individual User Online Sales Individual User Real Site Sales Switchboard	support.jp.dell.com toll-free: 0120-198-26 81-44-520-1435 toll-free: 0120-198-433 81-44-556-3894 toll-free: 0120-198-498 81-44-556-4162 toll-free: 0120-981-690 81-44-556-3468 044-556-3490 044-556-3801 044-556-4240 044-556-1465 044-556-3433 044-556-5963 044-556-3469 044-556-1657 044-556-2203 044-556-4649 044-556-4300
Korea (Seoul) International Access Code: 001 Country Code: 82 City Code: 2	Web Address Technical Support, Customer Service Technical Support - Dimension, PDA, Electronics, and Accessories Sales Fax Switchboard	Support.ap.dell.com toll-free: 080-200-3800 toll-free: 080-200-3801 toll-free: 080-200-3600 2194-6202 2194-6000
Latin America	Customer Technical Support (Austin, Texas, U.S.A.) Customer Service (Austin, Texas, U.S.A.) Fax (Technical Support and Customer Service) (Austin, Texas, U.S.A.) Sales (Austin, Texas, U.S.A.) SalesFax (Austin, Texas, U.S.A.)	512 728-4093 512 728-3619 512 728-3883 512 728-4397 512 728-4600 or 512 728-3772
Luxemborg International Access Code: 00 Country Code: 352	Web Address Support Home/Small Business Sales Corporate Sales	Support.euro.dell.com 3420808075 +32 (0)2 713 15 96 26 25 77 81

	Customer Service	+32 (0)2 481 91 19
	Fax	26 25 77 82
Macao	Technical Support	toll-free: 0800 105
Country Code: 83	Customer Service (Xiamen, China)	34 160 910
	Transaction Sales (Xiamen, China)	29 693 115
Malaysia (Penang)	Web Address	Support.ap.dell.com
International Access Code: 00	Technical Support - Dell Precision, OptiPlex, and Latitude	toll-free: 1800 880 193
Country Code: 60	Technical Support - Dimension, Inspiron, and Electronics and Accessories	toll-free: 1800 881 306
City Code: 4	Technical Support - PowerApp, PowerEdge, PowerConnect, and PowerVault	toll-free: 1800 881 386
	Customer Service	toll-free: 1800 881 306 (option 6)
	Transaction Sales	toll-free: 1800 888 202
	Corporate Sales	toll-free: 1800 888 213
Mexico	Web Address	www.dell.com/mx
International Access Code: 00	E-mail Address	la-techsupport@dell.com
Country Code: 52	Customer Technical Support	001-877-384-8979 or 001-877-269-3383
	Sales	50-81-8800 or 01-800-888-3355
	Customer Service	001-877-384-8979 or 001-877-269-3383
	Main	50-81-8800 or 01-800-888-3355
Montserrat	E-mail Address	la-techsupport@dell.com
	Technical Support, Customer Service, Sales	Toll-free: 1-866-278-6822
Netherlands Antilles	E-mail Address	la-techsupport@dell.com
	Web Address	support.euro.dell.com
Netherlands (Amsterdam)	Technical Support	020 674 45 00
	Technical Support Fax	020 674 47 66
International Access Code: 00	Home/Small Business Customer Service	020 674 42 00
	Relational Customer Service	020 674 43 25
Country Code: 31	Home/Small Business Sales	020 674 55 00
City Code: 20	Relational Sales	020 674 50 00
	Home/Small Business Sales Fax	020 674 47 75
	Relational Sales Fax	020 674 47 50
	Switchboard	020 674 47 75
	Switchboard Fax	020 674 47 50
New Zealand	Web Address	020 674 50 00
International Access Code: 00	E-mail Address	020 674 47 50
Country Code: 64	Technical Support, Customer Service, Sales	Support.ap.dell.com
		Support.ap.dell.com/contactus
		0800 441 567
Nicaragua	Web Address	www.dell.com/ni
	E-mail Address	la-techsupport@dell.com
	Technical Support, Customer Service, Sales	001-800-220-1377
Norway (Lysaker)	Web Address	Support.euro.dell.com
International Access Code: 00	Technical Support	671 16882
	Relational Customer Service	671 17575
Country Code: 47	Home/Small Business Customer Service	231 62298
	Switchboard	671 16800
	Fax Switchboard	671 16865

Panama	Web Address E-mail Address Technical Support, Customer Service, Sales	www.dell.com/pa la-techsupport@dell.com 011-800-507-1264
Peru	Web Address E-mail Address Technical Support, Customer Service, Sales	www.dell.com/pe la-techsupport@dell.com 0800-50-669
Poland (Warsaw) International Access Code: 011 Country Code: 48 City Code: 22	Web Address E-mail Address Customer Service Phone Customer Service Sales Customer Service Fax Reception Desk Fax Switchboard	support.euro.dell.com pl_support_tech@dell.com 57 95 700 57 95 999 57 95 999 57 95 806 57 95 998 57 95 999
Portugal International Access Code: 00 Country Code: 351	Web Address Technical Support Customer Service Sales Fax	Support.euro.dell.com 707200149 800 300 413 800-300-410 or 800-300 -411 or 800-300-412 or 21-422-07-10 21-424-01-12
Puerto Rico	Web Address E-mail Address Technical Support, Customer Service, Sales	www.dell.com/pr la-techsupport@dell.com 1-877-537-3355
St. Kitts and Nevis	Web Address E-mail Address Technical Support, Customer Service, Sales	www.dell.com/kn la-techsupport@dell.com toll-free: 1-866-540-3355
St. Lucia	Web Address E-mail Address Technical Support, Customer Service, Sales	www.dell.com/lc la-techsupport@dell.com toll-free: 1-866-464-4352
St. Vincent and the Grenadines	Web Address E-mail Address Technical Support, Customer Service, Sales	www.dell.com/vc la-techsupport@dell.com toll-free: 1-866-464-4353
Singapore International Access Code: 005 Country Code: 65	NOTE: The phone numbers in this section should be called from within Singapore or Malaysia only. Web Address Technical Support - Dimension, Inspiron, and Electronics and Accessories Technical Support - OptiPlex, Latitude, and Dell Precision Technical Support - PowerApp, PowerEdge, PowerConnect, and PowerVault Customer Service Transaction Sales Corporate Sales	 support.ap.dell.com toll-free: 1 800 394 7430 toll-free: 1 800 394 7488 toll-free: 1 800 394 7478 toll-free: 1 800 394 7430 (option 6) toll-free: 1 800 394 7412 toll-free: 1 800 394 7419
Slovakia (Prague) International Access Code: 00 Country Code: 421	Web Address E-mail Address Technical Support Customer Service	support.euro.dell.com czech_dell@dell.com 02 5441 5727 420 22537 2707

	Fax	02 5441 8328
	Tech Fax	02 5441 8328
	Switchboard (Sales)	02 5441 8328
		02 5441 7585
South Africa (Johannesburg) International Access Code: 09/091 Country Code: 27 City Code: 11	Web Address	support.euro.dell.com
	E-mail Address	dell_za_suppor@dell.com
	Gold Queue	011 709 7713
	Technical Support	011 709 7710
	Customer Service	011 709 7707
	Sales	011 709 7700
Spain (Madrid) International Access Code: 00 Country Code: 34 City Code: 91	Web Address	Support.euro.com
	Home and Small Business	
	Technical Support	902 100 130
	Customer Service	902 118 540
	Sales	902 118 541
	Switchboard	902 118 541
	Fax	902 118 539
	Corporate	
	Technical Support	902 100 130
	Customer Service	902 115 236
	Switchboard	91 722 92 00
	Fax	91 722 95 83
Sweden (Upplands Vasby) International Access Code: 00 Country Code: 46 City Code: 8	Web Address	support.euro.dell.com
	Technical Support	08 590 05 199
	Relational Customer Service	08 590 05 642
	Home/Small Business Customer Service	08 587 70 527
	Employee Purchase Program (EPP) Support	020 140 14 44
	Technical Support Fax	08 590 05 594
Switzerland (Geneva) International Access Code: 00 Country Code: 41 City Code: 22	Web Address	Support.euro.dell.com
	E-mail Address	Tech_support_central_Europe@dell.com
	Technical Support – Home and Small Business	0844 811 411
	Technical Support – Corporate	0844 822 844
	Customer Service – Home and Small Business	0848 802 202
	Customer Service – Corporate	0848 821 721
	Fax	022 799 01 90
	Switchboard	022 799 01 01
Taiwan International Access Code: 002 Country Code: 886	Web Address	support.ap.dell.com
	E-mail Address	support.dell.com.cn/email
	Technical Support - OptiPlex, Latitude, Inspiron, Dimension, and Electronics and Accessories	toll-free: 0080 186 1011
	Technical Support - Servers and Storage	toll-free: 0080 160 1256
	Customer Service	toll-free: 0080 160 1250 (option 5)
	Transaction Sales	toll-free: 0080 165 1228
	Corporate Sales	toll-free: 0080 165 1227
Thailand International Access Code: 001 Country Code: 66	Web Address	Support.ap.dell.com
	Technical Support (OptiPlex, Latitude, and Dell Precision)	toll-free: 1800 0060 07
	Technical Support (PowerApp, PowerEdge, PowerConnect, and PowerVault)	toll-free: 1800 0600 09
	Customer Service	toll-free: 1800 006 007 (option

	Corporate Sales Transaction Sales	7) toll-free: 1800 006 009 toll-free: 1800 006 006
Trinidad/Tobago	Web Address E-mail Address Technical Support, Customer Service, Sales	www.dell.com/tt la-techsupport@dell.com toll-free: 1-888-799-5908
Turks and Caicos Islands	Web Address E-mail Address Technical Support, Customer Service, Sales	www.dell.com/tc la-techsupport@dell.com toll-free: 1-877-441-4735
U.K.(Bracknell) International Access Code: 00 Country Code: 44 City Code: 1344	Web Address E-mail Address Customer Service Website **Sales** Home and Small Business Sales Corporate/Public Sector Sales **Customer Service** Home and Small Business Corporate Preferred Accounts (500-5000 employees) Global Accounts Central Government Local Government & Education Health **Technical Support** Corporate/Preferred Accounts/PCA (1000+ employees) Other Dell Products **General** Home and Small Business Fax	upport.euro.dell.com dell_direct_support@dell.com support.euro.dell.com/uk/en/ECare/form/home.asp 0870 907 4000 01344 860 456 0870 906 0010 01344 373 185 0870 906 0010 01344 373 186 01344 373 196 01344 373 199 01344 373 194 0870 908 0500 0870 353 0800 0870 907 4006
Uruguay	Web Address E-mail Address Technical Support, Customer Service, Sales	www.dell.com/uy la-techsupport@dell.com toll-free: 000-413-598-2521
U.S.A. (Austin, Texas) **International** Access Code: 011 Country Code: 1	Automated Order-Status Service AutoTech (portable and desktop computers) Hardware and Warranty Support (Dell TV, Printers, and Projectors) for Relationship customers Consumer (Home and Home Office) Support for Dell products Customer Service Employee Purchase Program (EPP) Customers Financial Services Web Address Financial Services (lease/loans) Financial Services (Dell Preferred Accounts [DPA]) **Business** Customer Service Employee Purchase Program (EPP) Customer s Support for printers, projectors, PDAs, and MP3 players **Public (government, education, and healthcare)**	toll-free: 1-800-433-9014 toll-free: 1-800-247-9362 toll-free: 1-877-459-7298 toll-free: 1-800-624-9896 toll-free: 1-800-624-9897 toll-free: 1-800-695-8133 www.dellfinancialservices.com toll-free: 1-877-577-3355 toll-free: 1-800-283-2210 toll-free: 1-800-624-9897 toll-free: 1-800-695-8133 toll-free: 1-877-459-7298

	Customer Service and Support	
	Employee Purchase Program (EPP) Customers	toll-free: 1-800-456-3355
	Dell Sales	toll-free: 1-800-695-8133 toll-free: 1-800-289-3355 or
	Dell Outlet Store (Dell refurbished computers)	toll-free: 1-800-879-3355
	Software and Peripherals Sales	toll-free: 1-888-798-7561
	Spare Parts Sales	toll-free: 1-800-671-3355
	Extended Service and Warranty Sales	toll-free: 1-800-357-3355
	Fax	toll-free: 1-800-247-4618
	Dell Services for the Deaf, Hard-of-Hearing, or Speech-Impaired	toll-free: 1-800-727-8320 toll-free: 1-877-DELLTTY (1-877-335-5889)
U.S. Virgin Islands	Web Address	www.dell.com/vi
	E-mail Address	la-techsupport@dell.com
	Technical Support, Customer Service, Sales	toll-free: 1-877-702-4360
Venezuela	Web Address	www.dell.com/ve
	E-mail Address	la-techsupport@dell.com
	Technical Support, Customer Service, Sales	0800-100-4752

2 Installation

System Requirements

This section describes the hardware and software requirements for vRanger Pro.

Location Requirements

You can install the software on a local administrator's workstation or a centrally accessible (via RDP) server or workstation with a gigabit network card (preferred). vRanger Pro requires Windows 2000 SP4 or greater and the .NET Framework version 2.0 or later.

You can confirm that you have .NET Framework 2.0 installed by accessing Start→Add or Remove Programs. You can install it through Internet Explorer→Tools→Windows Update. Alternately, you can download it from the Microsoft website.

The client machine must also meet the following criteria:

- Pentium III class CPU or greater
- 256MB RAM (512MB recommended)
- 2GB free hard disk space (4GB or greater recommended)
- 1024x768 video resolution (1280x1024 or greater recommended)
- 100Mb/sec or greater network adapter
- Windows Installer 3.1 is needed for installation.

ESX Server Requirements

VMware ESX Server version 2.5.4 or greater. No installation on the ESX Server is necessary.

VM Guest Requirements

For standard operation, there are no guest OS requirements.

Guest VSS Support

The following are supported:

OS	Service Pack	Bit Level
Windows 2003	SP1 and SP2	32

The following are not supported:

OS	Service Pack	Bit Level
Windows 2000	SP4 and SP5	32

OS	Service Pack	Bit Level
Windows 2003 R2	SP1 and SP2	64
Windows XP Pro	SP1 and SP2	32 and 64
Windows Vista	N/A	N/A
Windows 2008	N/A	N/A

Backup Destination Requirements

You can use any of the following OSs:

- Windows Server 2000 SP1 or greater
- ESX Server version 2.5.4 or greater
- Linux

ESXi 3.5 and Licensing

There are two versions of ESXi 3.5—free and licensed. The free version allows you to virtualize on a limited basis. The licensed version of ESXi 3.5 provides a gateway to additional functionality, such as VCB and vMotion. vRanger Pro only supports the licensed version of ESXi 3.5.

vRanger Pro supports VCB versions 1.0.2 through 1.5. VCB must be installed to back up a licensed ESXi 3.5 host over fiber or a network. If you are backing up over a network, you will need an IP address from the VCB/vRanger Pro host to all ESX hosts. When you install VCB, it will be set through fiber by default unless you select the network option.

You can restore a VCB backup of ESX 3.x to ESXi 3.5. You cannot restore a network backup of ESX 3.x to ESXi 3.5.

User Accounts and Passwords

ESXi 3.5 and Root

ESXi 3.5 allows you to communicate with the API only through a root account. When you add a host, you can create one account at a time. This account must have local rights over the relevant VMs.

Password Security Setting Policy

Weak passwords compromise system security. When you create and update passwords in vRanger Pro, follow as many of these guidelines as your environment allows:

A password should not include a significant portion of a user or account name.

Each password should be at least six characters long.

Passwords should contain characters from several of these categories:

-Uppercase letters in English (A-Z)

-Lowercase letters in English (a-z)

-Digits 0-9

-Non-alphabetic characters (for example, $, !, #, %)

Vizioncore Support Policy

Vizioncore attempts to support all .dot versions of ESX Server within 60-90 days of release. However, changes to the platform can create unforeseen circumstances, causing an unexpected delay in providing support.

Support for all major versions of ESX Server is to be determined. Vizioncore has the right to change this policy without prior notice or notification.

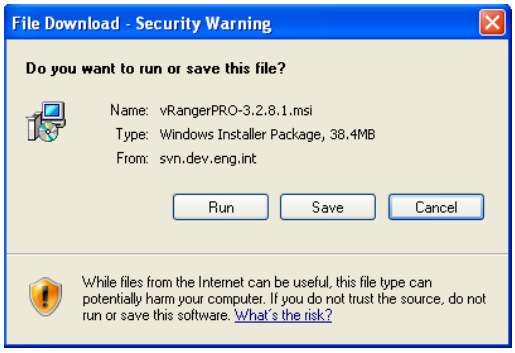
Installing vRanger Pro

This chapter will guide you through installing vRanger Pro on a workstation or server. There are also instructions for uninstalling a previous version of the software and upgrading to a new version. Since network latency can compromise performance, the software should not be installed on a network drive.

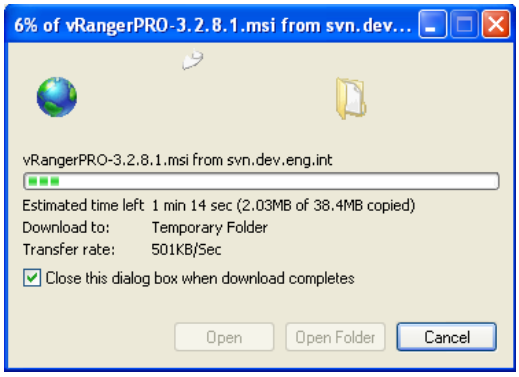
Pre-requisites:

- You must have administrator privileges on the workstation or server on which you install the software.
- You must have access to the installer file.

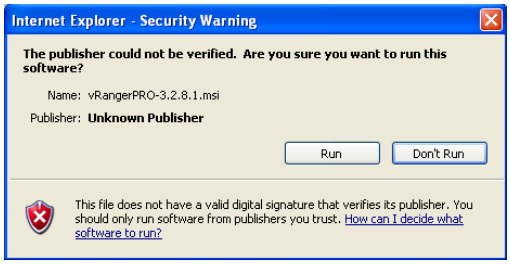
1. From the desktop, double-click the installer file.
   The Security Warning dialog displays.



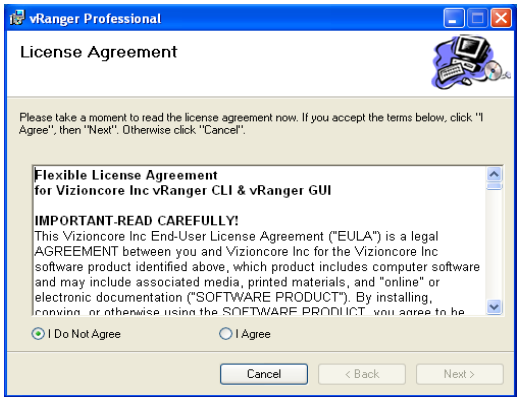
2. Click **Run.**
   The vRanger Pro Setup Wizard dialog displays.



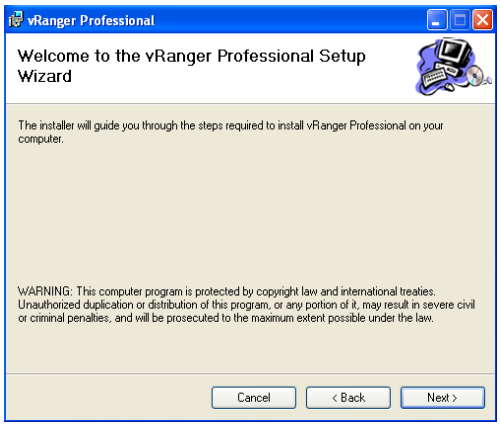
3. If a software publisher message displays, click **Run.**



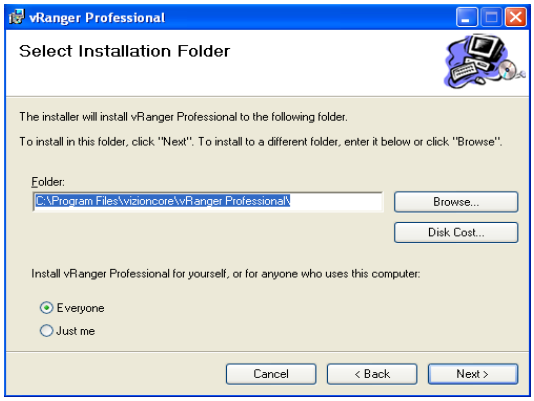
4. Click **Next.**
   The License Agreement dialog displays.



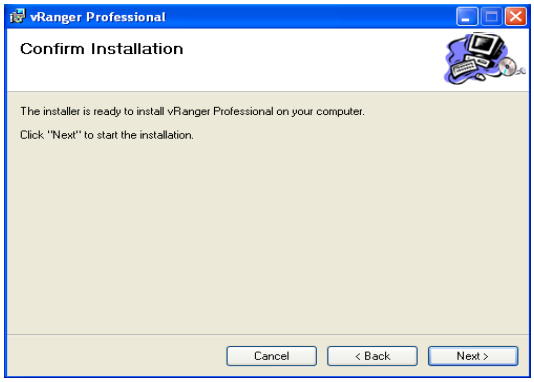
5. Read the license agreement. If you agree to its terms, click **I Agree** and then click **Next.**
   The vRanger Professional Setup Wizard dialog displays.



