# VIRTUALIZATION MANAGER™ ADMINISTRATOR GUIDE

Version: V4.2

## NOTICE

The information in this document is provided as is and without warranty of any kind and is subject to change without notice. Virtual Iron Incorporated assumes no responsibility, and shall have no liability of any kind arising from supply or use of this publication or any material contained herein.



Virtual Iron® Software, Inc.
900 Chelmsford Street
Tower I, Floor 2
Lowell, MA 01851
http://www.virtualiron.com

## TRADEMARKS

Virtual Iron®, Virtual Iron® Virtualization Manager™ and the Virtual Iron® logo are trademarks of Virtual Iron Software, Inc.

Other company and product names are trademarks and trade names or registered trademarks of their respective owners.

00010708R

# CONTENTS


**Preface ..... vii**
Audience ..... vii
Conventions ..... vii
License Information ..... viii
Redistributing GPL Source Files viii

**1 Virtual Iron® Overview ..... 1**
About Virtual Iron® ..... 2
Virtualization Manager ..... 2
Delivering Virtual Infrastructure ..... 3
Virtual Iron® Architecture ..... 4
Product Requirements ..... 5
Object Relationships in Virtualization Manager ..... 6
Managed Nodes and Virtual Data Centers ..... 6
Virtual Data Centers and Virtual Servers ..... 7
Virtual Server Characteristics ..... 8
Processors ..... 8
Processing Priority ..... 8
Memory ..... 8
Network Connections ..... 9
Disks ..... 9
Boot Methods ..... 9

**2 Installing Virtual Iron® ..... 11**
Installation Overview ..... 12
Virtual Iron® Single Server Edition (SSE) ..... 12
Virtual Iron® Enterprise Edition (EE) ..... 13
Hardware and Software Requirements ..... 15
SSE Managed Server, Minimum Requirements ..... 15
EE Managed Servers, Minimum Requirements ..... 15
EE Management Server, Minimum Requirements ..... 15
Virtual Iron Maximum Limits ..... 16
Virtualization Manager Client Requirements ..... 16
GOSs Supported by Virtual Servers ..... 16
Languages Supported ..... 17
Product Configurations ..... 18
Management Operations ..... 18

# Contents


Product Configuration, Enterprise Edition ..... 19
PXE Booting Managed Nodes ..... 19
Managed Node Configuration ..... 20
Virtualization Processor Settings of Each Node ..... 20
Configure IPMI or ILO for each Node ..... 20
Disabling Hyperthreading Support ..... 21
Site Preparation ..... 22
Define the Physical Infrastructure ..... 22
Defining Network Connections ..... 22
Connecting Nodes to the SAN Infrastructure ..... 24
Installing Virtual Iron® ..... 25
Before installation ..... 25

**3 Configuring Networks ..... 39**
Connecting to the Virtualization Manager ..... 40
Mapping Physical Ports to Logical Networks ..... 42
Defining Networks in a Virtualized Environment ..... 42
Configuring Networks, Enterprise and Single Server Editions ..... 45
Default Management Network, Enterprise Edition ..... 45
Default Public Network, Single Server Edition ..... 46
Configuring Ethernet Networks ..... 47
Configuring iSCSI Connectivity ..... 49
Configuring VLANs ..... 55
Creating a Failover Network ..... 58

**4 Using Administration Manager® ..... 61**
About the Administration Manager ..... 62
Using the Administration Manager ..... 63
Reviewing Which Features You Are Running ..... 64
Receiving a New License for Additional Features ..... 64
Upgrading to a New Version of Virtual Iron ..... 64
Put/Get Files on the Virtualization Manager ..... 64
Backing up the Virtualization Manager Database ..... 66
Restoring to a Backup Version of the Database ..... 66
Restarting Virtualization Manager Services ..... 67
Reloading Virtualization Manager ..... 67
Running a Command on Virtualization Manager ..... 68

**5 Using Virtualization Manager® ..... 69**
Using the Integrated Tutorial ..... 70
Virtualization Manager Overview ..... 71
Using the Pull-down Menus ..... 72
File Menu ..... 72
View Menu ..... 73
Help Menu ..... 73
Accessing License Information ..... 74
Using the Application Toolbar ..... 76
Resource Center ..... 76
Hardware ..... 77

Policies and Reports ..... 77
Jobs ..... 79
Users ..... 81
Using the Navigation Tree ..... 82
Using the Action Toolbar ..... 84
About the Jobs Framework ..... 85
Managing in a Multi-User Environment ..... 85
Jobs and Resource Locking ..... 86
Performing Job Operations ..... 88
About the Jobs View ..... 88
Starting a Job ..... 89
Aborting Jobs ..... 90
Determining the Cause of Job Failure ..... 91
Closing Job Tabs ..... 91

**6 Configuring Storage ..... 93**
Configuring Storage ..... 94
Advantages of Managed Storage ..... 95
Discovery and Management of Physical Disks ..... 96
LUNs and Aliases ..... 97
Configuring Logical Disks ..... 98
Disk Groups and Logical Disks ..... 98
Creating Disk Groups ..... 99
Creating Logical Disks ..... 101
Exporting and Importing ..... 103
Enterprise Edition ..... 103
Single Server Edition ..... 106
Cloning Disks ..... 108
Cloning Logical Disks ..... 108
VHD Repository ..... 110
VHD File Naming Conventions ..... 110
Exporting or Importing VHD Image Files ..... 110
Snapshots And Disk Space Usage ..... 112
Snapshots Example ..... 112
Snapshots and Overbooking ..... 113

**7 Creating and Configuring Virtual Servers ..... 115**
Creating Virtual Data Centers ..... 116
VDCs are Containers for Virtual Servers ..... 116
Assigning Nodes to Virtual Data Centers ..... 118
VDCs and Unassigned Virtual Servers ..... 121
About Unassigned Virtual Servers ..... 121
Configuring Unassigned Virtual Servers ..... 122
Deploying an Unassigned Virtual Server ..... 122
Moving a VS to Unassigned ..... 123
Virtual Servers ..... 124
Creating a Virtual Server ..... 124
Cloning Virtual Servers ..... 133
Preparing a Windows VS for Cloning ..... 133

Cloning a Virtual Server ..... 134
Virtual Server Snapshots ..... 136
Creating a Snapshot of a Virtual Server ..... 137
Installing a Guest OS ..... 139
Installing VSTools on Virtual Servers ..... 141
On Linux Virtual Servers Using a Browser ..... 141
On Linux Virtual Servers Using ISO Images ..... 143
On Windows® Virtual Servers Using a Browser ..... 146
VS Tools Silent Install: Windows XP and Windows 2003 149
On Windows Virtual Servers Using ISO Images ..... 149
Special Considerations for Windows 2000 OS ..... 151
Starting and Stopping Virtual Servers ..... 152
Starting a Virtual Server ..... 152
Stopping a Virtual Server ..... 152
Launching a Virtual Server Console ..... 154
Configuring Policy-Based Management ..... 155
LiveCapacity™ ..... 155
LiveRecovery ..... 157
LiveMaintenance™ ..... 160
Moving Virtual Servers and Nodes ..... 161
The Role of the Resource Center ..... 161
Moving Nodes to a VDC ..... 161
Moving a Node to Resource Center ..... 163
LiveMigrate: Conditions for Virtual Server Movement ..... 164
Provisioning VSs with Gold Masters ..... 167
Creating a Gold Master Logical Disk ..... 167
Cloning and Booting from a Gold Master Logical Disk ..... 168

**8 Policies and Reports ..... 169**
About Policies and Reports ..... 170
Changing Policies and Reports Scheduling ..... 171
Report Types ..... 172
Report Naming and Types ..... 172
Generating Reports ..... 172
Report Examples ..... 175
User Policies ..... 178
Configuring and Starting User Policies ..... 178
Starting System Policies ..... 182
LiveCapacity and LiveRecovery ..... 182
LVM Snapshot Utilization ..... 183
Technical Support ..... 184

**9 Performing Administrative Tasks ..... 187**
Configuring User Accounts ..... 188
Creating Local User Accounts ..... 188
Deleting User Accounts ..... 189
Editing Account Information ..... 190
Configuring LDAP ..... 191
About LDAP Authentication ..... 191

LDAP Support and Administration ..... 191
LDAP Component Information ..... 191
Configuring Virtual Iron To Authenticate with LDAP .... 192
Changing the LDAP Configuration ..... 197
Configuring Non-English Keyboards ..... 198
Workaround ..... 198
Performance Statistics ..... 201
Accessing Performance Statistics ..... 201
Starting the Virtualization Manager ..... 207
Starting the Virtualization Manager, Linux® ..... 207
Starting the Virtualization Manager, Windows® ..... 207
Performing Backup and Restore Operations ..... 209
Backing up the Configuration Database ..... 209
Restoring the Configuration Database ..... 209
Changing the Virtualization Manager IP Address ..... 211
Configuring the Archive Manager ..... 212
Assuring Virtualization Manager High Availability ..... 213
High Availability Considerations ..... 214
Single Node to Multi-Node Conversion ..... 217
Prior to Converting ..... 217
Uninstalling Virtualization Manager ..... 219
Uninstalling from Linux ..... 219
Uninstalling from Windows ..... 219
Reassigning Unassigned DGs ..... 220
Accessing Online Help ..... 221
Accessing Technical Support ..... 223

**Index ..... 1**

# Contents

# PREFACE

Virtual Iron® Virtualization Manager™ consists of a management server and a graphical client. This guide describes how to install and configure Virtual Iron® in an enterprise data center.

This guide describes the functional relationships between Virtual Iron® software components. Procedures define how to use the Virtualization Manager client to manage virtual servers and perform administrative tasks.

## AUDIENCE

This guide is for experienced IT administrators with knowledge of the following:

- Server cabling and configuration
- LINUX® or Windows® administration
- Network configuration
- SAN set-up and management, including Fibre Channel administration

## CONVENTIONS

This book uses the following conventions:

- **Bold** type is used to call out the names of fields, buttons, and navigation controls in the Virtual Iron® management client.
- Light blue text is used for hyper-text links.
- Mono-spaced blue type is used for command examples.
- *Italicized text* is used to define or emphasize key terms.

# LICENSE INFORMATION

The following Third Party Software modules are incorporated in or shipped with the Virtual Iron® software and are subject to the following terms and conditions:

**Linux®**

Linux® is a registered trademark of Linus Torvalds.

## Redistributing GPL Source Files

You can redistribute and/or modify General Public License (GPL) software under the terms of the GPL. You may obtain a copy of the source code corresponding to the binaries for the GPL Software (the “GPL Source Files”) by downloading the GPL Source Files from:

http://www.virtualiron.com/products/open_source.cfm

This offer to obtain a copy of the GPL Source Files is valid for three years from the date you acquired this software product.

1

# VIRTUAL IRON® OVERVIEW

Virtual Iron® ™ is a data center virtualization product that allows you to create and manage multiple functionally independent *virtual servers* (VSs) on one or more *physical servers*. This chapter provides an overview of the Virtual Iron product.