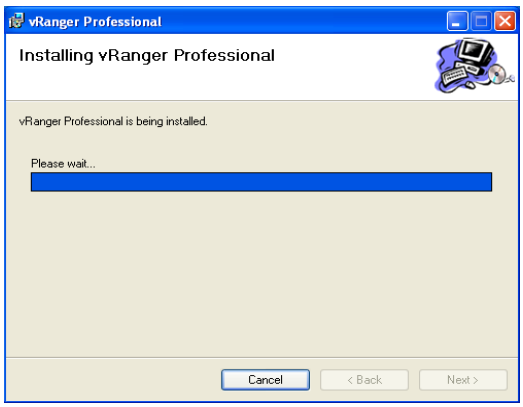
6. Click **Next.**



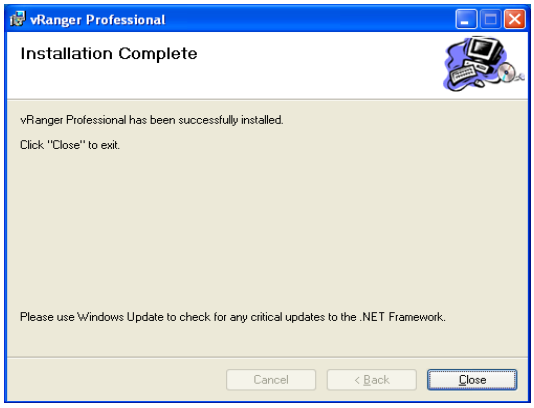
In the Folder field, specify the location where vRanger Pro should be installed or leave the default as is. Select a radio button—**Everyone** or **Just me**—and then click **Next.**



7. Click **Next** to start the installation process.
   This dialog will remain displayed during the process.

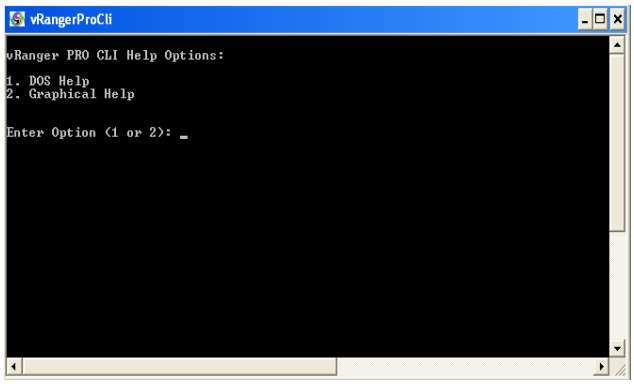


8. When installation is complete, a confirmation dialog displays.

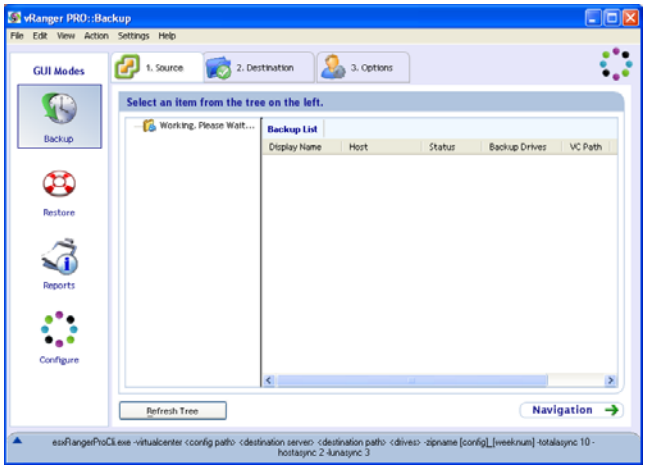


9. Click **Close.**
   Two vRanger Pro desktop icons display—one for the CLI and one for the GUI.

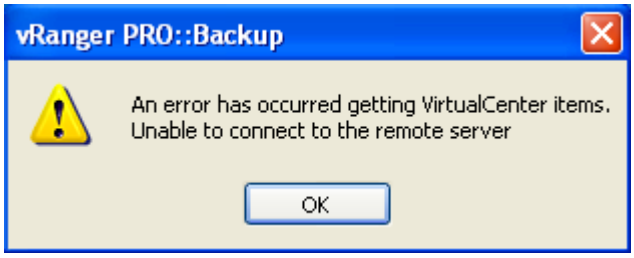
If you double-click the CLI icon, this window displays.



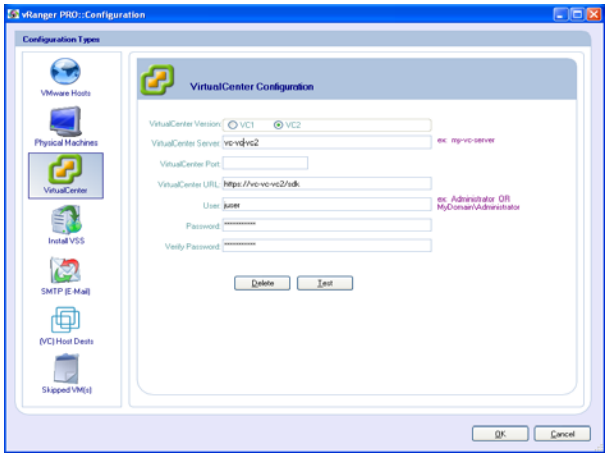
If you double-click the GUI icon, the vRanger Pro screen displays.



If this error message displays along with the vRanger Pro screen, confirm the settings on the VirtualCenter Configuration screen.



a. To do this, click **OK** to close the message. In the GUI Mode Menu pane of the vRanger Pro screen, click **Configure.** Then, click **VirtualCenter.**

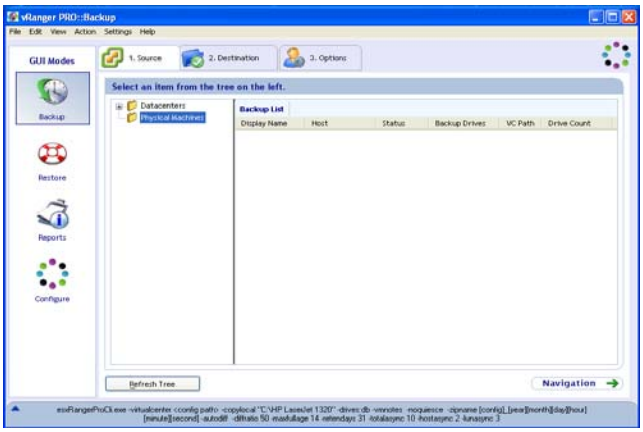


b. On the VirtualCenter Configuration screen, confirm that the values in all of the fields are correct. The VirtualCenter Port field should be populated only if a port other than the VC1 or VC2 defaults has been configured.

c. To confirm credentials and the VC connection, click **Test.**

A confirmation message displays, indicating that the settings work. Click **OK**. If a message displays indicating an error when retrieving information using the settings, this could be due to a login failure. Confirm the settings.

d. On the VirtualCenter Configuration screen, click **OK.**
The vRanger Pro screen refreshes and data loads to form a tree in the GUI Mode Menu pane.



(Optional) Follow the instructions later in this chapter to install the VCB plug-in.

Using the Startup Wizard

This section explains how to use the Startup Wizard to configure vRanger Pro for your environment. You will need the location and login credentials for VC. If you do not have VC implemented in your environment, or you do not want to configure it at this time, you may skip that portion of the setup.

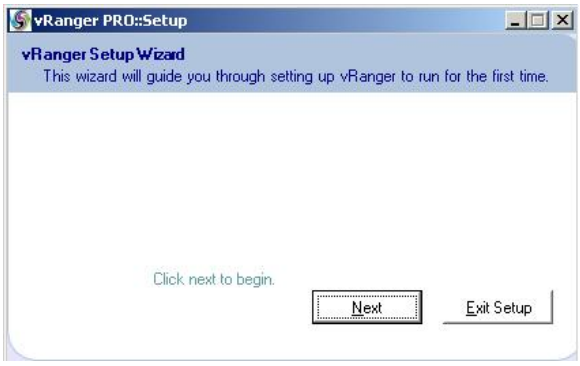
Configure VC Dialog

VirtualCenter Version	Select a version of VC—VC1 or VC2. Note: If you are using ESX Server v2 on some ESX Servers and ESX Server v3 on other ones, consider the following when selecting a version of VC: • If the majority of your servers use ESX Server v2, select VC1. • If the majority of your servers use ESX Server v3, select VC2.
VirtualCenter Server	The server address.
VirtualCenter Port	The port used by VC for remote communication. This generally depends upon what you select for VirtualCenter Version and will be populated automatically when VirtualCenter Version is set. • For VC2, the port is sdk. • For VC1, the port is 8443.
VirtualCenter URL	The full address used by VC. This field is generated automatically, using the values of VirtualCenter Version, VirtualCenter Server, and VirtualCenter Port.
User	The username used to log into VC. vRanger Pro can only back up machines that this username can see.
Password	The password for the login account entered in the User field.
Verify Password	The password for the login account entered in the User field.

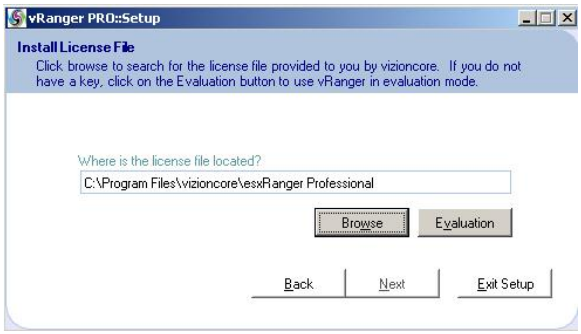
Host Information Dialog

Name	The IP address or fully qualified domain name (FQDN) of the ESX Server. Note: If you are using VC, this must be identical to the VC name. For instance, if you entered the FQDN in VC, you should not enter the IP address here. This should be populated by the Startup Wizard.
User	The username that vRanger Pro will use to log onto the ESX Server. vRanger Pro must have root-level permissions to perform a backup. For servers running ESX Server version 3 (and in some other situations), the security policy of the host server does not allow direct root access over a SSH connection. You can enter a different username to log onto the host server. vRanger Pro will then `su` (switch user) to root to perform the backup. If you do not use root, you should use rangeruser.
Password	The password for the login account entered in the User field.
ReType Password	The password for the login account entered in the User field.
'root' Password	The password for the root account on the ESX Server. Note: If you enter root in the User field, this field will be disabled.
ReType 'root' Password	The password for the root account on the ESX Server.
Description	Use this field to enter a description of the server. This will display on the Configured Hosts list and in other locations in the software. It can be used to identify servers more easily than by IP address or FQDN.

1. Double-click the vRanger Pro GUI icon.
   The Startup Wizard dialog displays.

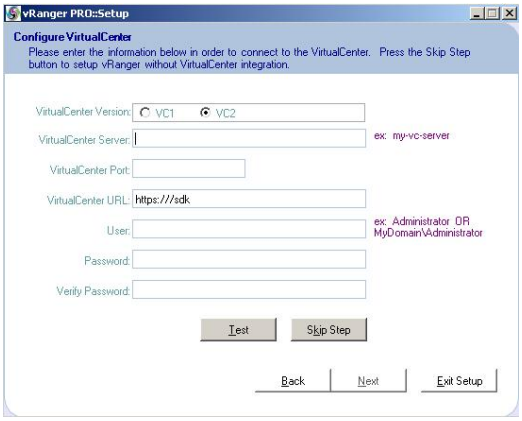


2. Click **Next.**
   The License File dialog displays.



3. Browse to the location of the license file. If it is an evaluation copy, click **Evaluation.** Then, click **Next.**
   The Configure VC dialog displays.

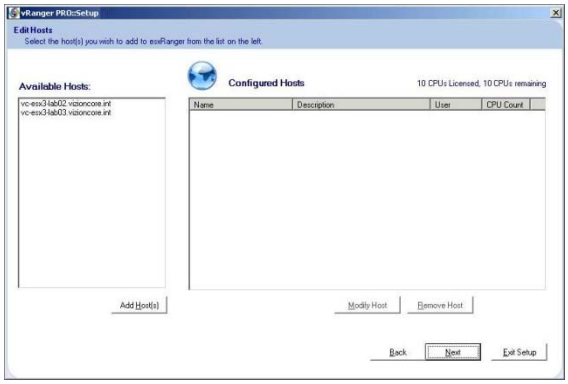
   Note: If you skip the VC configuration at this point, you can set it up later by completing the steps in Chapter 4, *Configuration.*



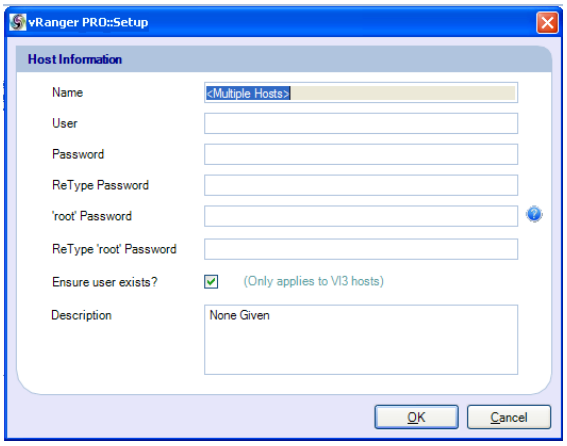
4. Populate the fields on the Configure VC dialog. Click **Test.**
   vRanger Pro attempts to connect to VC using the current configuration. A window displays, confirming that the attempt was successful.

   Note: If the connection was not successful, confirm that the setting was entered correctly and that VC is visible to the computer on which vRanger Pro is installed.

5. Click **Next.**
   The Hosts dialog displays.



6. Select the available hosts and click **Add Host(s).**
   The Host Information dialog displays.



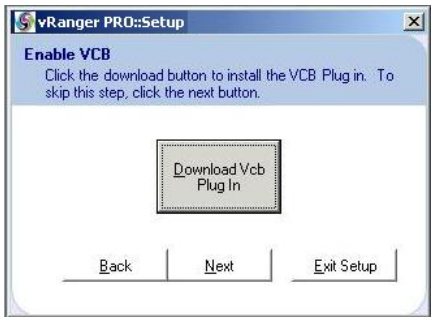
7. Populate the fields on the Host Information dialog. Click **OK.**
   The Download VCB Plug in Wizard opens.

VCB Integration Plug In

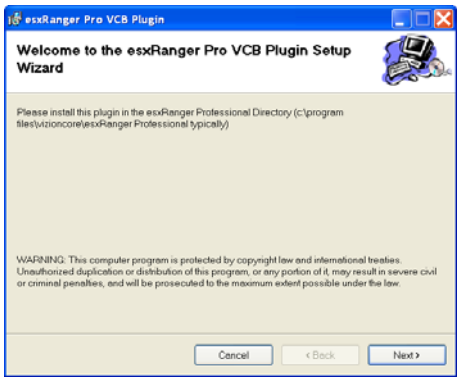
To enable vRanger Pro to take advantage of VMware's VCB proxy for LAN-free backups and restores, you must install an additional plug-in after vRanger Pro is installed.

Install VCB Plug In

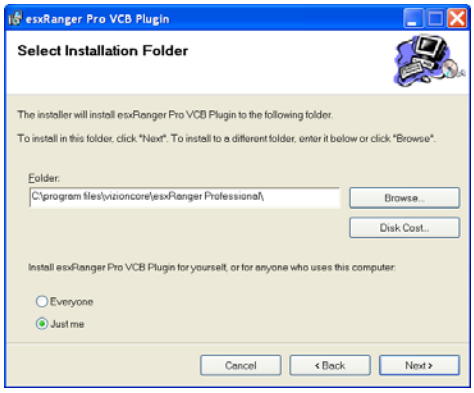
1. When the Enable VCB window displays, click **Download VCB Plug In.**



2. When the download is complete, double-click the installer to run it.
   The Setup Wizard window displays.

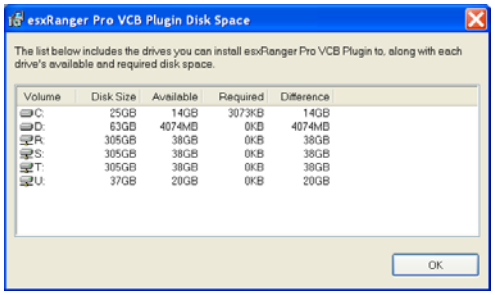


3. Click **Next.**
   The Select Installation Folder screen displays.



4. Specify the location where vRanger Pro is installed. The default is c:\Program Files\vizioncore\vRanger Pro\.
5. If you want to change the install location, edit the path directly or click **Browse** to select a path.

   Note: vRanger Pro cannot be installed on a network drive.
6. Click **Disk Cost** to view how much free space is on each available hard drive.



7. Select users for vRanger Pro—either all users of the workstation or only the user installing the program.

   Note: If you select the latter, other users will not be provided with a shortcut to vRanger Pro, but will still be able to run or remove the program.
8. Click **Next.**
9. Click **Next.**
   Wait while the plug in is installed.
10. Click **Close.**
    The plug in is installed.

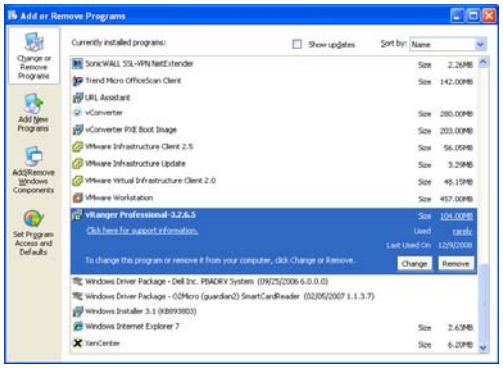
Upgrade to New Version

To upgrade to a new version of vRanger Pro, you must first uninstall any previous version of the software. When you do this, no configuration files are overwritten. These files must be removed manually:

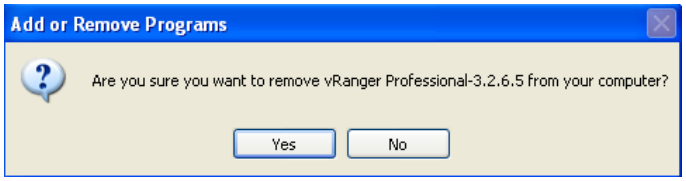
- vRanger Pro License (esxrangerpro.lic)
- Database (esxranger.mdb)
- VC Settings (vcenter.dat)
- ESX Host Settings (servers.dat)
- Added P2V Machines (PhysicalMachines.dat)
- Configured Host Destinations (hostpaths.dat)
- Email Settings (smtp.dat)

Uninstall vRanger Pro

1. Access Windows Control Panel→Add or Remove Programs.

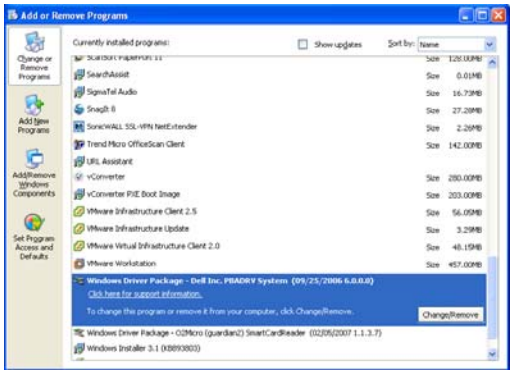


2. Click to highlight the version of vRanger Pro that you want to uninstall. Then, click **Remove.**



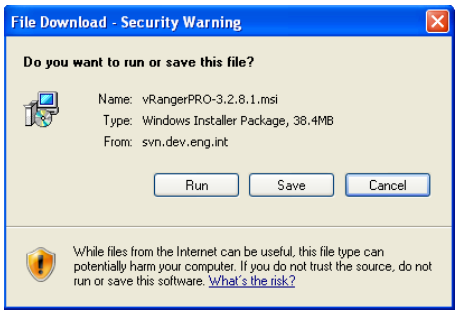
3. Click **Yes.**
   Wait as the software is uninstalled.

   vRanger Pro will no longer display in the Add or Remove Programs window.

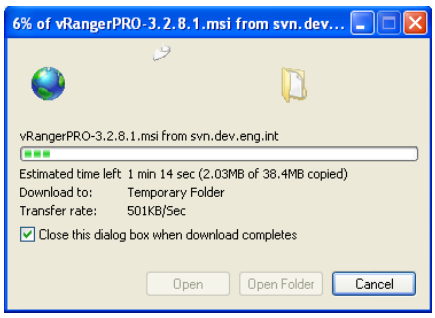


Upgrade to New Version of vRanger Pro

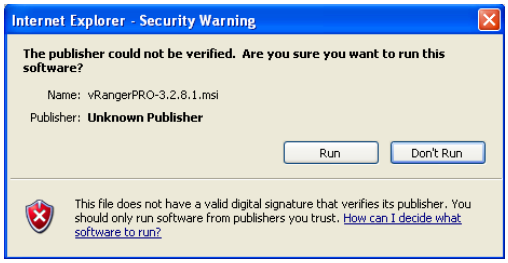
1. Using the instructions above, uninstall any previous version of the software.
2. From the desktop, double-click the installer file.
   The Security Warning dialog displays.



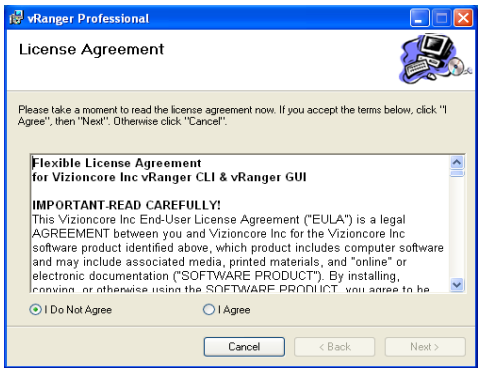
3. Click **Run.**
   The vRanger Pro Setup Wizard dialog displays.



4. If a software publisher message displays, click **Run.**

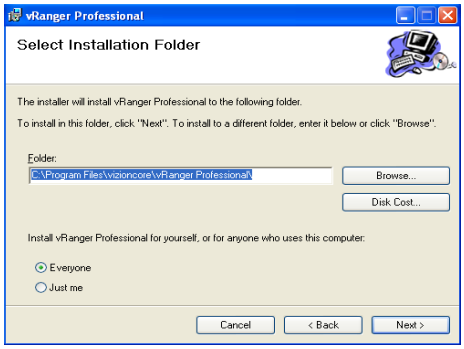


5. Click **Next.**
   The License Agreement dialog displays.

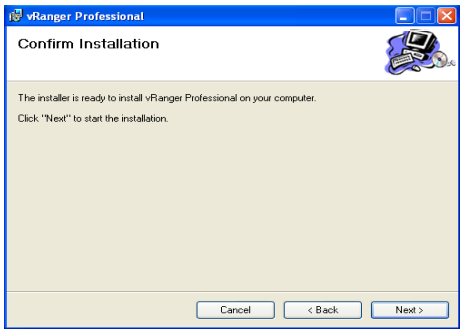


6. Read the license agreement. If you agree to its terms, click **I Agree** and then click **Next.**
   The vRanger Professional Setup Wizard dialog displays.