This chapter contains the following sections:


About Virtual Iron® ..... 2
Delivering Virtual Infrastructure ..... 3
Virtual Iron® Architecture ..... 4
Product Requirements ..... 5
Object Relationships in Virtualization Manager ..... 6
Virtual Server Characteristics ..... 8

# ABOUT VIRTUAL IRON®

Virtual Iron® is a virtualization product that enables IT administrators to increase the efficiency and flexibility of physical server resources. Virtual Iron® runs across a set of physical servers, or *managed nodes*. IT administrators partition node resources so that each node supports n-*virtual servers*. The goal is to use each physical node at maximum efficiency, in a framework that uses processing power where and when it is needed.Virtual Iron software:

- Increases server utilization rates
- Cuts management complexity and spiraling costs
- Adapts to changing business needs
- Allows modification and reallocation of server resources
- Copes with failures without requiring human intervention.

Virtual Iron's® Native Virtualization™ provides an efficient and easy-to-manage virtualization solution. The software streamlines virtual infrastructure management and reduces operating costs by:

- Leveraging hardware-assisted virtualization capabilities from Intel and AMD for optimal efficiency
- Allowing 32- and 64-bit x86 operating systems to run unmodified and concurrently on a partitioned server
- Requiring no installation or management of the virtualization layer
- Virtualizing all data center resources, including servers, networks, and storage.

## Virtualization Manager

Virtualization Manager comprises a management server and integrated database, and a graphical client user interface that supports multiple concurrent users.

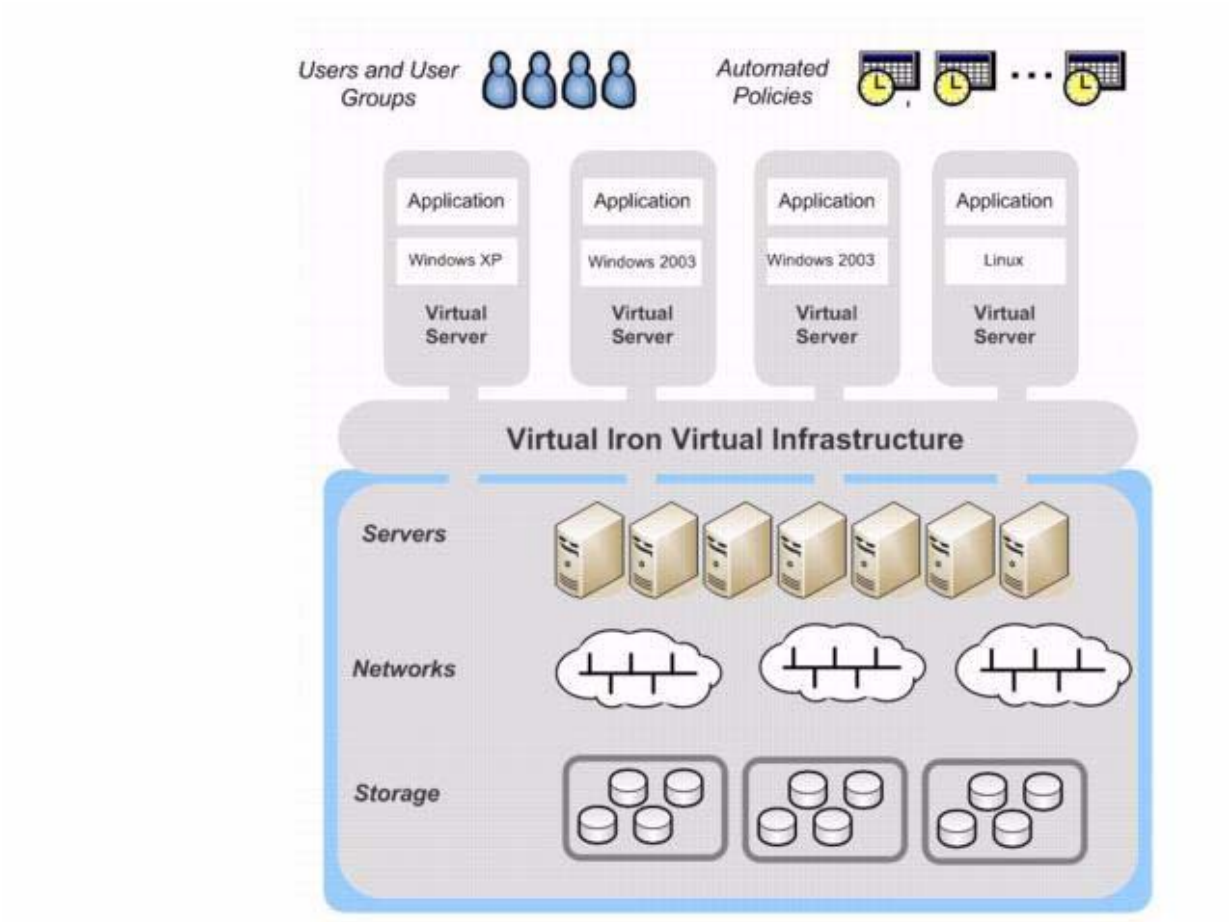
Virtualization Manager is an enterprise-class, transactional virtualization framework. Within this framework, one or more clients connect to the Virtual Iron® Virtualization Manager and manage the resources of a set of managed nodes.

## DELIVERING VIRTUAL INFRASTRUCTURE

At the highest level, Virtual Iron® transforms a set of interconnected nodes (physical machines) into a virtual infrastructure. In this flexible framework, a set of physical servers supports a number of operating systems (OS) and application workloads, which can be configured, deployed, and adapted to business changes on demand.

Figure 1 provides a high-level view of a virtual infrastructure built with the Virtual Iron® solution.

**Figure 1. Virtual Iron® Dynamic Infrastructure**




Automated policies control the resources used by virtual servers, based on performance and other criteria. As application demands change, virtual servers are moved from one physical server to another. Configuration of access to networks and SANs, and of redundant paths to guard against failure, are greatly simplified. Virtual Iron® leverages the virtualization extensions built into the latest Intel® and AMD® processors so applications run in this framework with no special configuration or driver support.

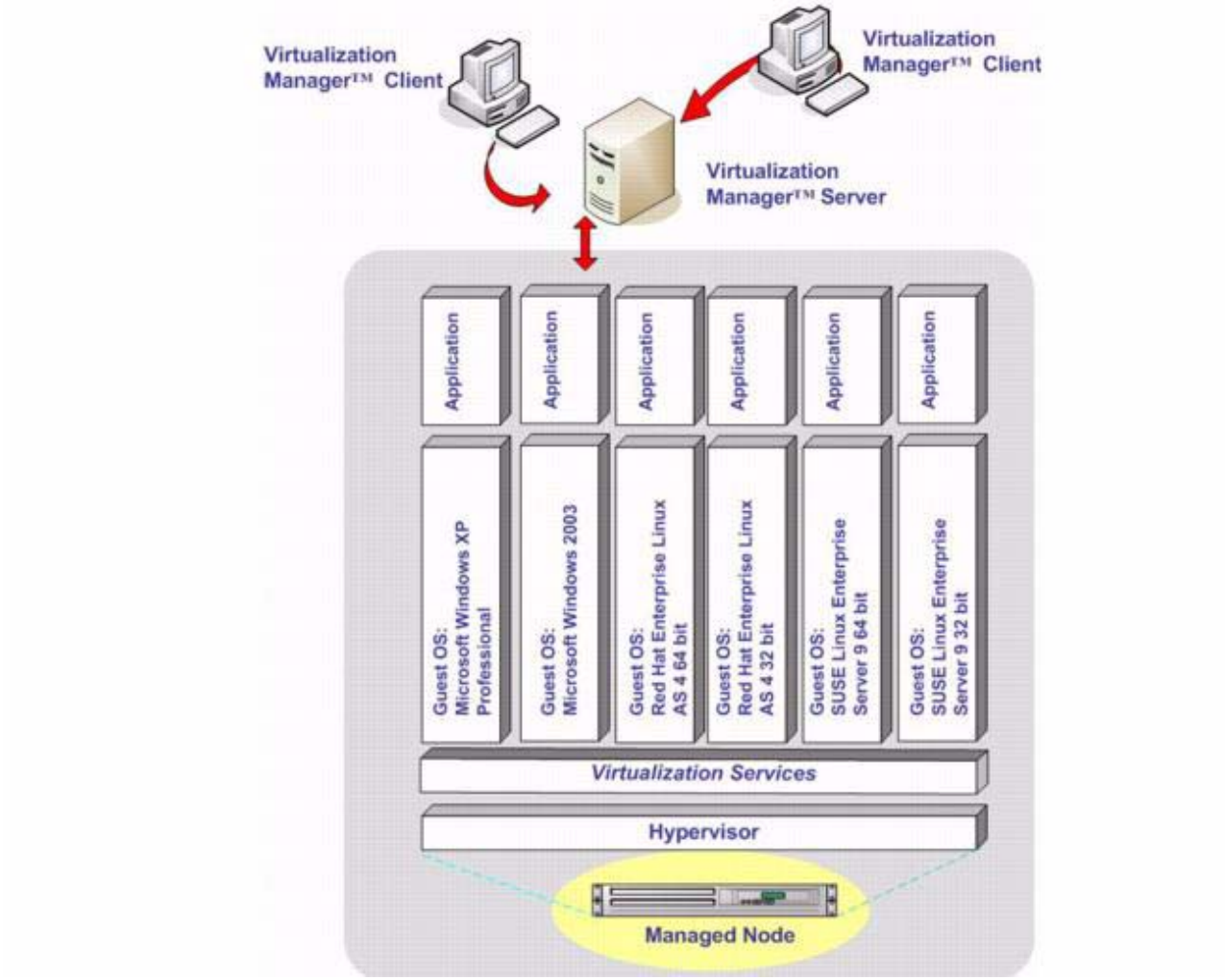
## VIRTUAL IRON® ARCHITECTURE

Virtual Iron® comprises three components.

- Hypervisor—An abstraction layer that mediates between the physical hardware and the Virtualization Services component.
- Virtual Iron® Virtualization Services—A software component that performs many functions ordinarily provided by standard operating systems.
- The Virtual Iron® Virtualization Manager—A high-performance client/server management framework.

Figure 2 shows a conceptual view of six virtual servers running on a single physical node.