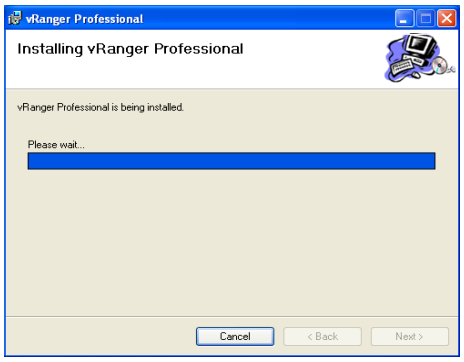
7. Click **Next.**



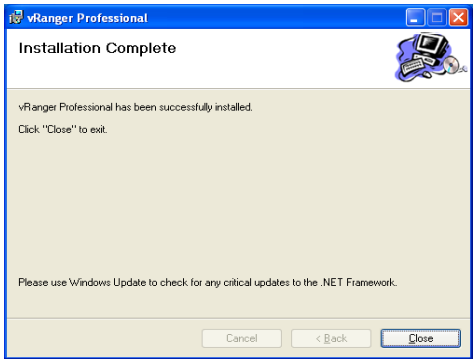
In the Folder field, specify the location where vRanger Pro should be installed or leave the default as is. Select a radio button—**Everyone** or **Just me**—and then click **Next.**



8. Click **Next** to start the installation process.
   This dialog will remain displayed during the process.



9. When installation is complete, a confirmation dialog displays.



10. Click **Close.**
    Two vRanger Pro desktop icons display—one for the CLI and one for the GUI.

3 Configuration

Using vRanger Pro for the First Time

You can set up the machines on your network to work with it. Start by setting up vRanger Pro logins and passwords on backup sources and destinations. Then, configure the software to identify and access files.

You can launch vRanger Pro by double-clicking the desktop icon or by accessing it through the Start menu. The software requires a number of application and environment configurations to ensure that it functions properly. They are described in detail below.

Backup Sources and Destination Requirements

In order to gain access to read existing VMs, create backups of those VMs, and restore them, vRanger Pro must be assigned a login with the appropriate permissions on each relevant machine.

Note: Make sure that all passwords are set so they will not expire.

Backup Sources

ESX Servers

vRanger Pro requires root-level permissions on each ESX Server to perform backups and restores. Vizioncore recommends that you restrict the root login. By doing this, vRanger Pro will be unable to log in directly as `root` – it needs to log in as a regular user and then su to root. To do this, Vizioncore recommends creating a new user account with shell access, called rangeruser.

VC

vRanger Pro requires a VC administrator level username.

Backup Destinations

On all destination machines, you should have a user account that has full permissions to read/write to the disk where the archives will be stored.

Port Requirements

If you are using a firewall or anything else that might restrict communications between the computers involved in the backup process, you need to ensure that the following ports are available:

Port	Direction	Function
22 TCP	vRanger Pro: outgoing	Used for backup traffic when using the encrypted backup traffic option. Also

	Host servers: incoming and outgoing	used for basic SSH communications
443 TCP, 902 TCP	vRanger Pro: outgoing	Used for VC communications and ESX host communications
6342 TCP 51000 - 51000x TCP	vRanger Pro: incoming Host servers: outgoing	Used for backup and restore traffic. Without using the encrypted backup traffic option, each job* requires an additional port extending upwards from 51000.
49152-4915x TCP	vRanger Pro: incoming Host servers: outgoing	Used for differential backups. Each job* requires an additional port extending upwards from 49152.
* - each execution of vRangerProCLI.exe counts as one (1) backup or restore job instance.		

Port Configuration

You now have the ability to change the communication ports to suit your environment. Changes can be made at the CLI level only, or for both the GUI and CLI.

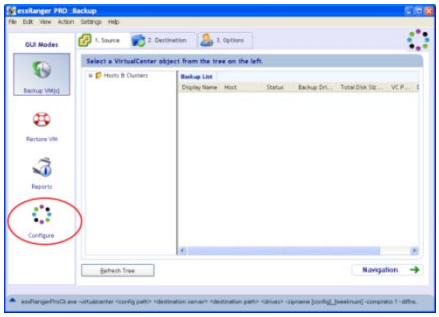
Changing Port Settings for the CLI

Edit the following values in the *`vRangerProCli.exe.config`* file located in the vRanger Pro installation directory.

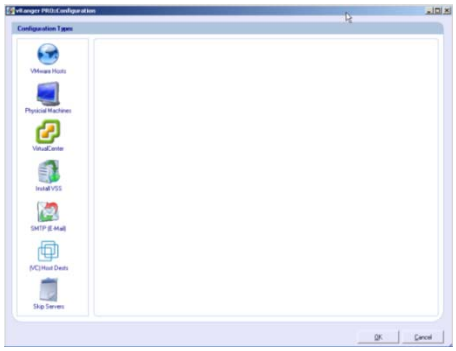
Port Name	Description
ListenPorts	Data transfer port for non-encrypted backups
PassivePorts	Data transfer port for non-encrypted backups
SSHPort	SSH Client Port
RangerSshServerPort	Encrypted Traffic Port
DiffEnginesPortRangeStart	Diff Engine Port - Start of the Range to pick from

Changing Port Settings in the GUI

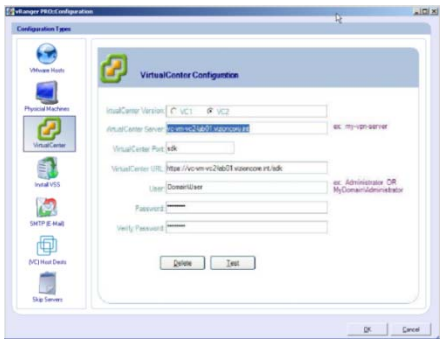
1. Launch the vRanger Pro GUI.



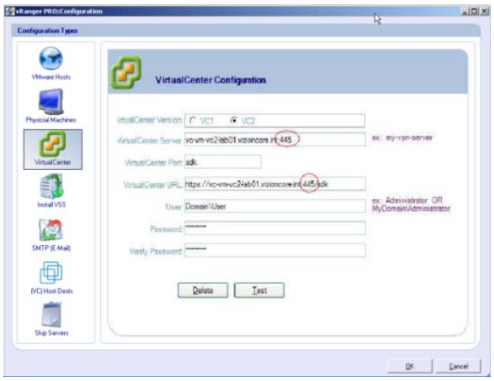
2. Click **Configure.**
   The Configuration screen displays.



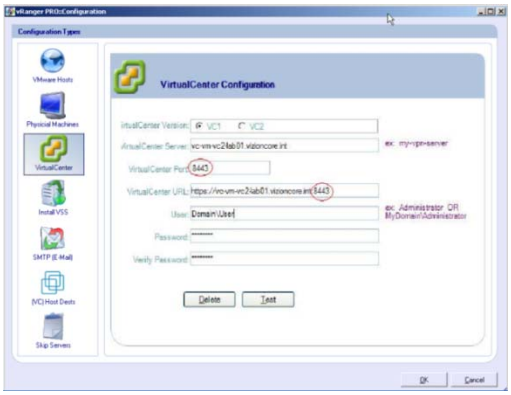
3. Click **VirtualCenter.**
   The VirtualCenter Configuration screen displays.



4. For VC 2: The VirtualCenter Port value cannot be changed from SDK; instead, simply append the desired port as shown below. This will direct traffic to the VC through the selected port.



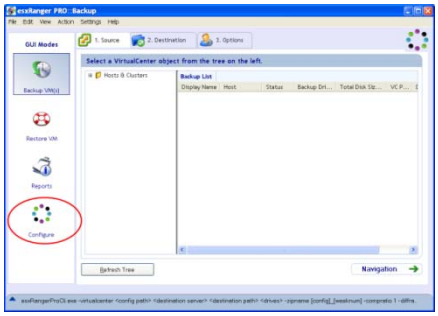
5. For VC 1: The VirtualCenter Port value can be changed directly.



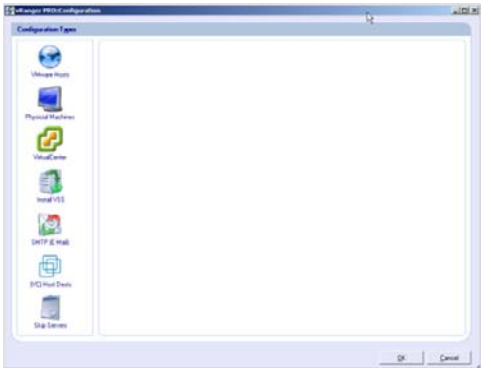
Configure vRanger Pro

Make sure that you have access to all of the usernames, their passwords, and root passwords for the ESX Servers.

1. Click **Configure**.



2. On the Configuration screen, select an icon from the left pane that corresponds to the GUI area you want to configure.



3. Populate the appropriate fields and click **OK.**

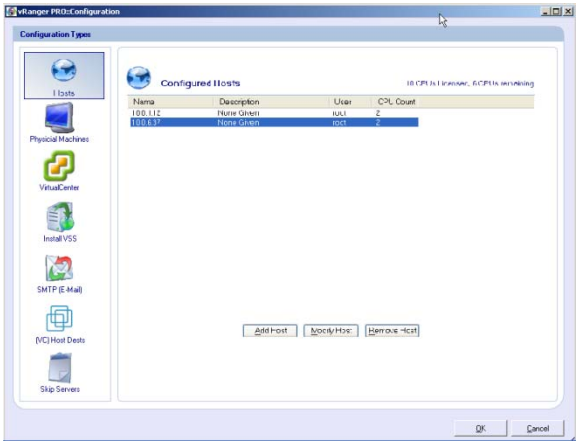
Basic Configurations

- **Hosts:** Define individual ESX Servers as sources of VMs to back up.
- **Physical Machines:** Define the physical Windows servers for which you wish to configure P2V backups.
- **VirtualCenter:** Enter the login information for VC (if available).
- **Install VSS:** Use this to select the machines on which you wish to install the VSS service. This is only needed for machines hosting VSS enabled databases.
- **SMTP (E-Mail):** Configure your SMTP server settings so vRanger Pro can email you logs of backup activity.
- **(VC) Host Dests:** Use this to set up LAN-free backup and restore sources to communicate directly with destinations on the same SAN without having to pass through the network.
- **Skip Servers:** When backing up groups of VMs with VC Backup mode, select individual VMs that should not be backed up.

Note: When you are finished configuring the subsections, you must click OK on the main Configuration screen for the changes to be saved.

Hosts

The Servers section of the Configuration dialog contains a list of individual ESX Servers that are defined in vRanger Pro, as well as licensing information. Each server in the Configured Hosts list can be used as a backup source. This information is initially provided during the Startup Wizard, but can be modified here.

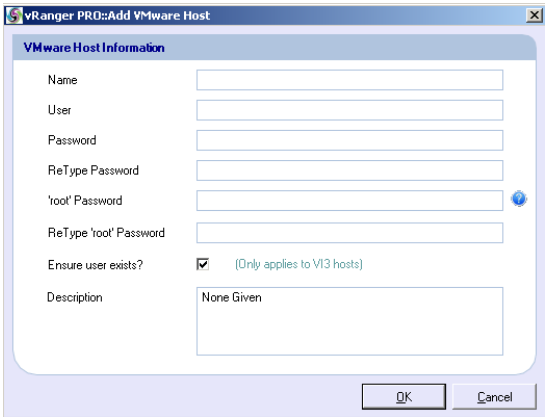


Name	The IP address or FQDN of the ESX Server.
Description	User-defined description of the ESX Server
User	The username used to log onto the ESX Server.
CPU Count	The number of CPUs on the ESX Server. Note: vRanger Pro counts dual-core processors as a single CPU.
CPUs Licensed	The number of CPUs allowed for by the vRanger Pro license. Note: If you do not have a permanent license, an evaluation license is automatically generated for you.
CPUs Remaining	The number of licensed CPUs that are not being used. Any CPU that appears in the Configured Hosts list counts as being used.

Add Server	Click this button to configure a new server.
Modify Server	Click this button to configure the server selected in the Configured Hosts list.
Remove Server	Click this button to remove the server selected in the Configured Hosts list. Note: This removes all login information for the selected server as well as related backup information. Jobs scheduled to use the removed server for backups will fail.

Add Host Dialog

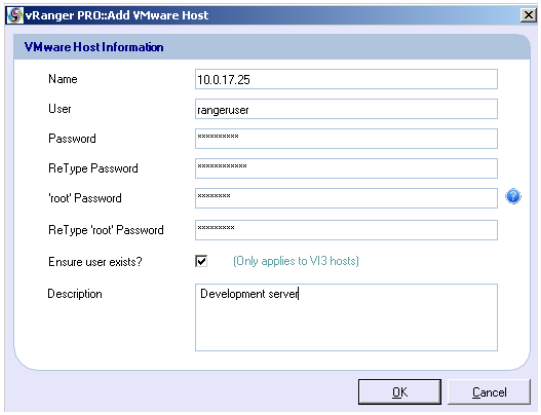
Through this dialog you can begin the process of adding a new host server. The fields on the Modify Host dialog are identical to those of the Add Host dialog.



Name	The IP address or FQDN of the ESX Server. *Note*: If you are using VC, this must be identical to the name as entered in VC. For instance, if you entered the FQDN in VC, you should not enter the IP address here.
User	The username that vRanger Pro will use to log onto the ESX Server. vRanger Pro must have root-level permissions to perform a backup, so it is preferable for it to log on as root. For servers running ESX Server version 3 (and in some other situations), the security policy of the host server does not allow direct root access over a SSH connection. In this situation, you can enter a different username that vRanger Pro will use to log onto the host server. vRanger Pro will then su to root to perform the backup. If you are not going to use root here, Vizioncore recommends that you use rangeruser.
Password	The password for the login account entered in the User field.
Retype Password	The password for the login account entered in the User field.
'root' Password	The password for the root account on the ESX Server. Note: If you enter root in the User field, this field will be disabled.
Retype 'root' Password	The password for the root account on the ESX Server.
Description	Enter a description of the server. It will display on the Configured Hosts list and in other locations in vRanger Pro, and can be used to identify servers more easily than by IP addresses or FQDNs.

Configure New Host Server

1. Click **Add Server.**
   The Add Host dialog displays.
2. Populate each field. Click **OK.**
   The connection to the new server is tested, confirming the username and passwords. If the connection succeeds, the new server is added to the **Configured Hosts** list.



Modify Existing Host Server

1. From the Configured Hosts list, select a server.
2. Click **Modify Host.**
   The Modify Host dialog displays.
3. Edit the fields. Click **OK.**

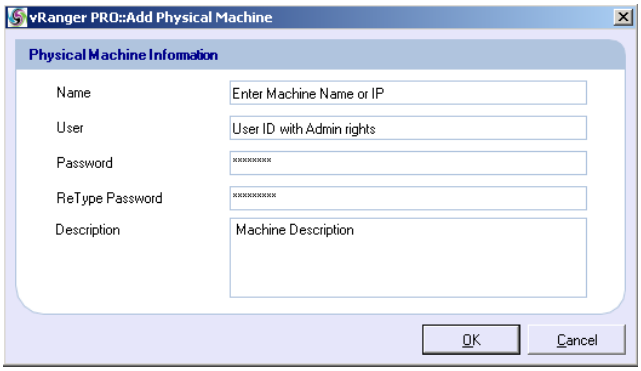
Delete Host Server

1. From the Configured Hosts list, select a server.
2. Click **Remove Host.**
   A confirmation dialog displays.
3. Click **Yes.**

Physical Machines

vRanger Pro offers the ability to perform an image level backup of a physical machine using a proven P2V engine. These backups are identical to a standard vRanger Pro archive, and can be restored to a VM with just a few mouse clicks. This functionality brings the DR benefits of virtualization to servers that organizations are unwilling or unable to convert.

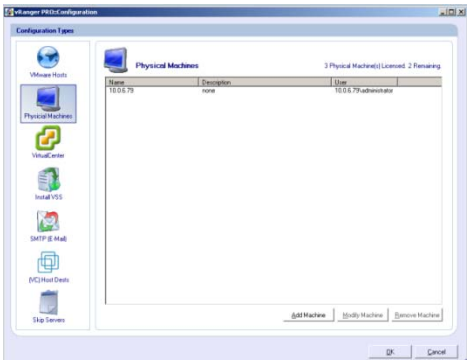
Add Physical Machine Dialog



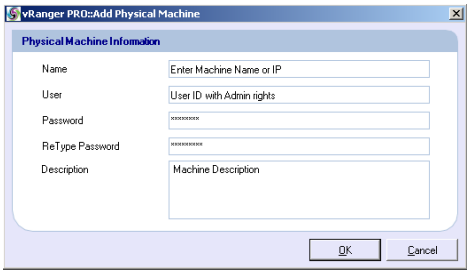
Name	The FQDN or IP address of the machine to be backed up.
User	A user account with administrator rights on the machine
Password/Retype Password	The password for the above user account.
Description	A brief description of the machine.
Test	This buttons displays at the bottom of the dialog. It allows you to test a connection that you configured.

Configure vRanger Pro for P2V Backups

1. In the left pane, click **Physical Machine.**
   The Physical Machine pane displays.



2. Click **Add Machine** to enable a machine for P2V backups. The Add Physical Machine window displays.

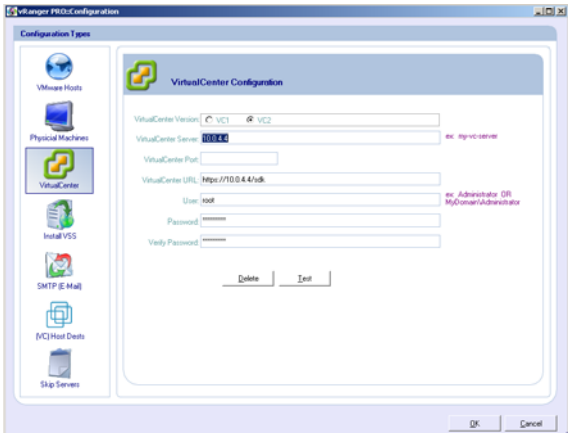


3. Populate the fields on the window. Click **OK.**

   Note: You can click Modify Machine to change values previously configured.

VirtualCenter

VMware's VC acts as a single management interface for dispersed ESX Servers. If you use VC, vRanger Pro can take advantage of its management and communication functions, allowing you to schedule and perform backups of multiple VMs or ESX Servers at a time. The VirtualCenter section of the Configuration dialog allows you to set up the communications and login information required for VC. This information is initially provided via the Startup Wizard. If you skipped this previously, you can follow the instructions below to complete the VirtualCenter configuration.

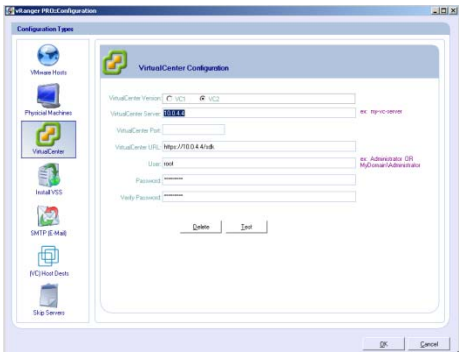


VirtualCenter Version	Select the version of VC that you are using. The available options are VC1 or VC2. *Note*: If you are using ESX Server v2 on some ESX Servers and ESX Server v3 on other ESX Servers, you should consider the following when choosing your version of VC: • If the majority of your servers use ESX Server v3, you should choose VC2. • If the majority of your servers use ESX Server v2, you should choose VC1.
VirtualCenter Server	The address of the server.
VirtualCenter Port	The port used by VC for remote communication. This generally depends upon what you chose for VirtualCenter Version and will be set automatically when VirtualCenter Version is set. • For VC2, the port is sdk. • For VC1, the port is 8443.
VirtualCenter	The full address used by VC. This field is generated

URL	automatically, using the values of VirtualCenter Version, VirtualCenter Server, and VirtualCenter Port.
User	The username used to log into VC. vRanger Pro can only back up machines that this username can see.
Password	The password for the login account entered in the User field.
Verify Password	The password for the login account entered in the User field.

Configure vRanger Pro for VC

1. Click **VirtualCenter.**
   The VirtualCenter Configuration screen displays.



2. Populate the fields on the screen. Click **OK** to confirm the settings.

Test VC Configuration

1. On the VirtualCenter Configuration screen, click **Test.**
   vRanger Pro attempts to connect to VC using the current configuration information.
2. If a dialog displays confirming that the test was successful, click **OK.**

   If the connection was not successful, it may indicate that a setting was entered incorrectly or that VC is not visible to the computer where vRanger Pro is installed.

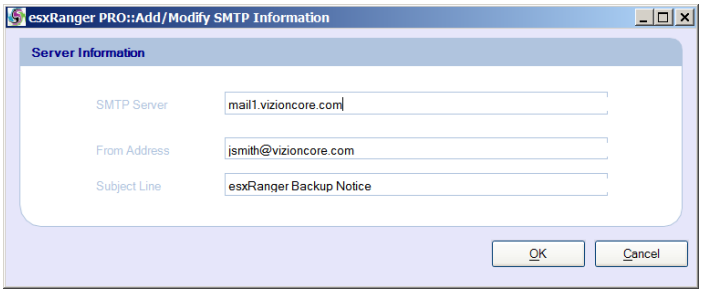
Delete VC Information

1. On the VirtualCenter Configuration screen, click **Delete.**
   A confirmation dialog displays.
2. Click **Yes.**

SMTP (E-Mail)

By configuring this section with your SMTP server settings, vRanger Pro can send you a notification email with logs every time a backup job runs.

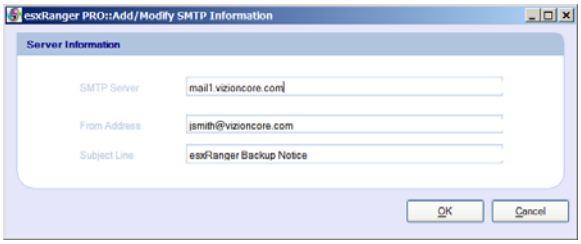
Add/Modify SMTP Information Dialog



Server	The address of the SMTP server that vRanger Pro will use to send the notification emails. Note: Choose an SMTP server that does not require authentication. An SMTP server that requires authentication will not allow vRanger Pro to send the notification emails.
From Address	The address that will appear in the From field of the email. Some SMTP servers have rules governing what they will or will not send, based on the From Address (e.g., must be a valid email account registered with that server). If you are having trouble configuring email notifications, contact your email provider to verify their sending rules.
Subject Line	The Subject field of the email that is sent. vRanger Pro sets the Subject field of the email to this value, so that it will be easily recognizable.
Add/Change Information	Click this button to add or modify SMTP server settings.

Add or Modify SMTP Server Settings

1. In the left pane of the VirtualCenter Configuration screen, click **SMTP (E-Mail).**
2. Click **Add/Change Information.**



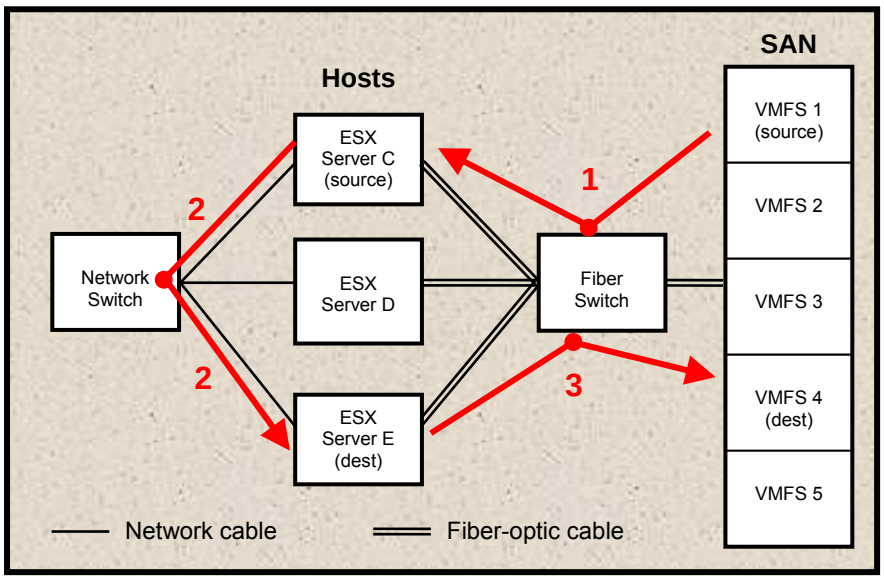
3. Populate the fields on the Add/Modify SMTP Information dialog. Click **OK.**

(VC) Host Dests

VC groups can contain VMs from multiple servers. Due to differences in the way networks and servers are structured, it may not make sense to send all of the archives to the same destination. Usually,each server uses its own local working space rather than a shared working space. If you find this is the case for your configuration, then you can use (VC) Host Dests to improve backup efficiency by assigning a different destination and working/temp space to each server.

LAN-Free Backups

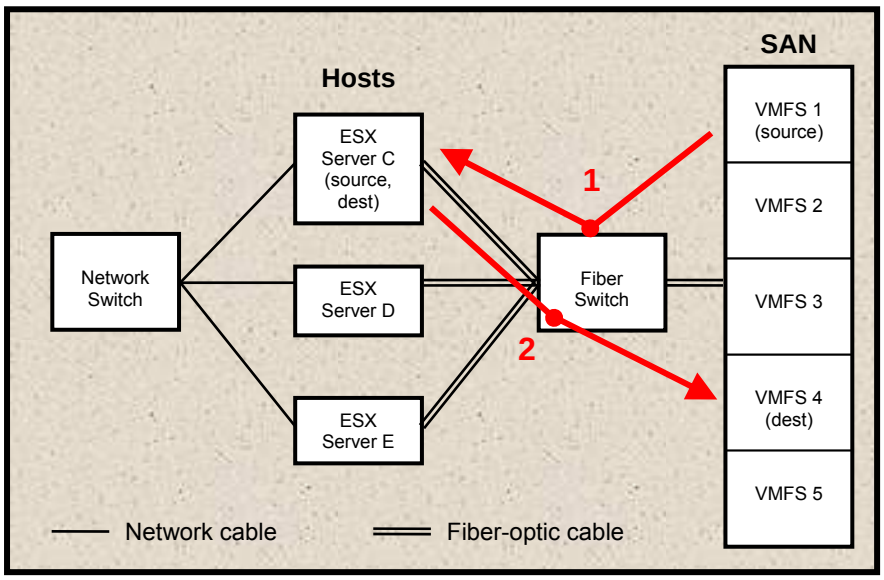
During normal operation, vRanger Pro backs up and restores VMs by sending data from one network location (source) to another (destination). The diagram below shows the major steps that the data makes on the path from a source VMFS to a destination VMFS within the
same SAN.



The data travels:

1. From VMFS 1, where the VM resides, through the fiber switch to ESX Server C (acting as source).
2. From ESX Server C, out to the network switch and back to ESX Server E (acting as destination).
3. From ESX Server E to VMFS 4, where the backup will be stored.

In this situation, vRanger Pro lets you take advantage of the high transfer rate of fiber-optic cable by eliminating the time-consuming trip through the network. ESX Server C can act as both the source and destination machine; it pulls the data from VMFS 1, compresses/decompresses it, and writes it directly to VMFS 4.



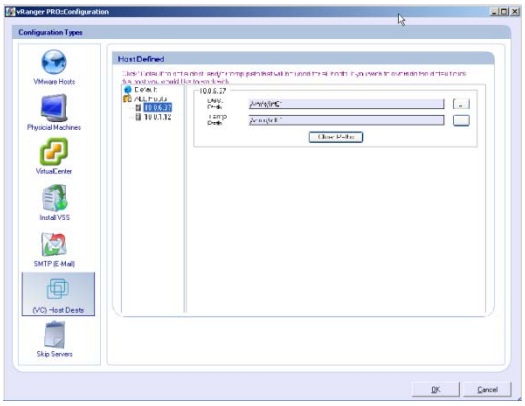
To perform a LAN-free backup, you need to:

1. Configure the source machine in the (VC) Hosts Dests screen.
2. Select the configured Host Dest in the Destination tab of the Backup or Restore screen.

Note:

If you attempt to restore a backup that was created LAN-free, it should also be restored LAN-free. To perform a LAN-free backup/restore, all ESX Servers that are attached to the fiber switch must be able to see both the source and destination VMFSs.

(VC) Host Dests Screen



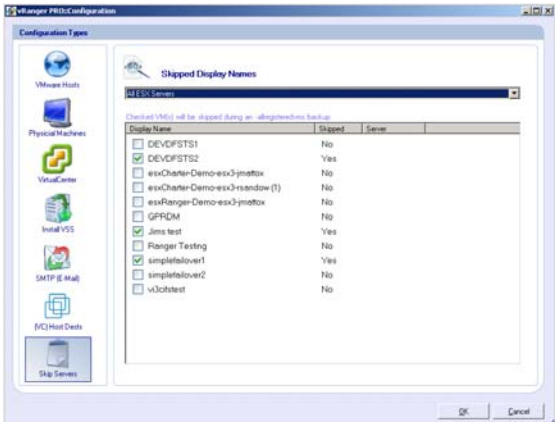
Dest Path	The destination location where the archive will ultimately reside.
Temp Path	The working directory where the archive is created. In almost every case, this should be the same as Dest Path.

Configure a Host Destination

1. Select a host or ALL Hosts from the list on the left.
2. Populate the Dest Path for the selected host by clicking the ellipsis (**…**) to browse for the destination path.
3. When you have chosen a Dest Path a message displayss, asking if you want to use the destination path as the temporary path.
4. Click **Yes**.
   The path entered in Dest Path is copied to Temp Path. The destination is now defined and can be selected from the Destination tab in VC Backup Mode.

Skip Servers

This option works in conjunction with VC Backup mode. When you back up groups of VMs at once, you can use this page to designate specific VMs that should not be backed up as part of the group backup.

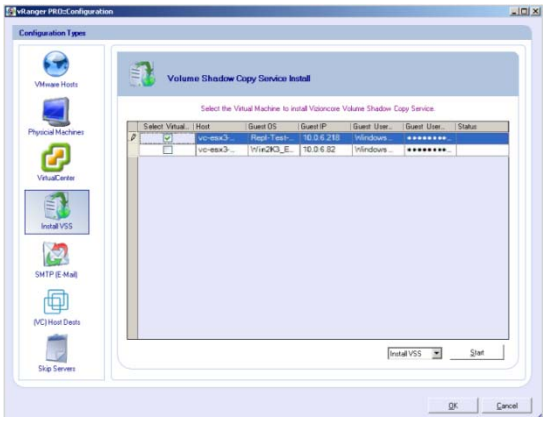


Host Server (unlabeled dropdown menu)	The host whose guests you want to designate as skipped. You can choose any host that is configured in the Servers configuration page or choose “All ESX Servers” to see guests from all configured hosts.
Guest List (unlabeled list)	All VMs running on the host indicated in the Host Server field are listed here.
Display Name	The name of a VM.
Skipped	If this is checked, then the corresponding VM will be skipped when a backup is run from VC mode for its host server, cluster, datacenter, or folder. Note: This setting is verified at the time the backup is run. If you set a VM to be skipped, schedule a backup that includes the VM,

	and then remove the skip setting from the VM, it will be backed up with the rest of its group.

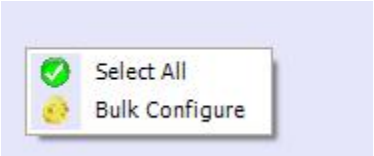
Install VSS

This option works in conjunction with the Enable VSS option (see Backup chapter for more information). This option installs the Vizioncore VSS service on the selected VM.



Select All	Selects all VMs displayed.
Bulk Configure	Allows the entry of a default set of login credentials to be used on all servers.
Drop Down Menu	Allows the selection of Install VSS or Uninstall VSS.
Start	Initiates the selected process.

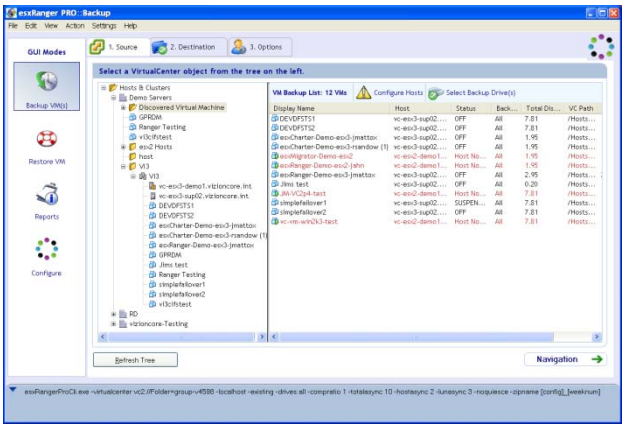
Right-clicking anywhere on the Install VSS screen will display the options below:



4 Using vRanger Pro

vRanger Pro User Interface

The vRanger Pro window is the central navigational area of the software. This is where you can view the main components of the system. Through this window you can access the commands that allow you to configure and execute backup and restore jobs.



The vRanger Pro window features these areas:

- GUI Mode Menu
- Tab Bar
- Menu Bar
- Content Area
- CLI Output

GUI Mode Menu

The GUI Mode Menu contains the following options:

Backup	Create backups of existing VMs.
Restore	Restore a VM from a backup you made previously.
Reports	Generate reports about the backups and archives that you have made.
Configure	Set up vRanger Pro to work with your ESX Servers, VC, and backup locations.

Tab Bar

These tabs represent steps in the backup and restore processes and change depending upon which mode you are in. The individual tabs are described in detail later in this chapter—Source, Destination, and Options.

Menu Bar

These menus are available in the backup and restore modes and contain a variety of commands.

File Menu

Exit	Closes the GUI window and exits vRanger Pro.

Edit Menu

Copy Command	Copies the text from the CLI Output area to the clipboard.
Schedule Command	Attempts to schedule a backup or restore job based on the information currently entered. This has the same effect as clicking the Schedule Backup or Schedule Restore buttons.

View Menu

Backup	Switches to Backup mode (same as clicking the Backup button in the GUI Modes menu).
Restore	Switches to Restore mode (same as clicking the Restore button in the GUI Modes menu).
View Logs	Opens the Logs Viewer window, where you can access and delete application log details.

Action Menu

Refresh VirtualCenter Tree	Refreshes the VC tree in the right pane of the main screen.
Database Maintenance→ Trim Records and Compact Database	Cleans the database of old records and compresses it, reducing the total size of the database.
Database Maintenance →Compact Database	Compresses the database without removing superfluous files.

Settings Menu

Backup Mode→ VirtualCenter	Sets the Backup Mode to VC Mode.
Backup Mode→Legacy	Sets the Backup Mode to Legacy Mode.

Help Menu

About	Displays information about vRanger Pro, including the version number and licensing information.
Documentation	Opens a PDF of the vRanger Pro User Manual.

Content Area

This changes depending on which mode and tab you have selected.

CLI Output

In addition to the standard graphic interface, advanced users can take advantage of the CLI, which can be useful if you want to integrate vRanger Pro with other backup scripts that you are running.

Backup

After vRanger Pro is configured, you can start to perform backups or schedule them to be performed. You can back up from ESXi 3.5 using VCB over fiber or a network.

Warning: You cannot restore ESX 3.x network backups to ESXi 3.5.

Backing up Groups of Hosts

If you back up a group of ESX and ESXi 3.5 hosts and select VCB over fiber, standard fiber-based backups will be performed. If you request a network backup of ESX and ESXi hosts and select VCB over the network for ESXi hosts, all backups will be performed over the VCB network.

Warning: If you configure network backups of ESX and ESXi 3.5 hosts and do not select VCB over the network, the backups will fail for the ESXi hosts.

Backup Process

vRanger has various flags and options that allow you to customize the backup process to your system architecture. However, most of these backups follow a common set of steps, which are described below. This is how a typical backup works:

- vRanger Pro initiates a point in time backup of ESX Server guest OSs (VMDK files).
- vRanger Pro executes the VSS process (if enabled):

  The VSS initiates the commit shadow copy phase. The VSS tells the writers to quiesce their data and temporarily freeze requestor (application) IO write requests for the several seconds required to create the shadow copy of the volume or volumes. The VSS flushes the file system buffer and then freezes the file system, which ensures that its metadata is written in a consistent order.
- vRanger Pro will use the VMware API to add a snapshot (utilizing VMware's Sync Driver) which will unlock the VMDK for read-only purposes. The snapshot will house any additional changes to the .VMDK until it is committed to the VMDK file and the file is restored to the original state.
- While the snapshot is open and housing the changes to the VM, vRanger Pro will begin compressing the VMDK file which makes a copy of the VMDK, eliminates the white space, and significantly reduces the data size.
- Once a snapshot is open, The VSS thaws the file system, releasing the writers from their temporary inactive phase and all queued write IOs are completed.
- vRanger Pro provides options for location of the compressed file to be sent to a Windows or Linux destination, or a particular VMFS or LUN.

- The snapshots are dealt with after the compression is complete and prior to the transfer of the compressed file. vRanger Pro handles the snapshots with a committing algorithm to reduce or eliminate any downtime for the VM.
- Once all changes to the VMDK in the snapshots are committed, the VMDK is returned to the original state and locked once again.
- Upon completion of this process, vRanger Pro will add an information file. Used in the restore process, this file contains information needed about the backup image including who performed it.

ESXi 3.5 Backup Process

This is how an ESXi 3.5 backup works in vRanger Pro:

- VCB network mode is executed. The entire VMDK is transferred over the network to the vRanger Pro/VCB Proxy server (for example, a 10 GB VMDK will be 10 GB of data over the network).
- The VCB data stream is compressed into a vRanger Pro archive before the 10 GB VMDK reaches the target disk or network. This process is similar to VCB over fiber.

A Word about Snapshots

Vizioncore has introduced some fail safe features to overcome potential snapshot issues. In addition to the initial Commit command to the VC, vRanger Pro executes similar commands at the Host API and CLI level. While the extra steps offer a more robust approach to managing snapshots, email alerting has also been updated to send notification of open snapshots after a backup.

Note: vRanger Pro includes a file locking mechanism that allows for error-free interaction with vReplicator. While vRanger has a VMs snapshot open, a file lock is put in place. vReplicator will read this file lock and will not attempt to open a snapshot on the same VM until the lock is removed. The process also works in reverse, with vRanger Pro reading an existing file lock put in place by vReplicator.

LAN-Free Backups

The process above covers the majority of VM backups. There is one other common type of backup called a LAN-free backup. You can use this when the source and destination drives are both accessible from the same machine, as is often the case when backing up a VM using a source and destination on the same SAN. In this situation, you can eliminate the network traffic speeding the copying process by restricting it to efficient fiber-optic cable.

VSS

The VSS process described above uses Microsoft's VSS and Vizioncore's VSS Service. While VSS is integrated with supported MS OSs, the Vizioncore VSS needs to be installed on each guest for which you wish to use it.

Enhanced Write Speeds

vRanger Pro now includes a proprietary functionality that greatly improves write speed to VMFS. This will enable faster backups to ESX Servers, but more importantly enable a lower RTO by reducing restore times. Note that this process does install a driver onto the ESX Server. This driver can be installed and removed without rebooting the server, and is only active during a vRanger Pro write.

Backup Archive Types

There are two general types of backup archives: full and differential.

Full Backups

A full backup is just what you would expect—the configuration file and all associated disk files are backed up in full. This may take up a significant amount of disk space if the VM is large. You can use a full backup to do a complete restore.

Differential Backups

Once you have completed a full backup, the next time you generate a backup vRanger Pro can create a differential backup instead. It contains the blocks in the VM that have changed since the last full backup. This type of archive is ideal for VMs that are backed up frequently or that do not change much between backups. The size of a differential backup will be relatively small—this means that it will take up less hard drive space and the copying stage will be faster. A differential archive is dependent on the most recent full backup at the time it was created— both archives are required to perform a restore.

Note: Differential backups are available for Windows destinations only and are not compatible with VCB backups.

Uncompressed Backups

Uncompressed backups are simply full, uncompressed backups of the source VM. They can be used for hot cloning, but the main purpose is to allow integration with data de-duplication solutions such as Data Domain. Uncompressed backups can be restored through the normal restore process.

Free Disk Space Requirements

Depending on the backup options you select, vRanger requires a certain amount of free space on the source and destination drive partitions.

Source Requirements

vRanger requires free space on the source disk to accommodate the snapshot log file, which continues to grow while the VM is archived and copied to the backup destination.

To avoid running out of space, the source hard drive must have a minimum of 6GB free when you begin a backup. However, Vizioncore recommends that you have at least 10GB or 10 percent of the VMFS, whichever is greater.

Destination Requirements

The destination drive must have enough free space to accommodate the new VM archive file. Space requirements will vary, as some archives compress more than others. vRanger Pro checks this by comparing the amount of free space on the destination to the size of the uncompressed VM.

Due to the unique nature of our P2V backup ability, the destination drive for P2V backups must have free space equal to 2 times the size of the target drive. For example, if a P2V backup of a machine with a 40GB hard drive is initiated, the destination machine must have at least 80GB free space.

Backup Modes

The vRanger Pro backup interface has two different modes: VC mode and Legacy Mode. It is important to understand the distinction between these in order to use vRanger Pro most effectively.

VC Mode

In VC Mode, vRanger Pro communicates directly with your VC installation and shows your VMs in a tree structure that mirrors VC's interface. The primary benefit of this structure is that you can use it to select an individual VM, a VM group, a host server, a server group, or even your entire infrastructure to be backed up at once.

Requirements:

- To use VC Mode, you must have a VMware VC installation running.
- When you configure VC Mode, you designate whether vRanger Pro will run in VC Mode 1 or VC Mode 2. If you are running VMware VC version 1, you have to use VC Mode 1, but if you are running VC version 2, you can choose either VC Mode.
- In VC Mode 1, you can only create backups using hosts running ESX Server v2.x. In VC Mode 2, you can only create backups using hosts running ESX Server v3.x.

  -If all of your host servers are running the same version of ESX Server, simply select the appropriate VC Mode.

  -If you have a combination of both versions, you will have to decide which VC

mode will benefit you the most. It is often best to select the VC mode corresponding to the majority of your host servers. You can back up the rest of your servers using Legacy Mode.

VMware VC Version	ESX Server Version	Select VC Mode
1 or 2	All 2.x	1
2	All 3.x	2
2	Majority 2.x	1
2	Majority 3.x	2

Legacy Mode

In Legacy Mode, you can select an individual VM to be backed up regardless of the ESX Server version that is hosting it. Note that P2V backups are not available in Legacy mode. In order to backup a physical machine, VC Mode must be used.

General Backup Process

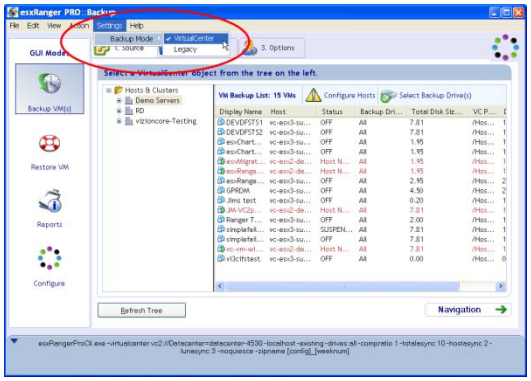
To create a backup, you must:

1. Select the source—the VMs you will be backing up.
2. Select a backup destination—the place where the archived backup files will be stored.
3. Select related options.

Each of these steps has its own tab in the Backup window. The appearance and features of the tabs may vary depending on whether you are using VC Mode or Legacy Mode.

Begin the Backup

1. Select the Backup Mode you want to use from Settings on the menu bar.

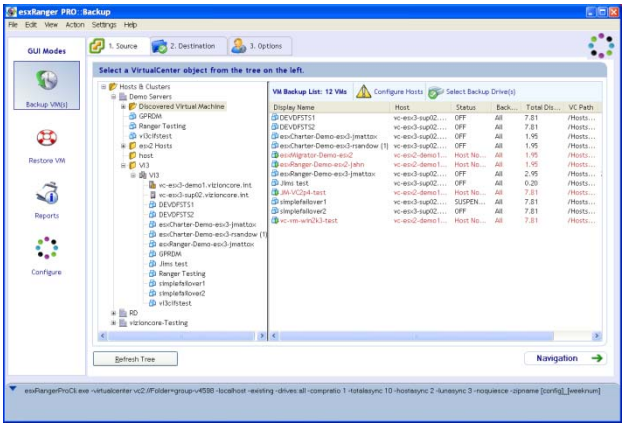


2. Select **VirtualCenter** or **Legacy.**
3. Populate the fields on each of the tabs in order. See the sections below for additional information.

Source Tab

This tab allows you to select the VM(s) which you will be backing up. It is significantly different for each of the two modes, so they will be discussed separately. This tab is split into two panes: the VC Tree and the VM Backup List.

VirtualCenter Mode



VC Tree

The left pane shows the VC Tree, which includes all of the servers and VMs configured in VC. This tree operates identically to the one in VC. By clicking on the '+' sign next to a datacenter or cluster, you can expand it to see the subfolders, hosts, or VMs that belong to it.

Icon	Meaning
	Folder
	Folder (expanded)
	Datacenter
	Cluster
	Host
	Host (unconfigured)
	Virtual Machine
	Virtual Machine (running)

Refresh Tree	Reloads the contents of the VC Tree, updating to match any changes that have occurred since it was last loaded.

VM Backup List

When you select and highlight any item on the tree, the VM Backup List shows all of the VMs that fall under it. These are the VMs that you are choosing to back up. For instance, if you select a VM in the tree, the same VM will show up in the result pane. If you select a cluster, all of the VMs running on all of the configured hosts in that cluster appear in the VM Backup List and will be backed up.

Note: VMs that display in RED belong to unconfigured hosts and will not be backed up.