**Figure 2. Virtual Iron® Architecture**

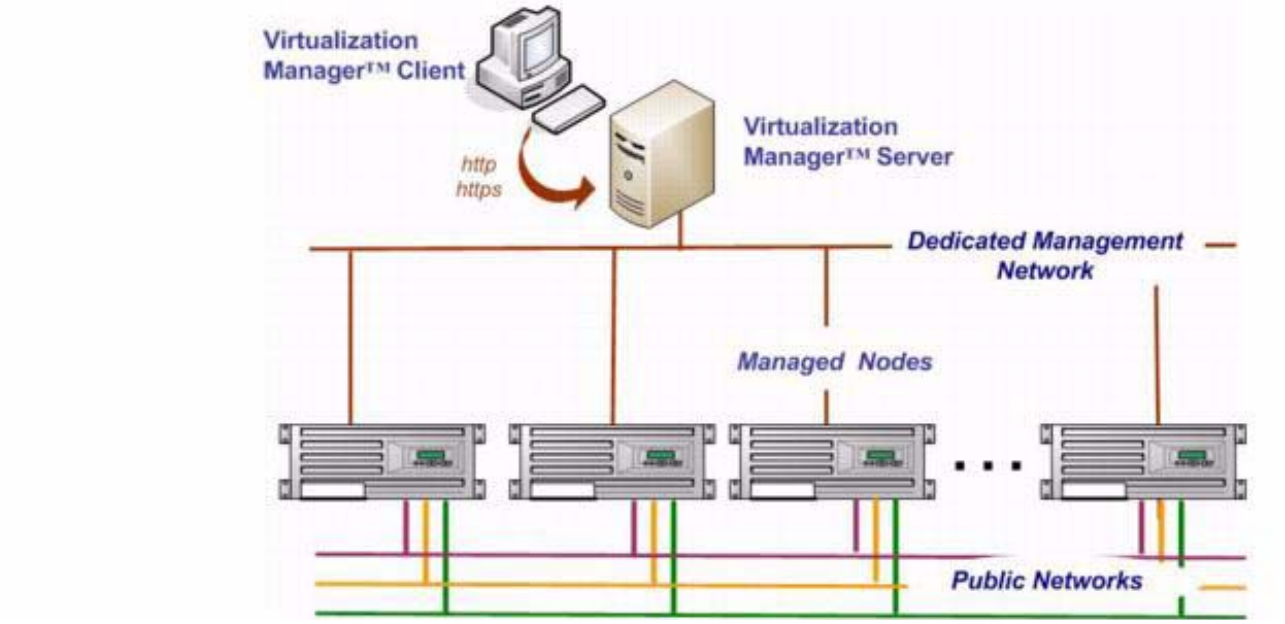


# PRODUCT REQUIREMENTS

With Virtual Iron®, you may virtualize the resources of one or more nodes. The number of nodes you can manage is processor-dependent, and varies with the license you have purchased. See Determining What Your License Supports for information on product licensing.

As Figure 3 shows, the Virtual Iron® framework requires a single management server linked to one or more physical servers, or *nodes*, on an Ethernet network. Virtual Iron's management server, *Virtualization Manager*™, communicates with each node over a dedicated management network. Nodes managed in this framework may also access SAN and network resources via one or more public networks.

**Figure 3. Conceptual View of the Virtual Iron® Framework**



# OBJECT RELATIONSHIPS IN VIRTUALIZATION MANAGER

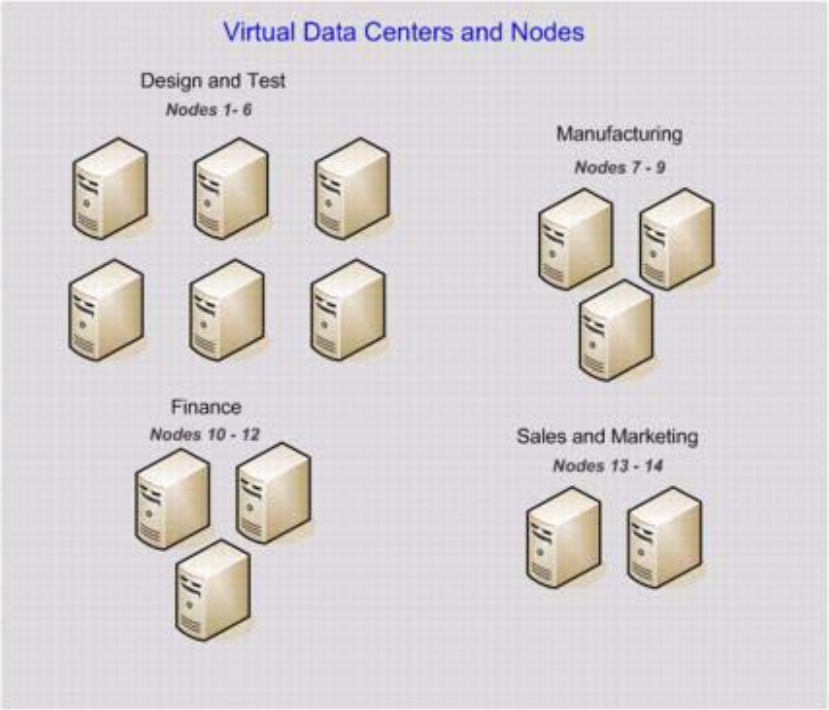
Virtual Iron® manages a set of nodes, enabling the creation of virtual data centers (VDCs) and virtual servers. The sections that follow describe the relationships between managed nodes, VDCs, and virtual servers.

## Managed Nodes and Virtual Data Centers

A *Virtual Data Center* (VDC) is an administrative container that refers to *a* group of managed nodes, their virtual servers, and applications. Each VDC houses a group of managed nodes used by a specific area of operations within an enterprise. Each VDC may need connections to specific networks and SANs within the enterprise.