Display Name	Display name of the VM.
Host	ESX Server that is hosting the VM.
Status	Indicates whether or not the VM is running. Also indicates if the host is not configured.
Backup Drives	Indicates which virtual disks will be backed up.
Total Disk Size (GB)	Disk space (in GB) taken by all files belonging to the VM.
VC Path	Path in the VC Tree to the VM. This is useful if you select a high-level folder or datacenter in the VC Tree and you want to know how to locate a specific VM in the tree.
Drive Count	Indicates the number of virtual hard disks belonging to the VM.
Select Backup	If a VM has more than one virtual hard disk, this allows you to select

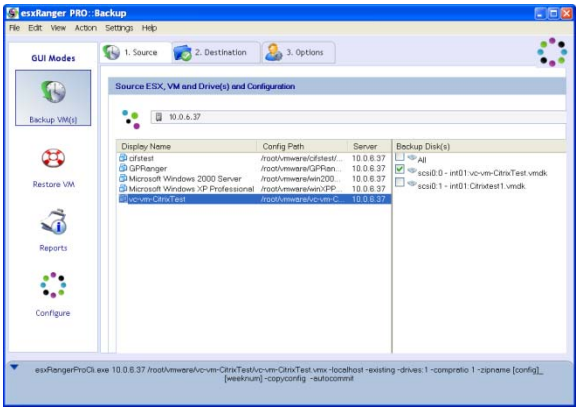
Drive(s)	which ones will be backed up.
Disable Drive Selection	Disables the Select Backup Drive option and backs up all drives for all selected VMs.
Refresh Tree	Refreshes the VC tree view.

Expanding a cluster in the VC Tree pane reveals a list of all host servers and VMs that fall under it, regardless of whether or not the host is configured. VMs running on unconfigured hosts will not appear in the Result pane and will not be backed up.

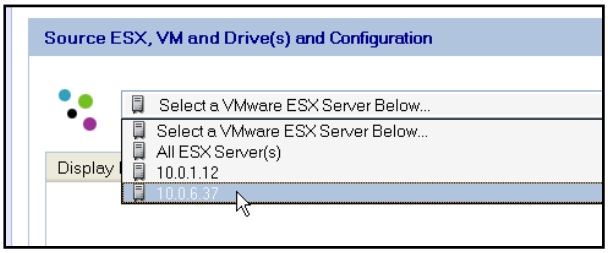
Additionally, VMs will appear in the Result pane regardless of the version of the host server. For example, if you are running in VC Backup Mode 2 and have a host running ESX Server version 2.x, any VMs running on that host will be backed up in VC2 mode.

When you have selected your backup source, click the Destination tab.

Legacy Mode



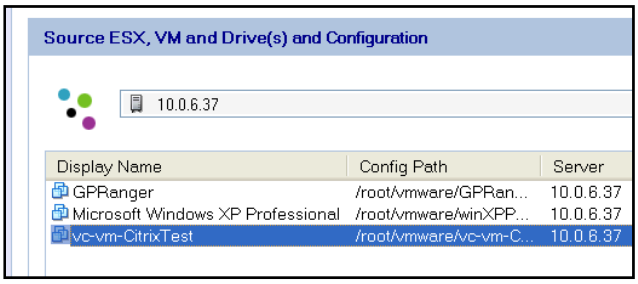
In Legacy Mode, you can select a single VM to back up. Similar to VC Mode, the Source tab is split into two panes: the VM List Pane and the Disk File List Pane. Above the two panes is the Host Selection Box.



VM List Pane

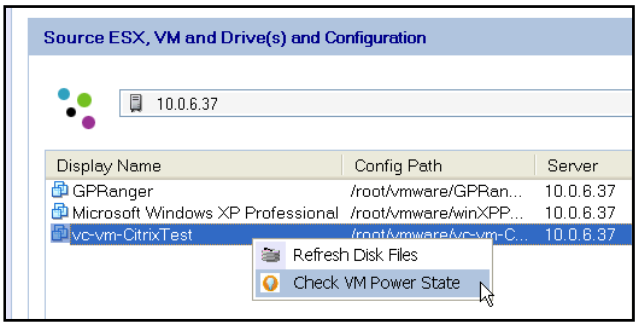
The Host Selection Box contains a list of all ESX Servers configured in vRanger Pro. Use it to select a server that hosts the VM that you want to back up, or select "All ESX Server(s)" to see a list of VMs on all configured servers. The VM List pane shows all of

the VMs hosted on the server indicated by the Host Selection Box. Select the VM that you want to back up from the list.



Display Name	Display name of the VM.
Config Path	Indicates the location of the VM configuration file.
Server	The ESX Server where the VM is hosted.

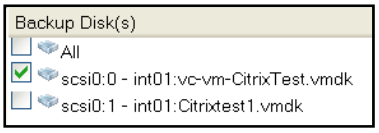
You can also right-click on any VM for a few more options.



Refresh Disk Files	Refreshes the contents of the Disk File List Pane.
Check VM Power State	Displays a message indicating whether or not the selected VM is currently running.

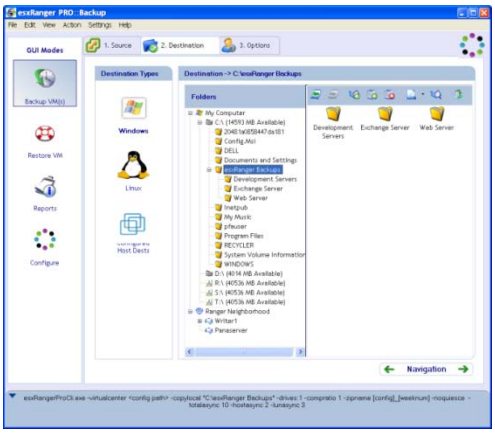
Disk File List Pane

This pane contains a list of the disk files that are associated with the selected VM. When you back up the VM, the configuration file is automatically backed up. You can specify which disk files are backed up by checking the box next to the disk, or you can choose to back up all associated disk files (default) by checking the box next to All. When you are finished, click on the Destination tab.



Destination Tab

Use this tab to select the location where your backup archives will be stored. The interface works the same for both VC and Legacy Modes.



First, you need to select the type of backup destination you will be using by clicking appropriate icon under Destination Types. vRanger supports Windows, some flavors of Linux, and other ESX Servers as destinations. To select an ESX Server, select the Linux icon. If you are doing a LAN-free backup, select the Configured Host Dests icon. The interfaces for each of these Destination Types are described below.

Windows Destinations

Immediately to the right of the Destination Types box is the Folder Tree. The tree is split into two groups:

My Computer—contains all hard drives directly visible to the machine running vRanger Pro, as well as all mapped network drives.

Ranger Neighborhood—contains Windows machines on the same network as the machine running vRanger Pro.

To the right of the Folder Tree there is a small Button Bar and the Contents Pane, which displays the subfolders of the directory that is selected in the Folder Tree.

Icon	Meaning	Icon	Meaning
	My Computer		Ranger Neighborhood
	Attached Hard Drive		Network Computer
	Mapped Network Drive		Network Share
	Folder		

Icon	Meaning
	**Back**—jumps to the previously selected item in the Folder Tree.
	**Forward**—jumps to the next selected item in the Folder Tree.
	**Create New Folder**—creates a new folder within the selected item in the Folder Tree.
	**Add Server**—adds a new network computer to the Ranger Neighborhood group.
	**Remove Server**—removes the currently selected network computer from the Ranger Neighborhood group.
	**Change View**—switches the view of the Contents Pane between large icons and a detailed list.
	**Show Files**—includes files in the Contents Pane; if you do not click this, only subfolders appear.
	**Enumerate Network Servers**—adds all Windows shares available on the domain that ESX Server is logged into the Ranger Neighborhood group.

When you select a backup destination, the path to that destination is displayed above the Folder Tree, after "Destination ->".

Selecting a Networked Computer as a Backup Destination

The My Computer group in the Folders Tree is automatically populated, but the Ranger Neighborhood group starts out empty. To use a Windows computer on your network as a backup location, you can either map it as a network drive or add it to the Ranger Neighborhood.

There are two ways to add a network computer to the Ranger Neighborhood:

- If you click the Enumerate Network Servers button, vRanger Pro will automatically attempt to identify all available networked computers and add them to the Ranger Neighborhood group.
- You can add individual computers manually by clicking the Add Server button. When the new server appears, simply type the computer name and it will be added.

Note: vRanger Pro assumes that the computer it is installed on has authentication with any network destination it is instructed to access. It will not attempt to authenticate the destination itself. Because authentication to a share can sometimes be unexpectedly lost over a period of time or after a computer reboot, Vizioncore recommends ensuring that the network shares used as backup destinations are accessible to the account running the scheduled backup.

Linux and ESX Server Destinations

The interface for Linux and ESX Server destinations is nearly identical to the Windows Destination interface, with the following differences:

- There is no My Computer group in the Folder Tree.
- The Ranger Neighborhood group automatically contains all ESX Servers that are configured in vRanger Pro. You can add more destinations using the Add Server button.
- There is no Enumerate Network Servers button.

Configured Host Dests

If you are using VC mode to back up simultaneously from multiple host servers, you can use this to distribute the processing and storage burden by assigning each host a separate destination and working directory.

You can also use this option to perform a LAN-free backup on a SAN.

Use Configured Host Dests

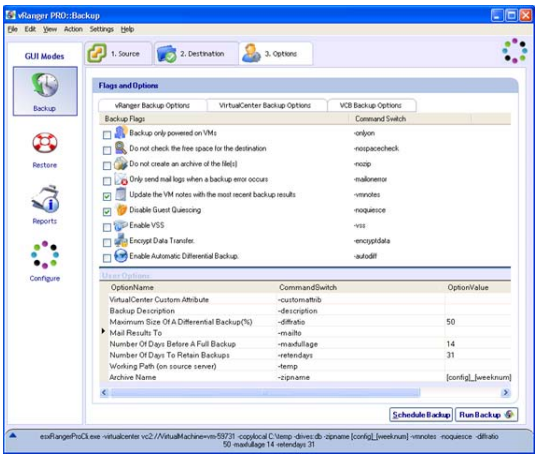
1. Click **Configured Host Dests** icon under Destination Types.
2. If you have already assigned destination paths for the hosts selected in the Source tab, you can proceed to the Options tab.

   Otherwise, click the **Click to Configure** link to open the (VC) Host Dests configuration page.

Options Tab

This tab contains a variety of simple, yet powerful options that you can choose from to customize your backup. The availability of these options depends on several factors,

including whether you are using VC Mode or Legacy Mode, and the server version of the backup source.



The Options tab is divided into sub-tabs:

- vRanger Backup Options
- VirtualCenter Backup Options (available in VC Mode only)
- VCB Backup Options (visible only with the VCB plug-in installed)

vRanger Backup Options

This tab contains two lists—Backup Flags and User Options.

Backup Flags

Backup Flags are all on/off options, and each is listed with a Command Switch. The Command Switch is relevant only if you are going to use the CLI.

Flag *[-Command Switch]* *Restrictions (if applicable)*	Description
Copy the VM Configuration File *[-copyconfig]*	If this flag is checked, vRanger will include the VM configuration (.vmx) file in the backup it creates. This is checked by default and Vizioncore recommends that you leave it on. Without it, only the disk files are backed up. When performing Vi3 backups the backup of the configuration file is built into the backup process.
Automatically commit persistent mode disk file REDO logs before backup *[-autocommit]*	If you are backing up a running VM, vRanger creates a snapshot of the VM, allowing it to continue to run while vRanger backs up the disk files. When the backup is completed, the snapshot is merged with the disk files and then deleted. If this flag is checked, vRanger closes any existing snapshots when it begins the backup and starts a new one. This is useful because snapshot files can grow in size very quickly for active VMs, consuming disk space which is required for creation of the backup. If the hard disk runs out of room, this can cause the VM to crash and/or may prevent vRanger from completing the backup. By starting the snapshot when the backup begins, the size of this file is kept to a minimum. This is checked by default and we recommend that you leave it on. To avoid running out of space, the source hard drive must have a minimum of 6GB free when you begin a backup; however, Vizioncore recommends that you have at least 10GB or 10 percent of the VMFS, whichever is greater. When performing Vi3 backups autocommit is built into the backup process to look for vRanger and VCB snapshots just prior to executing backups.
Backup only powered on VMs *[-onlyon]*	If this flag is checked, vRanger will check the status of the VM before it begins a backup, and will skip the VM if it is not running. If a VM is not running, it may be the case that it has not changed significantly since the last backup, so creating another backup could be redundant.

Flag *[-Command Switch]* *Restrictions (if applicable)*	Description
Do not check the free space for source or destination *[-nospacecheck]*	Before vRanger begins a backup, it checks the destination location to ensure that there is enough space available for the backup file to be written. Because it is not possible to determine how much space will be saved by compression, vRanger will generate an error if the free space at the destination is less than the combined size of the files belonging to the VM. If this flag is checked, vRanger will perform the backup without verifying the space available at the destination. You would use this flag if you knew that the VM can be compressed enough to fit in the existing free space. For example: If the destination drive has 80GB free and the VM is 100GB, vRanger would not usually attempt the backup. If you know, however, that the VM can be compressed to about 30GB (and so will fit on the destination drive), you would use this flag to override the destination free space check. *Note*: This flag does not override the 6GB free space required on the source drive.
Verify that the archive is valid after creating it *[-verifyarchive]* *Restrictions:* *ESX Server v2.x only*	If this flag is checked, vRanger stages the backup on the source ESX Server, verifies it, and then copies it to the destination. This guarantees the integrity of the backup, but may take two to three times longer. When performing Vi3 backups the archive validation is built into the backup process, without the extended time to perform the validation.
Do not create an archive of the file(s) *[-nozip]* *Restrictions:* *Not compatible with **zipname** or the –autodiff user option*	This flag causes vRanger to create an identical copy of the source VM, without using any compression. This can be used to perform a hot clone of a VM—to create a duplicate copy of a VM that is running. This flag is not compatible with the Archive Name user option. If you want to use this option, you must delete the OptionValue listed for Archive Name.

Flag *[-Command Switch]* *Restrictions (if applicable)*	Description
Only send mail logs when a backup error occurs *[-mailonerror]* *Restrictions:* ***SMTP** must be configured* *Requires **mailto** user option*	If this flag is checked, vRanger will only generate an email notification when an error occurs during a backup. Backups which are performed successfully will not result in a notification email.
Enable vRanger enhanced write speeds *[-vzboost]* *Restrictions:* *This feature only supports writing to VMFS.*	This functionality will install a driver onto the destination ESX Host to allow for enhanced write speeds to VMFS. When a write to VMFS is initialized, vRanger Pro will activate the driver for the duration of the write. When completed, the driver returns to an inactive state, consuming no resources.
Update the VM Notes with the most recent backup results *[-vmnotes]*	If this flag is checked, vRanger will update the VM Notes in VC with the most recent backup status. Note: vRanger maintains the existing VM notes in VC, appending the backup status to the end.
Disable Guest Quiescing *[-noquiesce]* *Not compatible with **VCB***	Disables the VMware Tools Synch Driver when creating a backup. You should use this flag if you're backing up a database server (for example, SQL Exchange, Active Directory, Oracle or any database that uses a service to write). When executing VCB backups, vRanger does not control VMware snapshots, thus the quiescing option cannot be disabled. To stop VCB from engaging the sync driver you must remove it from the VMware Tools by using Add/Remove Programs.
Enable VSS *[-vss]* *Restrictions:* ***VSS Service must be installed prior to backup*** ***Requires Guest OS and applications to support VSS quiescing.***	If this flag is checked, vRanger will interact with the Vizioncore VSS Service to freeze writes on supported applications. This will provide a consistent image of VSS enabled databases.

Flag *[-Command Switch]* *Restrictions (if applicable)*	Description
Encrypt Data Transfer *[-encryptdata]*	By default vRanger backup traffic is not encrypted to enable the backups to perform as fast as possible. By invoking this option you will reduce your backup speed by about 20 percent and all backup traffic will run over SSH to the Windows host.
Enable Automatic Differential Backup *[-autodiff]* *Restrictions:* *Windows destinations only* *Requires **diffratio** or **maxfullage** user option* *Not compatible with VCB*	If this flag is on, vRanger will create a differential backup instead of a full backup, if possible. This occurs when there is an existing full backup for the VM and depends on the Maximum Size Of A Differential Backup (%) and Number Of Days Before A Full Backup user options. If you select this option and then select Enable VMware Consolidated Backup on the VCB Backup Options tab, VCB differentials will be enabled.

User Options

User Options allow you to customize various values that relate to the backup, such as the name of the archive or the amount of compression to use.

Option ***[-Command Switch]*** ***Restrictions (if applicable)***	**Description**
Archive Name *[-zipname]* *Restrictions:* *Not compatible with* ***nozip*** *flag*	Indicates how the archive file will be named. You can include the following variables in the name: • [config] – the name of the vmx file belonging to the VM being backed up • [dayofweek] – abbreviated name of the day of the week (Sun, Mon, Tue, Wed, Trs, Fri, Sat) • [year] – current year as a 4-digit number (e.g., 2007) • [month] – current month number (01-12) • [day] – current day number (01-31) • [hour] – current hour (00-23) • [minute] – current minute (00-59) • [second] – current second (00-59) • [weeknum] – current week of the month, starting from the first of the month (0-5) • [biweekly] – week of the year (odd or even) If you leave this option blank, the name will be *[config]_[year][month][day][hour][minute][second]*. This naming convention is required for differential backups. The variables that you should use will depend on your backup schedule.
Backup Description *[-description]*	A text description of the backup that goes into the .info file and the backup database. This description will appear when you attempt to restore the VM, and can be used to identify the proper archive.
Mail Results To *[-mailto]*	vRanger will send an email notification to the addresses listed here upon completion of a backup (or upon error only, if the "Only send mail logs when a backup error occurs" flag is used). Multiple addresses should be separated by a semicolon '**;**'.

Option *[-Command Switch]* ***Restrictions (if applicable)***	Description
Maximum Size Of A Differential Backup (%) *[-diffratio]* *Restrictions:* *Windows destinations only* *Not applicable without* ***autodiff*** *flag*	If the **Enable Automatic Differential Backup** flag is checked, this option helps to determine if vRanger will create a differential backup instead of a full backup. If the size of the most recent differential backup of this VM is greater than the percentage of the full VM size indicated here, then vRanger will create a full backup. Otherwise, vRanger will create a differential backup, subject to the **Number Of Days Before A Full Backup** user option.
Number Of Days Before A Full Backup *[-maxfullage]* *Restrictions:* *Windows destinations only* *Not applicable without* ***autodiff*** *flag*	If the **Enable Automatic Differential Backup** flag is checked, this option helps to determine if vRanger will create a differential backup instead of a full backup. If it has been more than the number of days* indicated here since the last full backup of this VM, then vRanger will create a full backup. Otherwise, vRanger will create a differential backup, subject to the **Maximum Size Of A Differential Backup (%)** user option. Note: “Days”, here, refers to the backup period. If the VM is scheduled to back up every week, then the days in between backups are counted as days; so days are counted literally.
Number Of Days To Retain Backups *[-retendays]* *Restrictions:* *Windows destinations only* *Not applicable without* ***autodiff*** *flag*	This option determines how long vRanger will keep an archive before it is deleted to free up hard drive space. When creating a backup, vRanger checks all existing backups of the same VM with the same destination. Any backup that is older than the number of days* indicated here is deleted. Note: Full and differential backups are not deleted until *all* differential backups associated with the full backup are older than the number of days indicated here. Note: Days refers to the backup period. If the VM is scheduled to back up every week,, then the days in between backups are counted as days; so days are counted literally.

Option *[-Command Switch]* ***Restrictions (if applicable)***	**Description**

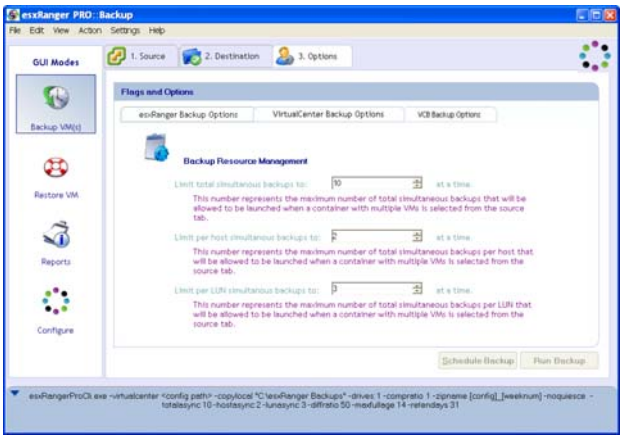
VirtualCenter Custom Attribute
[-customattrib]
Restrictions:
VC Mode only
VC 1.x only
	VC allows you to define custom attributes for VMs. This option allows you to further refine the list of VMs to be backed up, based on the values of those attributes.
	The format for this is:
	`Attribute=Value`
	where you can list up to three attributes that are defined in VC, separated by &&. vRanger will back up only the VMs that meet the criteria you specify here.
	For example, if you have two attributes defined in VC (column names "SAN" and "DR") you might complete this option as follows:
	`san=test&&dr=LH`
	Only VMs selected in the source tab that have "test" as the value of the SAN attribute and "LH" as the value of the DR attribute will be backed up.
	This field is not case sensitive.

Working Path (on source server) *[-temp]*	Rather than creating an archive of the VM on the same VMFS before copying it to the destination location, you can use this option to have vRanger create the archive in a different location. Here are some examples of when you might want to use this: • If your VMFS has low free space, you can stage the backup on another disk. • If you want to have a specific machine with better performance compress the VM. • If the destination location is visible to the host ESX Server (for LAN-free backups). This option should almost always be specified in the last case for best performance. This allows vRanger to spool the archive directly in the destination.

VirtualCenter Backup Options

These options are available only in VC Backup Mode. They are used to set limits on how many backups can be performed simultaneously, to avoid giving any particular hardware component too much work to do at once. Any scheduled backups that exceed the limits

set here will be queued and performed when the other backups are completed.