To illustrate what a VDC is and how to create and assign nodes to them, let's say your company has several departments: Design and Test, Manufacturing, Finance, and Sales. Each of these departments has different responsibilities and each will likely run a set of applications specific to its aims. The Design and Test organization may run CAD and other programs that are not used elsewhere in the organization. Manufacturing may run programs that link its production goals with existing inventories of materials. Finance runs small- and large-scale accounting applications. Therefore, your enterprise may, for example, divide a set of 14 nodes among four administrative groups, as shown in Figure 4.

**Figure 4. Nodes And Virtual Data Centers**



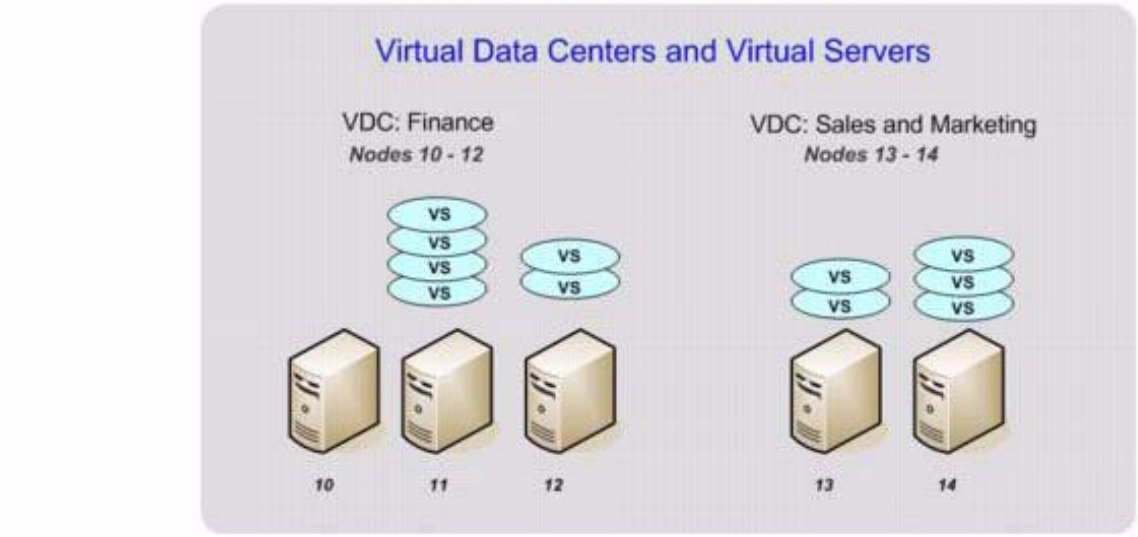
## Virtual Data Centers and Virtual Servers

A virtual server is a virtual machine that runs an OS and its associated applications. Just as each VDC owns the resources of a set of nodes, each node in a VDC can host a set of virtual servers.

With Virtual Iron®, each node is partitioned into a set of functionally independent environments, or virtual servers. A number of virtual servers can run simultaneously on a single node. Just as each VDC may contain *n*-nodes, each node may host multiple virtual servers.

To understand the relationship between VDCs, the nodes they contain, and the virtual servers that run on these nodes, refer to Figure 5. This illustration shows two VDCs, Finance and Sales and Marketing. Finance contains three managed nodes—10, 11, and 12. Of these, node 10 contains no virtual servers, while nodes 11 and 12 host four and two virtual servers respectively. Sales and Marketing contains nodes 13 and 14, which host two and three virtual servers.

**Figure 5. VDCs, Nodes and VSs**



# VIRTUAL SERVER CHARACTERISTICS

A virtual server is an instance of an operating system and its applications. With Virtual Iron®, you can configure and run multiple virtual servers on each managed node. Virtualization Manager™ provides control of virtual server characteristics, such as:

- Number of processors (default: 1)
- Processing priority (default 50)
- Memory (default: 256 MB)
- Network connections
- Disks (optional)
- Boot method

These characteristics are defined briefly below. For instructions on configuring them, see the integrated product tutorial.

## Processors

Each virtual server uses some or all of the processors on the node hosting it. Virtual Iron® allows multiple virtual servers to share the same processors. If a node has four physical processors, the virtual servers configured on that node can each use part or all of them. You can assign the default minimum of one processor or assign a higher number. Virtual Iron® limits each virtual server to the number of processors available on its host node.

## Processing Priority

When more than one virtual server is using the same processing resources, virtual servers assigned a higher priority are favored over another. For example, virtual servers A and B have the default priority of 50; C is assigned 100, the highest priority, Virtual Iron® allows C to run more frequently than A and B.

## Memory

By default, each virtual server is allocated approximately one quarter Gigabyte (256 MB) of memory. You can increase or decrease the memory allocated to each virtual server to suit application requirements.

Unlike processors, memory is not shared among virtual servers, but is allocated to virtual servers at configuration time. Memory allocated to one virtual server cannot be used or borrowed by another, even if it is unused. Instead, memory is apportioned among virtual servers administratively, with each allocated a specific amount of the total available. The total of allocated memory cannot exceed 100% of the available physical memory.

## Network Connections

Each virtual server uses a software object called a *virtual network interface card,* or *VNIC,* to connect to a specific subnet. Each VNIC has a unique MAC-address. You can assign multiple VNICs to each virtual server, enabling its applications to access multiple networks. Once a VNIC is assigned to a virtual server, it is bound to that virtual server, and cannot be used by any other. The total number of VNICs you can assign to all virtual servers is limited by your Virtual Iron® license. See Accessing License Information.

## Disks

As the Virtualization Manager administrator, you can assign disks to each virtual server. These disks can be raw SAN (Fibre Channel or iSCSI) volumes, or logical hard disks created on SAN or local drives. You can configure each virtual server to boot from, and access any disks visible to, the managed node hosting it. Virtual servers hosted by a node containing a *host bus adapter* (HBA) or access to an iSCSI network, can connect to SAN resources.

The Virtual Iron® administrator controls which *logical unit number* (LUN) to use as a boot disk, and the order in which LUNs are presented to the OS. You must provide the world wide node numbers (WWNN) associated with each HBA to the SAN administrator, so that switches may be programmed to provide the desired access.

## Boot Methods

Virtual servers can boot from logical disks on a SAN, from a local disk, or from a network boot device or from a CDROM. See the steps in Creating a Virtual Server for information on configuring boot parameters.

2

# INSTALLING VIRTUAL IRON®


Installation Overview ..... 12
Hardware and Software Requirements ..... 15
Product Configurations ..... 18
Managed Node Configuration ..... 20
Site Preparation ..... 22
Installing Virtual Iron® ..... 25

# INSTALLATION OVERVIEW

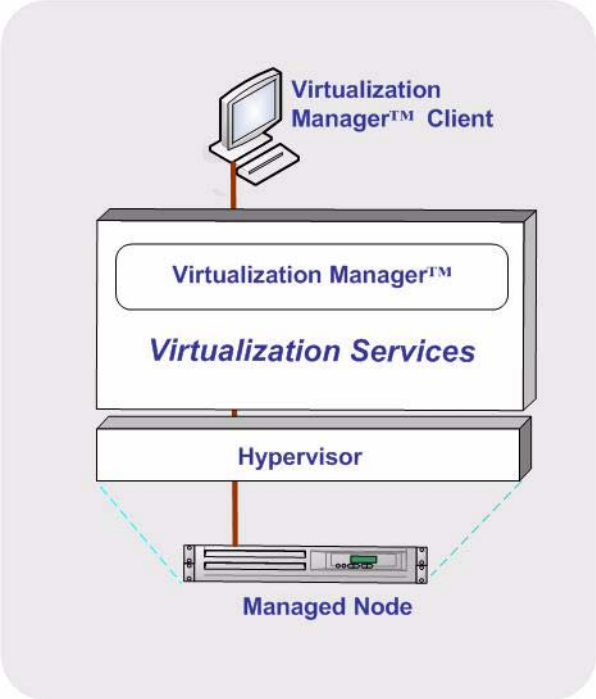
Virtual Iron® can be configured to run on a single server or across multiple servers. Each of these installation scenarios is treated separately in the installation procedure in the last section of this chapter, Installing Virtual Iron®.

## Virtual Iron® Single Server Edition (SSE)

In a single-server configuration, Virtualization Manager and the Virtual Iron® software reside together on the managed server. Instead of being hosted by a commercial operating system, Virtualization Manager is hosted by the Virtualization Services layer.

The relationship between these components is shown in Figure 6.

**Figure 6. Virtual Iron® Management Framework, Single Server Configuration**




### SSE RAID CONSIDERATIONS

When using RAID with SSE systems, consider the layout of the RAID set prior to SSE installation. If you are going to use RAID to configure your physical storage prior to Virtual Iron installation, configure one physical volume to be excluded from the RAID set and it will be used for the Virtual Iron install. Create another volume(s) with the remaining storage to store the virtual or logical disks for use by virtual servers.

During the installation process, the SSE installer clears all disk data on the boot volume of the physical server, so it is not recommended to store logical disks on that volume. Logical disks created on the boot volume can be saved, but it requires that the drives are exported prior to the re-install process. Since this is a time-consuming process, if you have multiple physical volumes on your node, combining them into one single large RAID volume is not an optimal practice.

Instead, use one physical volume for Virtual Iron software and then create separate volumes for logical disks. Virtual Iron recommends at least 36 GB for this volume. Configure the remaining physical volumes for logical disks.