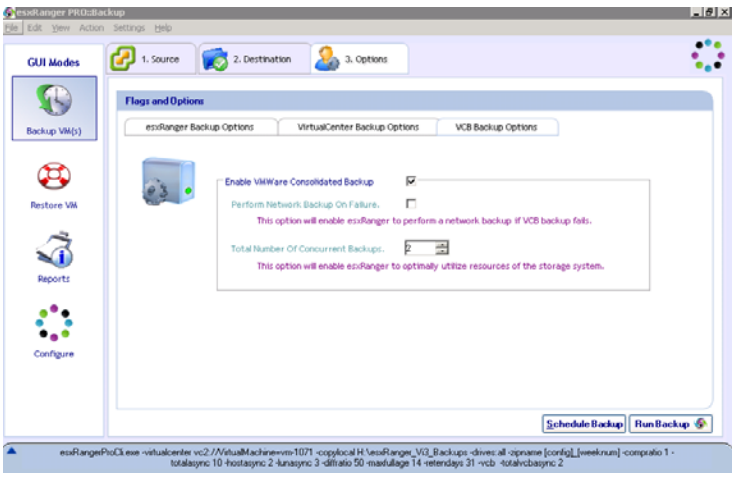


Limit total simultaneous backups to # at a time.	The maximum number of VMs that vRanger will back up at the same time. Vizioncore recommends keeping this at 10 or less.
Limit per host simultaneous backups to # at a time.	The maximum number of VMs from a single host that vRanger will back up at the same time. Vizioncore recommends keeping this at 1 or 2.
Limit per LUN simultaneous backups to # at a time.	The maximum number of VMs stored on a single LUN that vRanger will back up at the same time. This is relevant when backing up machines from a SAN, where several VMs might be stored on the same LUN but backed up using different hosts. Vizioncore recommends keeping this no higher than 3.

VCB Backup Options

vRanger Pro takes advantage of VCB, which can dramatically increase the speed of LAN-free backups by taking the backup workloads from the host ESX Servers and moving them to a centralized VCB proxy server. Use the VCB Backup Options sub-tab to instruct vRanger to use the VCB server when performing a LAN-free backup.

Note: This tab only appears if you have installed the VCB plug-in for vRanger and you have selected a Windows destination.



Enable VMware Consolidated Backup	Select this box to instruct vRanger to use the VCB proxy server for LAN-free backups. If you select this checkbox as well as the Enable Automatic Differential Backup checkbox on the vRanger Backup Options tab, VCB differentials will be enabled.
Perform Network Backup on Failure	If this box is checked and the VCB backup fails, vRanger will perform a standard LAN-based backup.
Total Number of Concurrent Backups	Indicates the maximum number of simultaneous backups the VCB proxy server will perform at one time. Vizioncore recommends that you set this to one (1) or two (2).

Finalizing the Backup

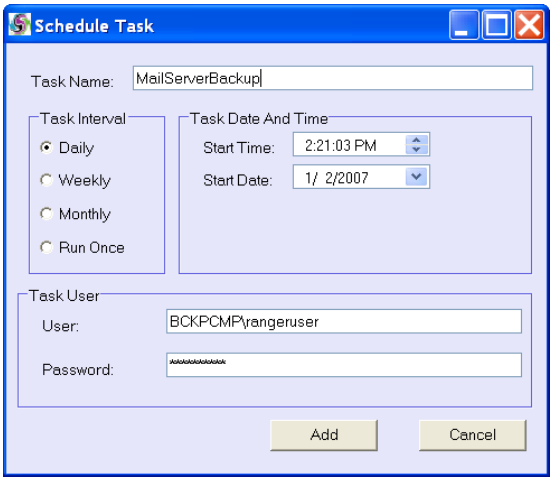
Once you have selected a source and destination, and filled in the appropriate options, you are ready to finalize your backup. You can either run the backup immediately or schedule it to run later. Each option has a corresponding button at the bottom of the Options tab.

Note: If these buttons are disabled, it means that insufficient information has been provided to perform the backup or that conflicting options have been selected (such as selecting the nozip flag without deleting the zipname option). Double-check each tab to make sure that you have provided all of the information necessary.

Scheduling Backups to Run Later

vRanger uses Windows Task Scheduler to manage scheduled backups. You can find the Task Scheduler by selecting Control Panel from the Windows Start menu. For more information on maintaining scheduled backups, refer to the Help menu within Task Scheduler.

If you click the Schedule Backup button, the Schedule Task dialog displays.



Task Name	This is the name of the task as it appears in the Scheduled Tasks list and in Windows Task Manager.
Task Interval	Indicates how frequently the backup job will be run. You can choose Daily, Weekly, Monthly, or Run Once. The options in Task Date And Time may change depending on what you select here.
Start Time	The time of day that the job will start.
Start Date	The date that this job will first run. Available only if Task Interval is set to Daily or Run Once.
Day (Day Names)	Day of the week that the job will be run. Available only if Task Interval is set to Weekly.
Day (Numbers)	Date each month that the job will be run. Available only if Task Interval is set to Monthly.
User	When the job is initiated, it will be run under this user. To make it easier to monitor vRanger activities, Vizioncore recommends that you run all backup and restore jobs as “ComputerName\rangeruser”.
Password	The password associated with the user account in User.

vRanger uses Windows Task Scheduler to manage scheduled backups. You can find the Task Scheduler by selecting Control Panel from the Windows Start menu. For more information on maintaining scheduled backups, refer to the Help menu within Task Scheduler.

Physical Machine Backups

The process to perform a P2V backup is similar to a standard vRanger Pro backup.

Flags and Options

Flag *[-Command Switch]* *Restrictions (if applicable)*	Description
Do not check the free space for source or destination *[-nospacecheck]*	Before vRanger Pro begins a backup, it checks the destination location to ensure that there is enough space available for the backup file to be written. Due to the unique nature of our P2V backup ability, the destination drive for P2V backups must have free space equal to two times the size of the target drive. For example: if a P2V backup of a machine with a 40GB hard drive is initiated, the destination machine must have at least 80GB free space. *Note*: This flag does not override the 6GB free space required on the source drive.
Only send mail logs when a backup error occurs *[-mailonerror]* *Restrictions:* ***SMTP** must be configured* *Requires **mailto** user option*	If this flag is checked, vRanger Pro will only generate an email notification when an error occurs during a backup. Backups that are performed successfully will not result in a notification email.
Do not create an archive of the file(s) *[-nozip]*	This flag causes vRanger Pro to create an identical copy of the source VM, without using any compression. This can be used to perform a hot clone of a VM to create a duplicate copy of a VM that is running. This flag is not compatible with the **Archive Name** user option. If you want to use this option, you must delete the OptionValue listed for **Archive Name**.

User Options

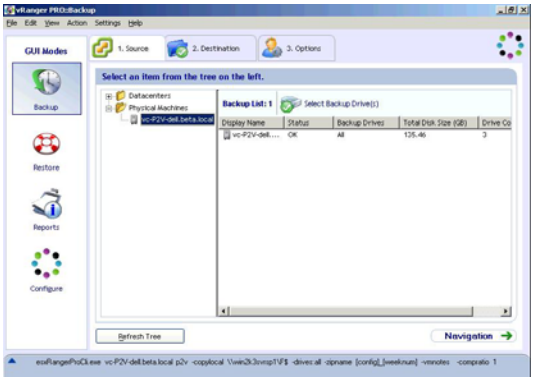
Option *[-Command Switch]*	**Description**

Option *[-Command Switch]*	Description
Maximum Simultaneous Backup Count *[-asynccount]*	The maximum number of backups that can be run at the same time. Default value is 5.
Backup Description *[-description]*	A text description of the backup that goes into the .info file and the backup database. This description will appear when you attempt to restore the VM, and can be used to identify the proper archive.
Mail Results To *[-mailto]*	vRanger will send an email notification to the addresses listed here upon completion of a backup (or upon error only, if the "Only send mail logs when a backup error occurs" flag is used). Multiple addresses should be separated by a semicolon '**;**'.
Working Path (on source server) *[-temp]*	Rather than creating an archive of the VM on the same VMFS before copying it to the destination location, you can use this option to have vRanger create the archive in a different location. Here are some examples of when you might want to use this: • If your VMFS has low free space, you can stage the backup on another disk. • If you want to have a specific machine with better performance compress the VM. • If the destination location is visible to the host ESX Server (for LAN-free backups). This option should almost always be specified in the last case for best performance. This allows vRanger Pro to spool the archive directly in the destination.

Option *[-Command Switch]*	Description
Archive Name *[-zipname]* *Restrictions:* *Not compatible with* ***nozip*** *flag*	Indicates how the archive file will be named. You can include the following variables in the name: • [config] – the name of the vmx file belonging to the VM being backed up • [dayofweek] – abbreviated name of the day of the week (Sun, Mon, Tue, Wed, Trs, Fri, Sat) • [year] – current year as a 4-digit number (e.g., 2007) • [month] – current month number (01-12) • [day] – current day number (01-31) • [hour] – current hour (00-23) • [minute] – current minute (00-59) • [second] – current second (00-59) • [weeknum] – current week of the month, starting from the first of the month (0-5) • [biweekly] – week of the year (odd or even) If you leave this option blank, the name will be *[config]_[year][month][day][hour][minute][second]*. This naming convention is required for differential backups. The variables that you should use will depend on your backup schedule.

Begin a Backup

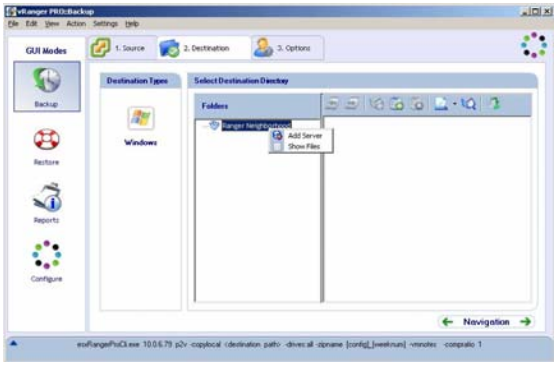
1. Select the physical machine you wish to backup from the Physical Machines folder.



2. Add the destination server.

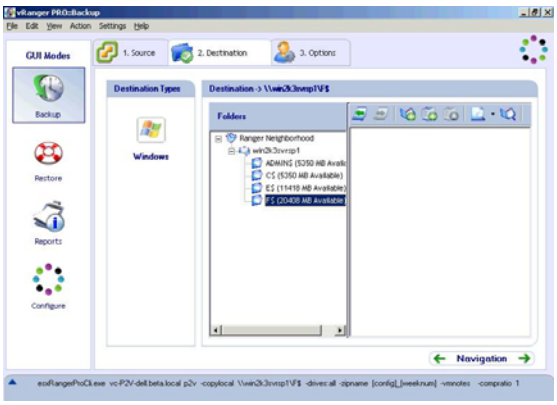
   Note that only Windows servers are supported as destination servers. P2V destinations servers are not enumerated from VC; each one needs to be added separately.

   Right-click **Ranger Neighborhood→Add Server.**

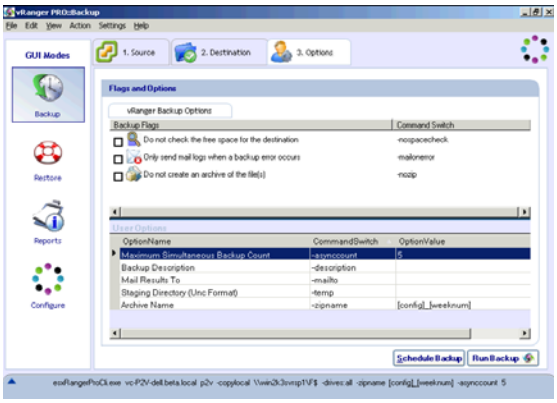


3. Enter the credentials for the destination server.

4. Select a location.



5. Click the Options tab and configure the backup options.



6. Click **Schedule Backup** or **Run Backup.**

Monitoring Backups in Progress

User Accounts

Scheduled backups are run based on what you specified in the Schedule Task dialog. To facilitate monitoring of backups that are currently running, set them up to run under a single user account that is not used for other scheduled tasks. Vizioncore recommends creating a user account called *rangeruser* for this purpose.

Unscheduled backups (jobs that are created by clicking Run Backup) are run under the user account that is currently logged in. You should run all such backups when logged into the *rangeruser* account, if possible.

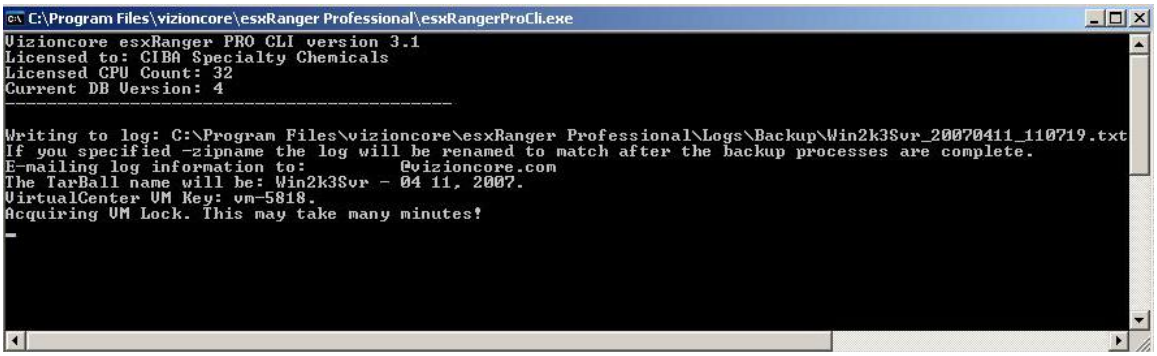
Monitoring

If you want to check the status of a backup that is currently running, simply log into the computer as *rangeruser*.

Warning: Do not log out of the *rangeruser* account while a backup job is running, as this will stop the backup. If your setup supports fast user switching, you can switch to another user without logging *rangeruser* out, and any active jobs will continue to run in the background.

File Locking

vRanger Pro includes a feature that will enable successful interaction with vReplicator. The main component of this feature is a file lock mechanism that verifies vRanger Pro has exclusive access to a VM before taking a snapshot. If a backup job is scheduled or started and vReplicator currently has the lock, vRanger Pro will wait until the lock is removed.



Data Domain

Vizioncore partners with Data Domain, a leading provider of enterprise protection storage systems for disk backup and network-based DR, to enable advanced data deduplication via vRanger Pro backups. Data Domain's inline data deduplication and

replication technologies offer data reduction rates that enable new efficiencies in enterprise data protection.

The integration of vRanger Pro and Data Domain is virtually seamless. Note that the process below assumes that the Data Domain appliance is already installed and configured.

1. Initiate vRanger Pro backup with the following options:

   -Full: There is no need to perform a differential backup with Data Domain.

   -Uncompressed: The Data Domain appliance requires the data in its uncompressed state.

   -Archive Name: Rather than overwrite existing backups, provide a unique backup directory for each deduplicated backup by using the Archive Name User Option in the vRanger Pro options screen. The ideal OptionValue would be "[config]_[year][month][day][hour][minute][second]"

2. Use the Data Domain UNC path as the Backup Destination.
3. Execute or schedule the backup.

   The Data Domain appliance will receive the data and perform high speed inline deduplication and compression, which reduces the backup data by an average of twenty times.

   Restore the deduplicated backup just as you would an ordinary backup.

Restore

Once you have used vRanger Pro to create some backup archives, you can restore them. The restore processes and modes are described below.

Restore Process

vRanger Pro provides you with a few different ways to restore your backed up VMs, as well as numerous options and flags. A typical restore includes these steps:

- vRanger Pro verifies that there is enough free space on the destination drive to perform the backup. This is simply the size of the uncompressed VM.
- vRanger Pro copies the configuration file to the destination and creates empty disk files.
- The compressed disk files are sent to the destination, block by block, decompressed, and written into the disk file.
- vRanger Pro registers the extracted disk files with the VM config file.
- The restored VM is registered with VC, if applicable, and configured in vRanger Pro.

Multiple .VMDKs

vRanger Pro enables VMs with multiple .VMDKs to be restored to multiple data stores. A storage location can be easily selected for each .VMDK during the restore process. In addition, each virtual NIC in a given VM can be configured to a virtual switch.

Enhanced Write Speeds

vRanger Pro includes a proprietary functionality that greatly improves write speed to VMFS. This will enable a lower RTO by reducing restore times. This process does install a driver onto the ESX Server, which can be installed and removed without rebooting the server and is only active during a vRanger Pro write.

ESXi 3.5 Restore Process

You can restore a VCB backup of ESX 3.x to ESXi 3.5. You cannot restore a network backup of ESX 3.x to ESXi 3.5.

This is how an ESXi 3.5 restore works in vRanger Pro:

- A shell VM is created, based on user configuration, during the restore process. Blank VMDKs are created as well.
- The vRanger Pro archive is not compressed by the vRanger Pro server.
- The uncompressed data stream is not written to disk, but written to the shell VMDKs via VMware VDDK (for example, a 2 GB archive that holds a 10 GB VMDK becomes 10 GB of data written over the network for restore).

Restore Modes

Similar to the backup process, there are a few different ways to restore a VM:

- **Normal Mode**—the typical restore method, using the vRanger database.
- **Restore From Info**—uses the info file to restore the VM, instead of an entry in the vRanger database. You might use this if the VM was backed up from another installation of vRanger and is not included in your local copy of the database.
- **File Level Restore**—used to mount the archived disk file, allowing you to search through it and find individual files to restore.
- **P2V Restore**—used to restore a P2V backup to a VM.

Normal Mode

To restore a backed up VM, you must complete these steps:

- Select the restore archive that you want to restore from.
- Choose the restore to location, where the VM will be placed.
- Select various related options.

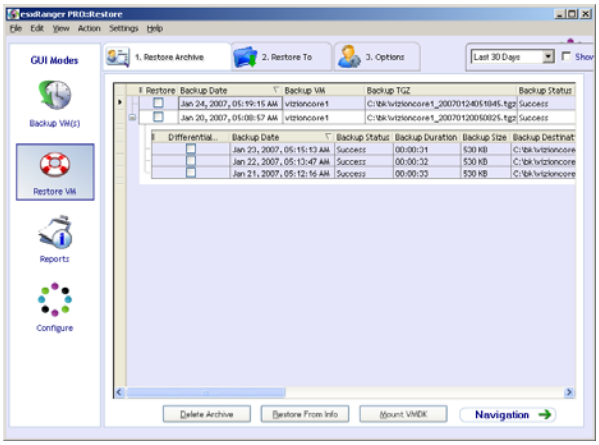
Each of these steps has its own tab in the Restore screen.

Begin the Restore

1. Select **Restore VM** from the GUI Modes menu on the left.
2. Populate the fields on each of the tabs, in order.

Restore Archive

This tab lists the available backups that have been performed by this installation of vRanger and allows you to select backup archives to restore.



Restore Grid

When vRanger backs up a VM, it makes an entry in its internal database containing information about the backup, such as backup date and VM name. This information is displayed here, on the restore grid, for archives that have not expired and been overwritten.

Each row represents a full backup that vRanger has processed. Some of these rows have a "+" sign at the left end. You can click that to show differential archives that were created, based upon that full backup.

Restore /	Check the box to restore this archive.

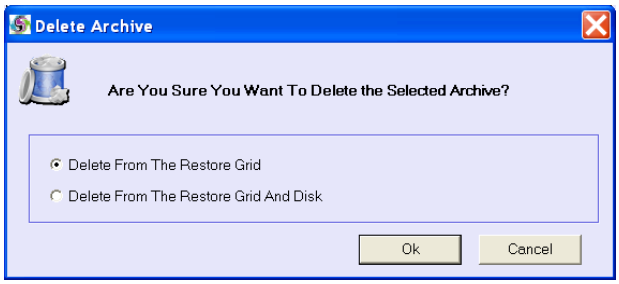
Differentials	Notes: If you are selecting differential archives, make sure you only select one differential per full backup. Highlighting a row by clicking on it does not select it for restoring or deleting—this box must be checked to have an effect.
Backup Date	The date and time the backup was completed.
Backup VM	The name of the VM in the archive.
Backup Archive	The path to the backup archive.
Backup Status	Indicates whether or not the original backup job was successful. You can only restore backups which were successful.
Backup Duration	The length of time that the original backup took.
Backup Size	The disk space taken up by the compressed backup archive.
Backup Source	The host which acted as the backup source.
Backup Source Version	Indicates the version of ESX Server used by the Backup Source at the time of the backup.
Backup Destination	The machine name where the archive is stored.
Backup Info File	The full path to the .info file for the backup. This file contains all information necessary to perform the restore.

Last # Days	Shows only available archives created in the time span selected.
Show Expired	Includes archives which have expired and been overwritten. This is for information purposes only. You cannot restore from these archives.

Delete Archive	Click this button to delete the selected archive(s) from the backup database (and disk if desired). Note: Differential backups are dependent on their full image parent. Never delete a full backup if you might need to use its differentials.
Restore From Info	Opens the Restore From Info dialog.
Mount VMDK	Click this button to mount a disk file from the selected archive to perform a file-level restore. Note: Exactly one restore box must be checked to use this.

Delete Archive

1. Check the **Restore** checkbox for one or more archives in the Restore Grid.
2. Click the **Delete Archive**.
   The Delete Archive dialog displays.

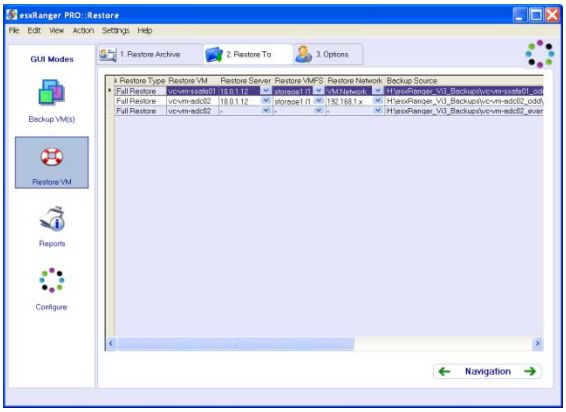


3. Select one of the following:
   -Delete From The Restore Grid—Deletes the listing from the backup database, but leaves the archive file intact. You can still restore the archive using the Restore From Info method.

   -Delete From The Restore Grid And Disk—Deletes the listing from the backup database and deletes the actual archive and .info files associated with it.
4. Click **OK**.
5. When you have selected the archives you want to restore, click the **Restore To** tab to continue.

Restore To

This tab allows you to choose the restore destination for each archive that you selected from the Restore Grid on the Restore Archive tab.



Restore Type	Indicates whether the archive is from a full backup or a differential backup.
Restore VM	The name of the VM that will be restored.
Restore To Server	Select the destination server to which the VM will be restored.
Restore To VMFS	When selected, the Restore To VMFS configuration will open.
Restore Network	When selected, the Restore Network configuration will open.
Backup Source	The location of the .info file where the backup archive is stored.
Backup Source Version	The ESX Server version of the original backup host. The VM must be restored to a host running the same ESX Server version.

Note: Vizioncore recommends restricting simultaneous restores as follows:

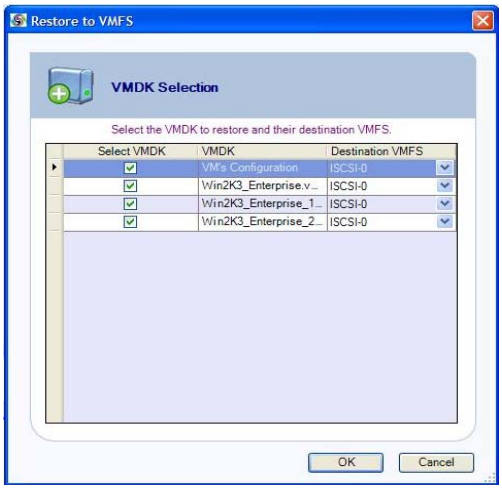
- No more than 2 simultaneous restores to a single host.
- No more than 10 simultaneous restores to a single VMFS.

Complete Tab

1. For each row, select a Restore Server, Restore VMFS, and Restore Network.
2. Click the Options tab to continue.

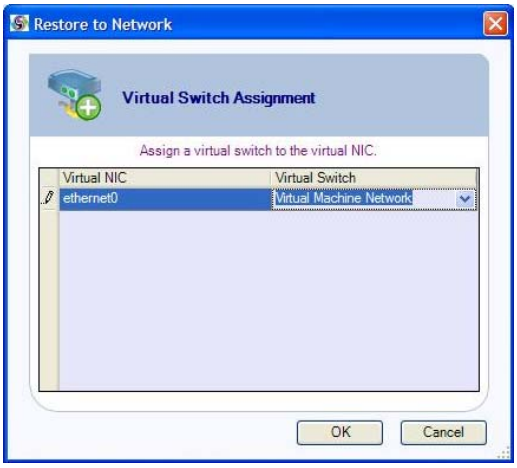
Restore to VMFS Configuration

When Restore To VMFS is clicked, a window opens that provides the ability to select storage locations for each .VMDK. To configure, simply select the .VMDK(s) to restore and the select the desired Destination VMFS, then click OK.



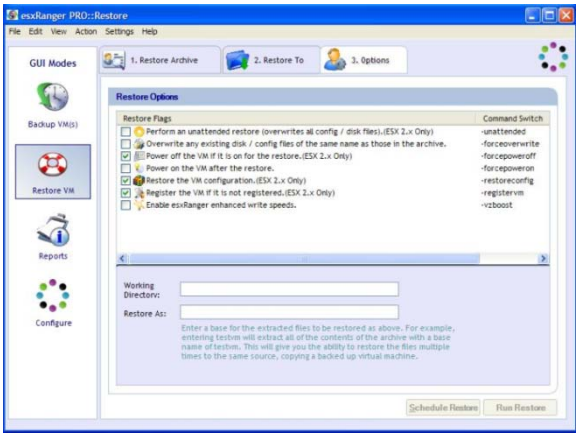
Restore to Network Configuration

When Restore to Network is clicked, the Restore to Network window opens, providing the ability to select the desired virtual switch for each vNIC. To configure, simply select the virtual NIC to use and the select the desired Destination Virtual Switch, then click OK.



Options

Use this tab to select various options that determine how the restore job will be processed.



Flag *[-Command Switch]* *Restrictions (if applicable)*	Description
Perform an unattended restore (overwrites all config / disk files). *[-unattended]* *Restrictions:* *ESX Server v2.x only* *Requires* ***–forcepoweroff***	If the VM being restored already exists at the restore destination location, and if this flag is checked, then the existing files for that VM will be removed before the restore begins. If the flag is not checked, vRanger will prompt you when starting the restore to see if you want to remove the old version. *Note*: This setting applies to ESX Server v2.x destinations only. Overwriting happens automatically for ESX Server v3.x destinations, regardless of this setting.
Overwrite any existing disk / config files of the same name as those in the archive. *[-forceoverwrite]*	If this option is checked, existing disk and config files at the destination will be overwritten by the new files, if they have the same name.
Power off the VM if it is on for the restore. *[-forcepoweroff]* *Restrictions:* *ESX Server v2.x only*	If this VM is running on the restore destination and this flag is checked, then it will be shut down before the restore begins. *Note*: This setting applies to ESX Server v2.x destinations only. Shutdown happens automatically for ESX Server v3.x destinations, regardless of this setting.
Power on the VM after the restore. *[-forcepoweron]*	If this flag is checked, the VM will be turned on when the restore is complete.

Flag *[-Command Switch]* *Restrictions (if applicable)*	Description
Restore the VM configuration. *[-restoreconfig]* *Restrictions:* *ESX Server v2.x only*	If this flag is checked, vRanger will restore the VM config file, as well as the disk files. If it is not checked, only the disk files will be restored. *Note*: This setting applies to ESX Server v2.x destinations only. Config files are automatically restored for ESX Server v3.x destinations, regardless of this setting.
Register the VM if it is not registered. *[-registervm]* *Restrictions:* *ESX Server v2.x only*	If this flag is checked and you are using vRanger with VC, vRanger will register the VM with VC if it is not already registered. *Note*: This setting applies to ESX Server v2.x destinations only. VMs are registered automatically for ESX Server v3.x destinations, regardless of this setting, if vRanger is configured with VC.
Enable vRanger enhanced write speeds *[-vzboost]*	This functionality will install a driver onto the destination ESX Host to allow for enhanced write speeds to VMFS. When a restore is initialized, vRanger Pro will activate the driver for the duration of the restore. When the restore is completed, the driver returns to an inactive state, consuming no resources.

Working Directory	Indicates the spooling directory for the restore job. This field applies only to ESX Server v2.x destinations. For ESX v2.x, instead of uncompressing the archive as it is copied the entire archive is copied and then extracted. If there is not enough space on the destination for both the archive and the restored VM, you can use this field to indicate the directory where the archive should be copied. It will then be extracted to the destination location.
Restore As	Changes the VM display name and all file names to this value. The VM will be assigned a new UID (unique identifier) when the restore is complete.

Finalizing the Restore

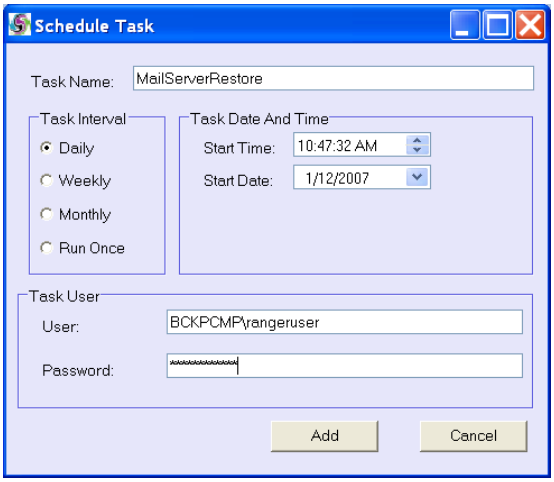
Once you have selected your source and destination, and filled in the appropriate options, you are ready to finalize your restore. You can either run the job immediately, or

schedule it to run later. Each option has a corresponding button at the bottom of the Options tab.

Note: If these buttons are disabled, it means that insufficient information has been provided to perform the restore or that conflicting options have been selected. Double-check each tab to ensure that you have provided all of the necessary information.

Scheduling Restores to Run Later

vRanger uses the Windows Scheduled Tasks feature to manage scheduled restore jobs. For more information on this feature, search for "Common Tasks: Scheduled Tasks" or "Using Scheduled Tasks" in Windows Help. If you click the Schedule Restore button, the Schedule Task dialog displays.



Task Name	This is the name of the task as it appears in the Scheduled Tasks list and in Windows Task Manager.
Task Interval	Indicates how frequently the backup job will be run. You can choose Daily, Weekly, Monthly, or Run Once. The options in Task Date And Time may change depending on what you select here.
Start Time	The time of day that the job will start.
Start Date	The date that this job will first run. Available only if Task Interval is set to Daily or Run Once.
Day (Day Names)	Day of the week that the job will be run. Available only if Task Interval is set to Weekly.
Day (Numbers)	Date each month that the job will be run. Available only if Task Interval is set to Monthly.

User	When the job is initiated, it will be run under this user. To make it easier to monitor vRanger activities, Vizioncore recommends that you run all backup and restore jobs as "ComputerName\rangeruser".
Password	The password associated with the user account in User.

Restore From Info

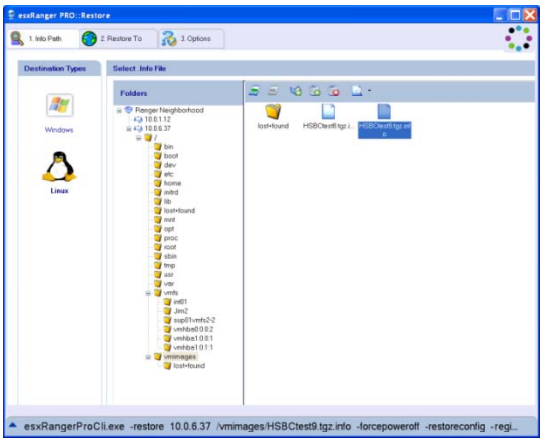
When vRanger backs up a VM, it creates an entry in an internal database and also generates an .info file, which contains information about the backup job. Typically, if you wanted to restore a VM from a backup archive, you would use the database entry to restore it. However, there are some circumstances in which this might not be possible, or in which it might be preferable to restore the VM using the .info file. Some of these situations include:

- If the backup database becomes corrupted and cannot be used to restore the VM.
- If you want to restore the VM using a different installation of vRanger than the one that created the backup, so the backup database would not include the archive.
- If the archive is moved, the path saved in the database becomes invalid.

This section describes how you can restore a VM from its .info file.

Info Path

Use this tab to locate and select an .info file to restore from. This screen functions in a similar fashion to the Destination tab in Backup Mode.



Select .info File

1. Select a Destination Type—**Windows** or **Linux.**

2. Use the **Folder Tree** to navigate to the location of the .info file.

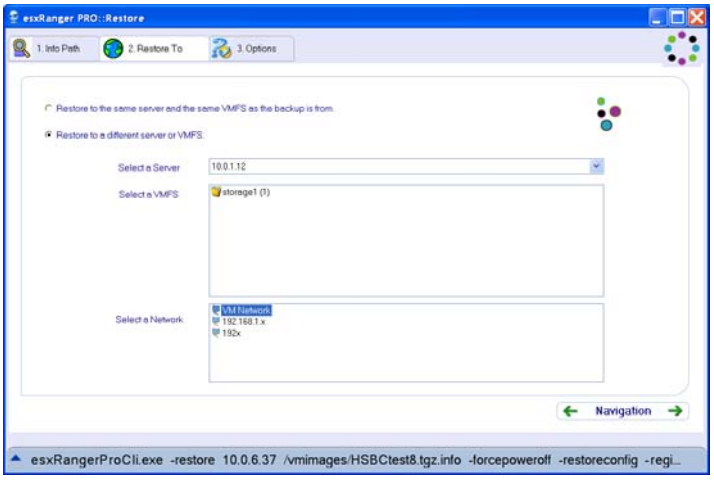
   The Folder Tree functions identically to the Destination tab in Backup Mode.

3. Select an .info file from the Contents Pane on the right.

   Note: You can only restore one VM at a time using this method.

Restore To

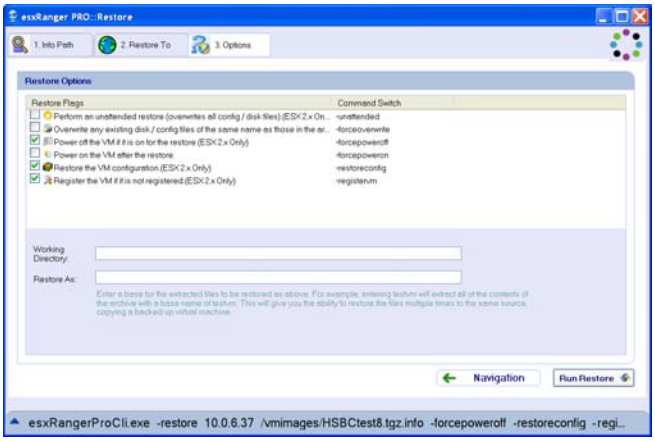
Use this tab to indicate where the VM should be restored. Once you have made selections in the appropriate fields, click the Options tab.



Restore to…	Select one of the following options: *Restore to the same server and the same VMFS as the backup is from* – Restores the VM to its original location. If you choose this option, you do not need to complete the rest of this tab. *Restore to a different server or VMFS* – Allows you to choose a different location to restore the VM. If you choose this option, you must complete the rest of the fields on this tab.
Select a Server	Choose an ESX Server to restore the VM to. All ESX Servers that are configured in vRanger Pro appear as options.
Select a VMFS	Select a VMFS from the server selected above, where the VM will be stored.
Select a Network	Select the NIC you will use to restore the VM.

Options

Use this tab to select various options that determine how the restore job will be processed. The contents of this tab look and function identically to the Options tab in the typical restore process.



Flag *[-Command Switch]* *Restrictions (if applicable)*	Description
Perform an unattended restore (overwrites all config / disk files). *[-unattended]* *Restrictions:* *ESX Server v2.x only* *Requires* ***–forcepoweroff***	If the VM being restored already exists at the restore destination location, and if this flag is checked, then the existing files for that VM will be removed before the restore begins. If the flag is not checked, vRanger will prompt you when starting the restore to see if you want to remove the old version. *Note*: This setting applies to ESX Server v2.x destinations only. Overwriting happens automatically for ESX Server v3.x destinations, regardless of this setting.
Overwrite any existing disk / config files of the same name as those in the archive. *[-forceoverwrite]*	If this option is checked, existing disk and config files at the destination will be overwritten by the new files, if they have the same name.
Power off the VM if it is on for the restore. *[-forcepoweroff]* *Restrictions:* *ESX Server v2.x only*	If this VM is running on the restore destination and this flag is checked, then it will be shut down before the restore begins. *Note*: This setting applies to ESX Server v2.x destinations only. Shutdown happens automatically for ESX Server v3.x destinations, regardless of this setting.

Flag *[-Command Switch]* *Restrictions (if applicable)*	Description
Power on the VM after the restore. *[-forcepoweron]*	If this flag is checked, the VM will be turned on when the restore is complete.
Restore the VM configuration. *[-restoreconfig]* *Restrictions:* *ESX Server v2.x only*	If this flag is checked, vRanger will restore the VM config file, as well as the disk files. If it is not checked, only the disk files will be restored. Note: This setting applies to ESX Server v2.x destinations only. Config files are automatically restored for ESX Server v3.x destinations, regardless of this setting.
Register the VM if it is not registered. *[-registervm]* *Restrictions:* *ESX Server v2.x only*	If this flag is checked and you are using vRanger with VC, vRanger will register the VM with VC if it is not already registered. *Note*: This setting applies to ESX Server v2.x destinations only. VMs are registered automatically for ESX Server v3.x destinations, regardless of this setting, if vRanger is configured with VC.
Enable vRanger enhanced write speeds *[-vzboost]*	This functionality will install a driver onto the destination ESX Host to allow for enhanced write speeds to VMFS. When a restore is initialized, vRanger Pro will activate the driver for the duration of the restore. When the restore is completed, the driver returns to an inactive state, consuming no resources.

Working Directory	Indicates the spooling directory for the restore job. This field applies only to ESX Server v2.x destinations. For ESX v2.x, instead of uncompressing the archive as it is copied the entire archive is copied and then extracted. If there is not enough space on the destination for both the archive and the restored VM, you can use this field to indicate the directory where the archive should be copied. It will then be extracted to the destination location.
Restore As	Changes the VM display name and all file names to this value. The VM will be assigned a new UID (unique identifier) when the restore is complete.

Finalizing the Restore

Once you have selected the source and destination, and filled in the appropriate options, you are ready to run your restore job by clicking the Run Restore button.

Note: If this button is disabled, it means that insufficient information has been provided to perform the restore or that conflicting options have been selected. Double-check each tab to ensure that you have provided all of the necessary information.

File-Level Restore

If you only need a file or two, and don't want to restore an entire VM, you can use vRanger to mount a VMDK archive on your Windows machine and access archived files as though they were on another hard disk.

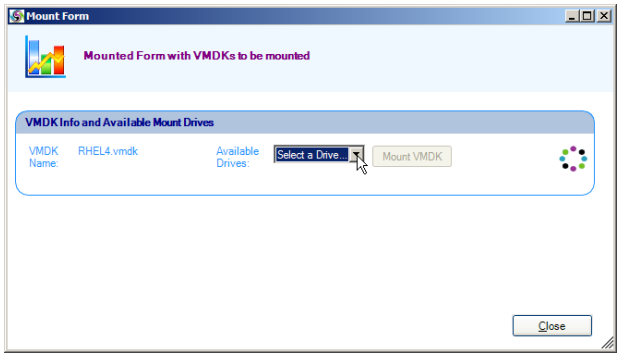
Note: To use this feature, you must download and install the free File-Level Restore Plug-in from the Vizioncore website.

Access an Archive at the File Level

1. Check the **Restore** box next to one archive that contains the disk file that you want to mount.

   Note: This archive must be stored on the machine running vRanger. You cannot mount a disk file over the network.

2. Click **Mount VMDK**.
   The Mount Form dialog displays.

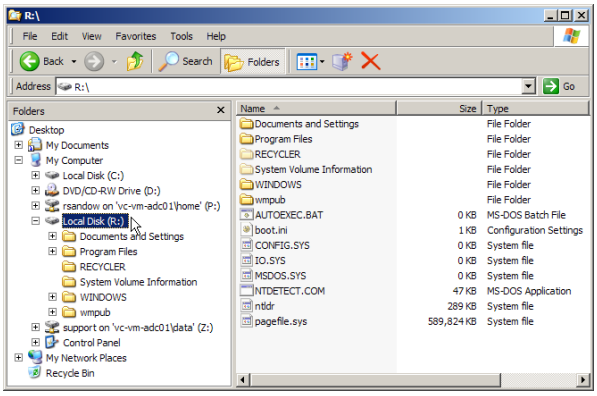


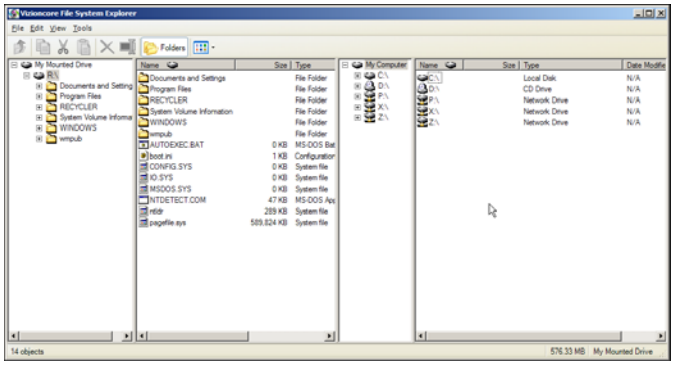
3. Select a drive letter from the Available Drives list. When the disk file is mounted, it will appear as the selected drive letter.

4. Click **Mount VMDK**.

   vRanger starts by extracting the disk file in the same directory where the compressed archive in located. This will take several minutes depending on the size of the disk file (typically 1-2 minutes per GB, but this can vary).

When the extraction is complete, vRanger uses Windows to mount the disk file. It will appear as a drive letter under My Computer, with the previously selected drive letter. The Vizioncore File System Explorer window also displays.





5. Use either the **Vizioncore File System Explorer** or **Windows Explorer** to access individual files or directories on the mounted image. *Note*: The image is mounted in read-only mode. You can copy files from it, but you cannot add, change, or erase anything on the image.
6. When you are finished, simply close the Mount Form.
   This signals vRanger to unmount the disk image and delete the extracted disk file. The compressed archive remains, so you mount it again or use it for a restore job later.

P2V Restore

vRanger Pro offers the ability to create a VM archive from a physical machine. This archive is restored using essentially the same process as a typical vRanger Pro backup.

To restore a backed up VM, you must complete these steps:

- Select the archive that you want to restore from.

- Choose the restore to location, where the VM will be placed.
- Select various related options.

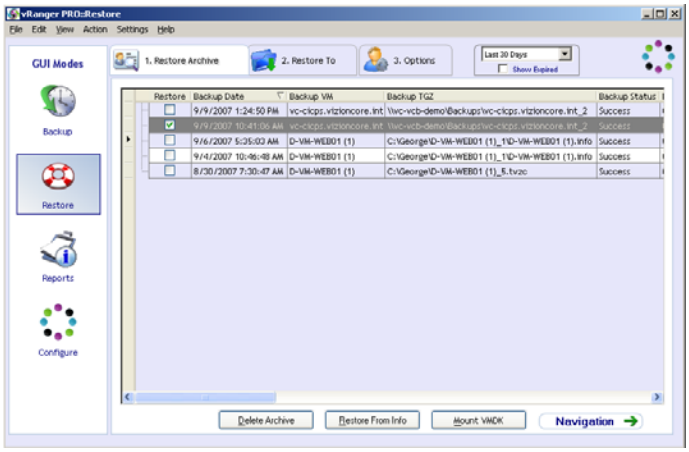
Each of these steps has its own tab in the Restore screen.

Begin the Restore

1. Select **Restore VM** from the GUI Modes menu on the left.
2. Populate the fields on each of the tabs, in order.

Restore Archive

This tab lists the available backups that have been performed by this installation of vRanger and allows you to select backup archives to restore.



Restore Grid

When vRanger backs up a VM, it makes an entry in its internal database containing information about the backup, such as backup date and VM name. This information is displayed here, on the restore grid, for archives that have not expired and been overwritten. Each row represents a full backup that vRanger has processed. At this time, all P2V backups are full backups.

Restore	Check the box to restore this archive. Note: Highlighting a row by clicking on it does not select it for restoring or deleting. This box must be checked to have an effect.
Backup Date	The date and time the backup was completed.
Backup VM	The name of the VM in the archive.

Backup TGZ	The path to the backup archive.
Backup Status	Indicates whether or not the original backup job was successful. You can only restore backups which were successful.
Backup Duration	The length of time that the original backup took.
Backup Size	The disk space taken up by the compressed backup archive.
Backup Source	The host that acted as the backup source.
Backup Source Version	Indicates the version of ESX Server used by the Backup Source at the time of the backup.
Backup Destination	The machine name where the archive is stored.
Backup Info File	The full path to the .info file for the backup. This file contains all information necessary to perform the restore.

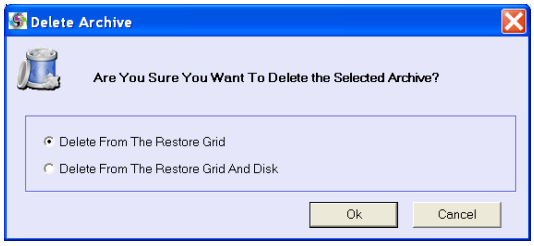
Last # Days	Shows only available archives created in the time span selected.
Show Expired	Includes archives that have expired and been overwritten. This is for information purposes only. You cannot restore from these archives.

Delete Archive	Click this button to delete the selected archive(s) from the backup database (and disk if desired). Note: Differential backups are dependent on their full image parent. Never delete a full backup if you might need to use its differentials.
Restore From Info	Opens the Restore From Info dialog.
Mount VMDK	Click this button to mount a disk file from the selected archive to perform a file-level restore. Note: Exactly one restore box must be checked to use this.

Delete an Archive

1. Check the **Restore** checkbox for one or more archives in the Restore Grid.

2. Click **Delete Archive**.



3. Select one of the following:

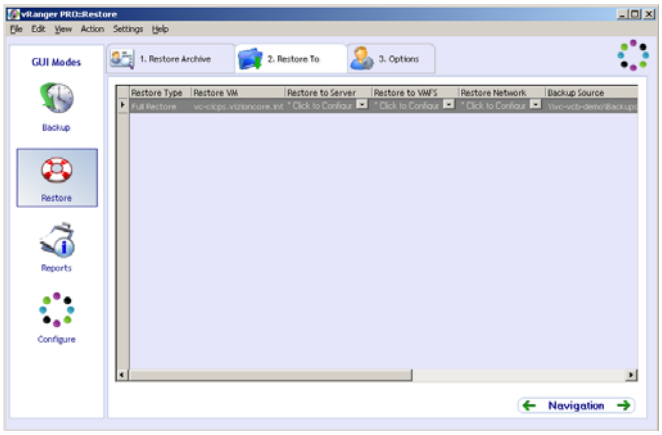
   -Delete From The Restore Grid: Deletes the listing from the backup database, but leaves the archive file intact. You can still restore the archive using the Restore From Info method.

   -Delete From The Restore Grid And Disk: Deletes the listing from the backup database and deletes the actual archive and .info files associated with it.

4. Click **OK**.
5. When you have selected the archives you want to restore, click the **Restore To** tab to continue.

Restore To

This tab allows you to choose the restore destination for each archive that you selected from the Restore Grid on the Restore Archive tab.



Restore Type	Indicates whether the archive is from a full backup or a differential backup. This will always be set to “Full Restore” for P2V backups.
Restore VM	The name of the VM that will be restored.

Restore Server	Select the destination server to which the VM will be restored.
Restore To VMFS	When selected, the Restore To VMFS configuration will open. See below for more information.
Restore To Network	When selected, the Restore To Network configuration will open. See below for more information.
Backup Source	The location of the .info file where the backup archive is stored.
Backup Source Version	The ESX Server version of the original backup host. The VM must be restored to a host running the same ESX Server version.

Note: Vizioncore recommends restricting simultaneous restores as follows:

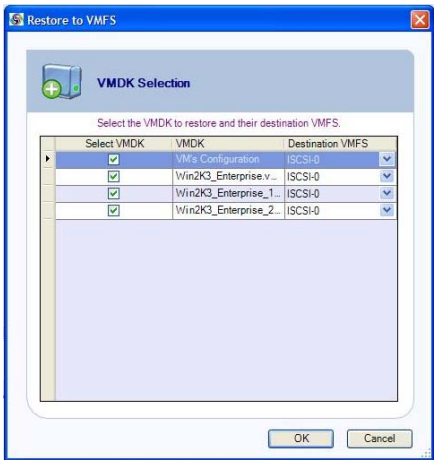
- No more than two simultaneous restores to a single host
- No more than ten simultaneous restores to a single VMFS

Complete this Tab

1. For each row, select a Restore Server, Restore VMFS, and Restore Network.
2. Click the Options tab to continue.

Restore to VMFS Configuration

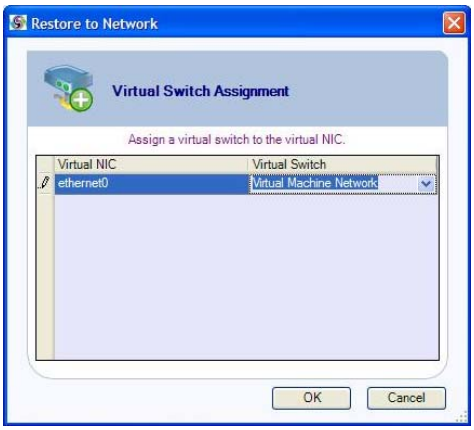
When Restore to VMFS is clicked, the Restore to VMFS window opens, providing the ability to select storage locations for each .VMDK. To configure, select the .VMDKs to restore and the select the desired Destination VMFS, then click OK.



Restore to Network Configuration

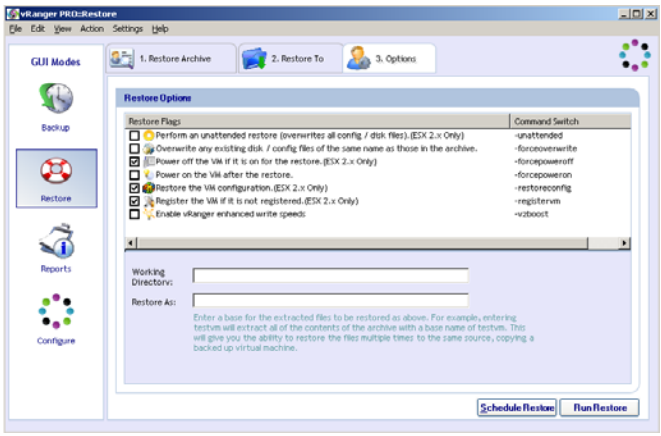
When Restore to Network is clicked, the Restore to Network window opens, providing the ability to select the desired virtual switch for each vNIC. To configure, select the

virtual NIC to use and the select the desired Destination Virtual Switch, then click OK.



Options

Use this tab to select various options that determine how the restore job will be processed.



Flag *[-Command Switch]* *Restrictions (if applicable)*	Description

Flag *[-Command Switch]* *Restrictions (if applicable)*	Description
Perform an unattended restore (overwrites all config / disk files). *[-unattended]* *Restrictions:* *ESX Server v2.x only* *Requires –* ***forcepoweroff***	If the VM being restored already exists at the restore destination location, and if this flag is checked, then the existing files for that VM will be removed before the restore begins. If the flag is not checked, vRanger will prompt you when starting the restore to see if you want to remove the old version. Note: This setting applies to ESX Server v2.x destinations only. Overwriting happens automatically for ESX Server v3.x destinations, regardless of this setting.
Overwrite any existing disk / config files of the same name as those in the archive. *[-forceoverwrite]*	If this option is checked, existing disk and config files at the destination will be overwritten by the new files, if they have the same name.
Power off the VM if it is on for the restore. *[-forcepoweroff]* *Restrictions:* *ESX Server v2.x only*	If this VM is running on the restore destination and this flag is checked, then it will be shut down before the restore begins. *Note*: This setting applies to ESX Server v2.x destinations only. Shutdown happens automatically for ESX Server v3.x destinations, regardless of this setting.
Power on the VM after the restore. *[-forcepoweron]*	If this flag is checked, the VM will be turned on when the restore is complete.
Restore the VM configuration. *[-restoreconfig]* *Restrictions:* *ESX Server v2.x only*	If this flag is checked, vRanger will restore the VM config file, as well as the disk files. If it is not checked, only the disk files will be restored. Note: This setting applies to ESX Server v2.x destinations only. Config files are automatically restored for ESX Server v3.x destinations, regardless of this setting.

Flag *[-Command Switch]* *Restrictions (if applicable)*	Description
Register the VM if it is not registered. *[-registervm]* *Restrictions:* *ESX Server v2.x only*	If this flag is checked and you are using vRanger with VC, vRanger will register the VM with VC if it is not already registered. Note: This setting applies to ESX Server v2.x destinations only. VMs are registered automatically for ESX Server v3.x destinations, regardless of this setting, if vRanger is configured with VC.
Enable vRanger enhanced write speeds *[-vzboost]*	This functionality will install a driver onto the destination ESX Host to allow for enhanced write speeds to VMFS. When a restore is initialized, vRanger Pro will activate the driver for the duration of the restore. When the restore is completed, the driver returns to an inactive state, consuming no resources.

Working Directory	Indicates the spooling directory for the restore job. This field applies only to ESX Server v2.x destinations. For ESX v2.x, instead of uncompressing the archive as it is copied the entire archive is copied and then extracted. If there is not enough space on the destination for both the archive and the restored VM, you can use this field to indicate the directory where the archive should be copied. It will then be extracted to the destination location.
Restore As	Changes the VM display name and all file names to this value. The VM will be assigned a new UID (unique identifier) when the restore is complete.

Finalizing the Restore

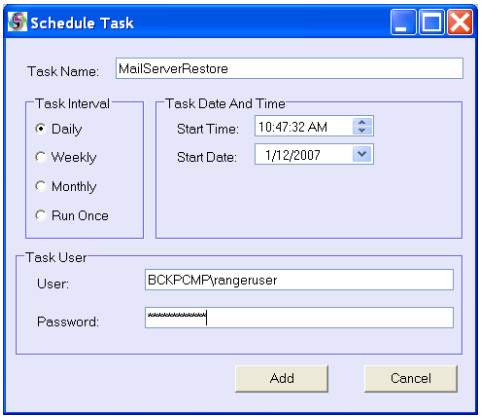
Once you have selected the source and destination, and filled in the appropriate options, you are ready to finalize your restore. You can either run the job immediately, or schedule it to run later. Each option has a corresponding button at the bottom of the Options tab.

Note: If these buttons are disabled, it means that insufficient information has been provided to perform the restore or that conflicting options have been selected. Double-check each tab to ensure that you have provided all of the necessary information.

Scheduling Restores to Run Later

vRanger uses the Windows Scheduled Tasks feature to manage scheduled restore jobs. For more information on this feature, search for “Common Tasks: Scheduled Tasks” or “Using Scheduled Tasks” in Windows Help.

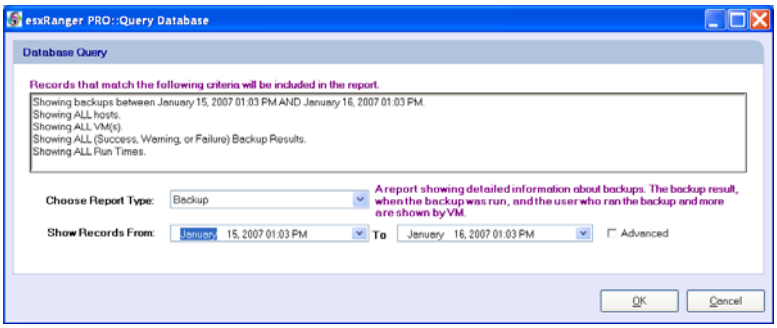
If you click Schedule Restore, the Schedule Task dialog displays:



Task Name	This is the name of the task as it appears in the Scheduled Tasks list and in Windows Task Manager.
Task Interval	Indicates how frequently the backup job will be run. You can choose Daily, Weekly, Monthly, or Run Once. The options in Task Date And Time may change depending on what you select here.
Start Time	The time of day that the job will start.
Start Date	The date that this job will first run. Available only if Task Interval is set to Daily or Run Once.
Day (Day Names)	Day of the week that the job will be run. Available only if Task Interval is set to Weekly.
Day (Numbers)	Date each month that the job will be run. Available only if Task Interval is set to Monthly.
User	When the job is initiated, it will be run under this user. To make it easier to monitor vRanger activities, Vizioncore recommends that you run all backup and restore jobs as “ComputerName\rangeruser”.
Password	The password associated with the user account in User.

Running Reports

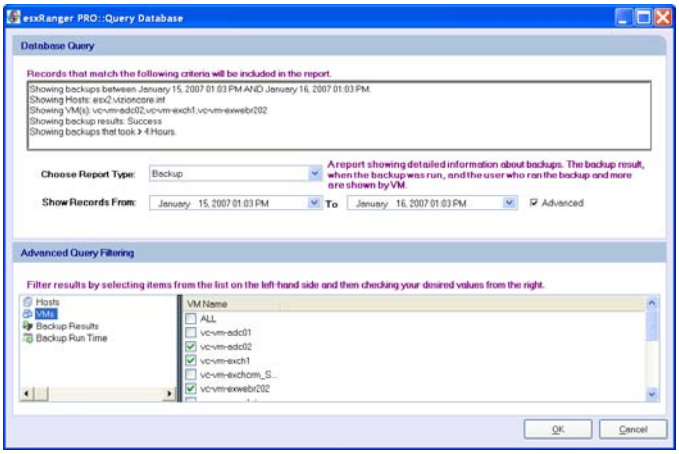
In addition to performing powerful backup and restore jobs, vRanger Pro makes it easy to generate reports based on its activities. To access vRanger's reporting capabilities, simply click the Reports icon in the GUI Modes menu. This displays the Database Query dialog.



Records that match the following criteria will be included in the report.	Displays the current search criteria, as indicated by values entered in other fields.
Choose Report Type	Indicates the type of report being generated. You can choose from: Backup—shows information about each backup, such as when it was run, the user who ran it, and the result, displayed by VM. Archive—shows information about the archives created by a backup job, such as archive size, compression ratio, and the time spent creating/transferring the archive, displayed by VM. Runtime—shows timing information about each step of a backup job, displayed by Host and VM.
Show Records From … To …	Indicates the start and end date/time for the report – only records in between these two date/times will be displayed.
Advanced	Displays Advanced Query Filtering options, when checked, allowing you to further refine your report.

Advanced Query Filtering

By clicking on the Advanced checkbox, you can display the Advanced Query Filtering options.



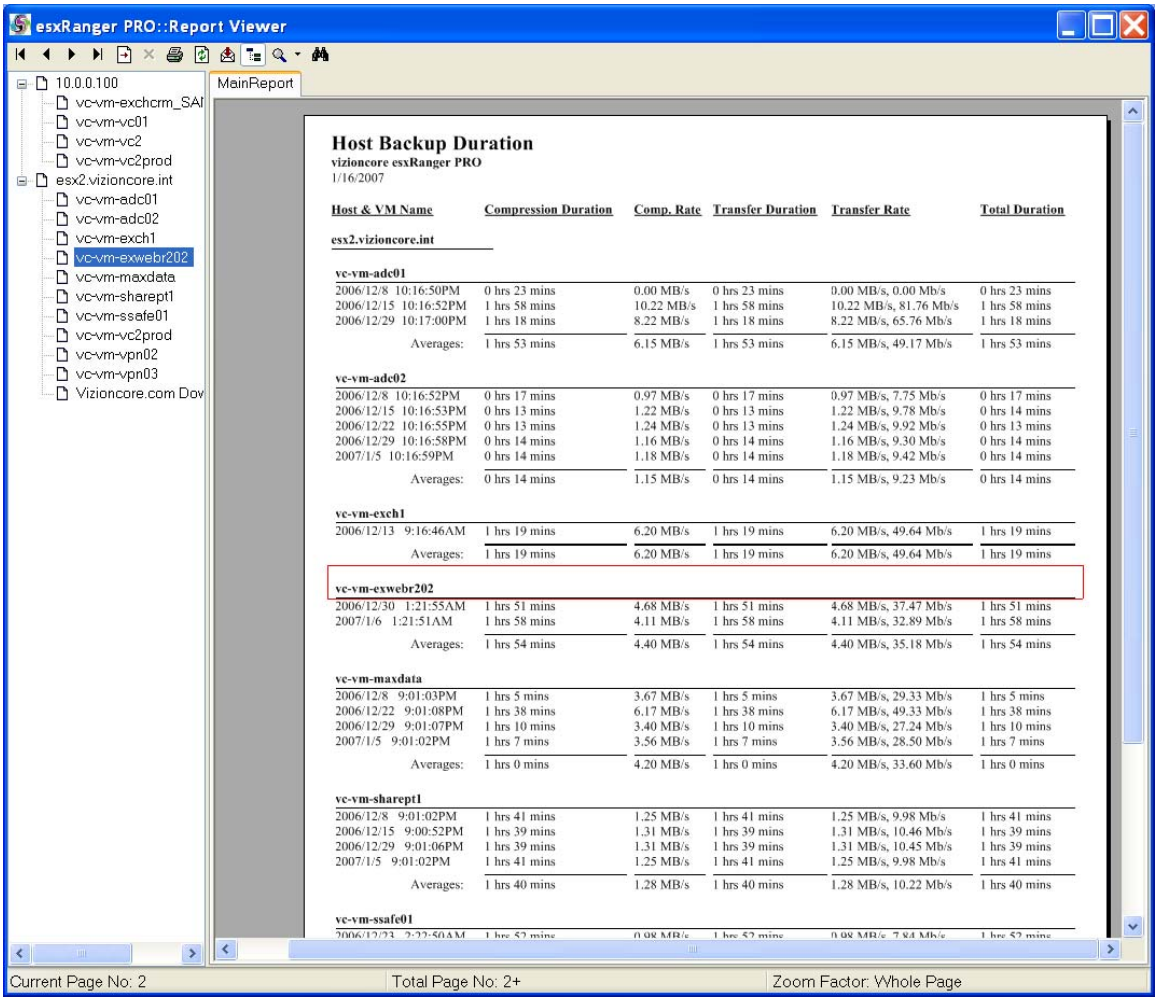
This extra pane allows you to apply additional filters to your report results. To use it, select a filter criteria group from the left-hand side, then check off the values you want to display in the right-hand side.

The filter criteria groups you can choose from are:

- Hosts—display only backups from the selected hosts, or select ALL to display backups from all hosts.
- VMs—display only backups of the selected VMs or select ALL to display backups of all VMs.
- Backup Result—display only backups with the selected results, or select ALL to display backups with any result.
- Backup Run Time—display only backup jobs that took longer than the selected run time, or select ALL to display any backup, regardless of run time.

Generated Reports

When you click OK, vRanger queries its internal database and generates the appropriate report, corresponding to your specified criteria.



You can use the toolbar at the top to move from page to page, print, or export the report. The Group Tree on the left lets you jump to a specific section of the report, based on VM or Host (runtime reports only).

5 Using vRanger Pro CLI

The vRanger CLI allows you to use DOS scripts to activate your backup jobs, giving you a little more flexibility and control over how and when your backup jobs are run.

Using vRanger CLI

You can find the CLI executable where the vRanger GUI is installed—typically:

"`C:\Program Files\vizioncore\vRanger CLI`"

To simplify entering the many options and flags required to run a backup job, the vRanger GUI will generate the command line calls for you.

Use GUI to Generate a Command Line Call

1. Use the GUI as described in earlier chapters to select your source, destination, and any applicable options or flags. As you select each option, the CLI Output text at the bottom of the screen is updated to reflect your changes.
2. When you are satisfied with the options you have selected, do not click the Run or Schedule buttons. Instead, right-click on the CLI Output text and select **Copy Command**.

   This option is also available in the Edit menu.

   Note: The Copy Command option will not appear if you have supplied insufficient or contradictory information.
3. You can then paste this text into a script or text file. This command line call contains all of the options and information you supplied in the GUI and will produce the same results when used to call the CLI.

For additional information on CLI functionality, contact Customer Support.

6 Appendix

Databases

vRanger Pro is a software tool designed to provide hot, image-based backups of running VMs. vRanger Pro is able to take advantage of VCB which offers, among other things, queiescing for Windows file systems. The purpose of this is to ensure that no file system writes are pending when the snapshot is taken, allowing for file system level consistency.

Unfortunately, the VMware Sync Driver responsible for file system quiescing has been known to cause problems with multiple types of databases, including SQL, Exchange, and Oracle. Note that these problems are not associated with vRanger Pro, but with the driver itself. Vizioncore does not recommend using the VMware Sync Driver on VMs running these databases, and as such has the Sync Driver disabled by default in the vRanger Pro Options screen.

This means that standard, image-level backup tools (VCB and other image-level backup products) can only provide what is known as a crash-consistent image of database servers. Restoring a crash-consistent image is essentially the equivalent of rebooting a server after a hard shutdown. For typical VMs this has not been an issue, as current OSs can easily handle this type of activity. For database servers, however, enterprises are unwilling to accept the risk of lost data, data corruption, or even the high resource consumption of database consistency checks that accompany bringing up a database on a crash consistent image.

In response to this, Vizioncore has developed a process to incorporate the appropriate VSS functions into vRanger Pro backups to provide consistent images of VSS enabled databases.

VSS

The process of implementing VSS enabled backups is more complex than simply creating a VSS snapshot inside the guest prior to backups. Using this method, the restored image would have an open VSS. This can cause problems. Our process utilizes only the freeze portion of VSS to pause application writes, flush the guest file system buffer and then freeze the guest file system. The exact process is detailed below:

1. The requestor asks the VSS to enumerate the writers, gather the writer metadata, and prepare for shadow copy creation.

2. The writer creates an XML description of the backup components to the VSS, and defines the restore method. The VSS notifies the application-specific writer to prepare its data for making a shadow copy.

3. The writer prepares the data in whatever way is appropriate, such as completing all open transactions, rolling transaction logs, and flushing caches. When the data is prepared for shadow copy creation, the writer notifies the VSS.

4. The VSS initiates the commit shadow copy phase.

5. The VSS tells the writers to quiesce the data and temporarily freeze requestor (application) IO write requests for the several seconds required to create the VMware snapshot. IO read requests are still possible. The application freeze is not allowed to take longer than 60 seconds. The VSS flushes the file system buffer and then freezes the file system, which ensures that file system metadata is written in a consistent order.

6. Open VMware snapshot with VMware's Sync Driver. By flushing the OS and applications beforehand, then it is fine to use the VMware Sync Driver on the file system to help with any other writes.

7. The VSS thaws the file system and releases the writers from their temporary inactive phase. All queued write IOs are completed.

8. The VSS queries the writers to confirm that write IOs were successfully held during the freeze.

9. If the writes were not successfully held (meaning that the freeze was unsuccessful), the requestor is notified.

10. The requestor can retry the process (go back to step 1) or notify the administrator to retry it at a later time.

11. If the freeze is successful, the VSS will provide the information back to the requestor.

Recommended Solution

It is important to remember that even with VSS, vRanger Pro is intended to be an image-level backup tool. It is recommended that the appropriate database agent is utilized to properly maintain the database as well as provide such granular ability as mailbox level restores. By combining an agent-based database backup, and a consistent, outside the guest, image-level backup, a fully functional backup/recovery strategy can be implemented.