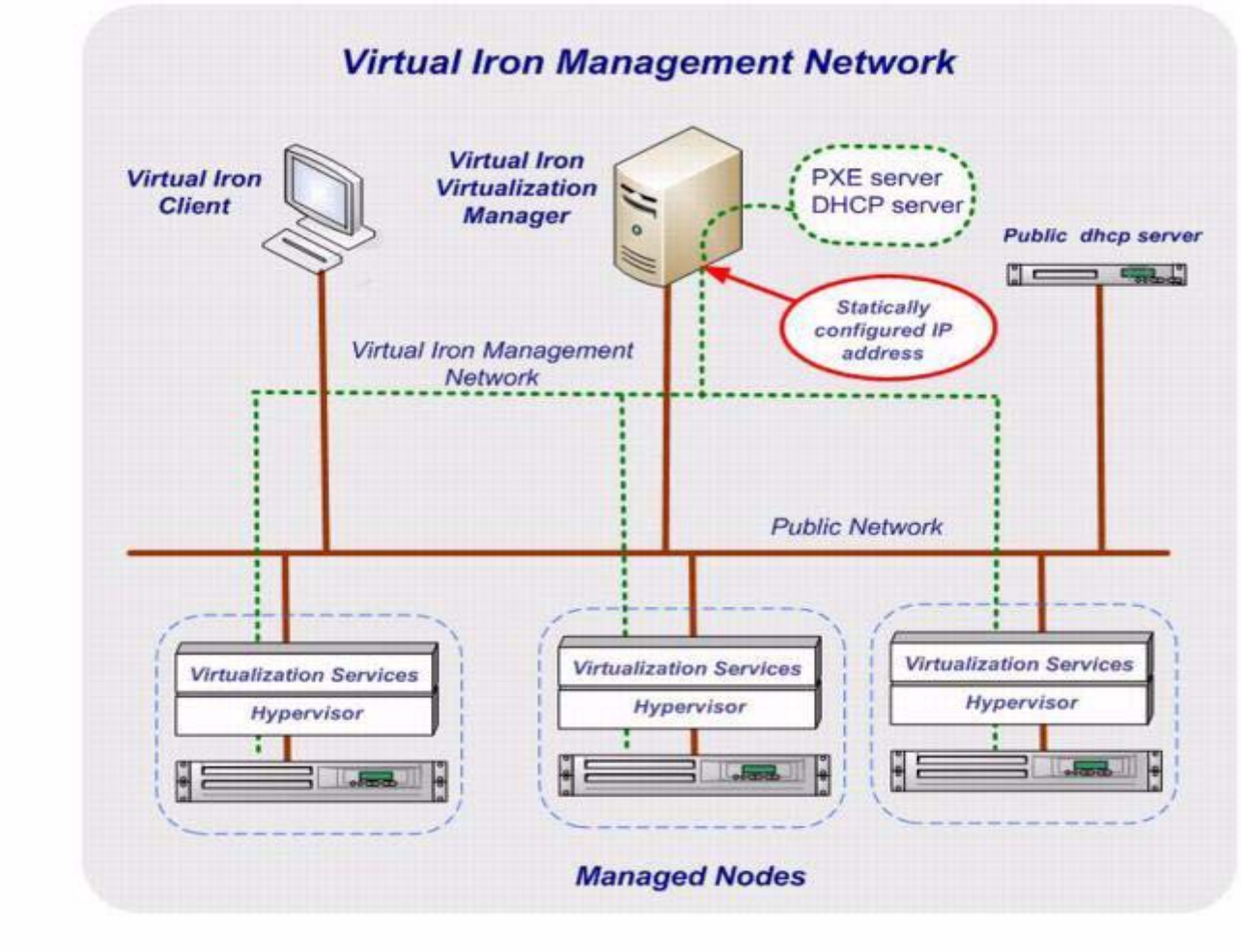
For example, if you have four 250 GB disks in your system, do not create one large 1,000 GB volume. Instead, use one 250 GB volume for the boot/install disk, and create one 740 GB RAID-set volume for storing logical disks.

## Virtual Iron® Enterprise Edition (EE)

Virtual Iron® Enterprise Edition runs on one or more Intel or AMD-based servers called *managed node*s. These servers are managed by *Virtualization Manager,* the web-based management application hosted by a separate management server node (the *management node*).

When running Virtual Iron® EE, Virtualization Manager and all managed nodes are interconnected by a dedicated management network, as shown in Figure 7. Note that the nodes in this illustration are connected to a public network, which hosts a DHCP server. With Virtual Iron® EE, managed nodes can be connected with any number of public networks. However, these nodes can only be managed via a single dedicated management network.

**Figure 7. Virtual Iron® Management Framework**



# HARDWARE AND SOFTWARE REQUIREMENTS

Virtual Iron® can run on a single node, or can comprise a management node (which runs Virtualization Manager) interconnected with one or more managed nodes.

**Note:** The Virtualization Manager can be installed onto a Linux or Windows platform. However, once installed, it can not be moved from one platform to another. Instead, uninstall it and reinstall it. The Virtualization Manager can be upgraded per Virtual Iron's upgrade instructions.

## Single Server Edition Managed Server, Minimum Requirements

Managed nodes have the following minimum requirements.

- Intel®-VT or AMD-V® based nodes
- 2 GB RAM
- 26 GB hard drive
- Ethernet ports: 1

## Enterprise Edition Managed Servers, Minimum Requirements

Managed nodes have the following minimum requirements.

- Intel®-VT or AMD-V® based nodes
- 2 GB RAM
- Local SATA and iSCSI drives. IDE disk drives are not supported.
- Ethernet ports: 2; if using iSCSI, 3
- Fibre channel card (optional)

## Enterprise Edition Management Server, Minimum Requirements

The management node hosts the Virtual Iron® Virtualization Manager.

- 1 CPU
- 2 GB RAM
- 30 GB hard drive
- Ethernet ports: 2
- OSs supported:
  - Red Hat Enterprises Linux 4 U4 and U5 32-bit and 64-bit
  - Windows 2003 server 32-bit
  - SUSE Linux Enterprise Server 9 SP3 32-bit and 64-bit

## Virtual Iron Maximum Limits

| Component | Virtual Iron |
|---|---|
| CPUs per virtual server | 8 maximum. Varies, depending on OS distribution. |
| RAM per virtual server | 32 GB |
| NICs per physical server | 3 (5 ports) |
| vNICs per virtual server | 5 (5 ports) |
| Disk size (iSCSI or FC LUN, logical disk) | 1 TB |
| Number of disks per virtual server | 15 |
| Number of virtual servers per physical server | Varies, depending on memory and CPU requirements. |

## Virtualization Manager Client Requirements

The Virtualization Manager client manages physical and virtual objects. The client requires the 32-bit version of JRE 1.5.

**Note:** If you are installing Virtualization Manager on Linux, you must have **glib** installed on the management server to make use of the Network (Image) Boot feature. If your management server is running X Windows or Gnome you have glib installed. If **glib** is not installed, the following error message appears in the log:

/opt/VirtualIron/VirtualizationManager/system/log/nbd-server.log contains bin/nbd-server: error while loading shared libraries: libglib-2.0.so.0: cannot open shared object file: No such file or directory

## GOSs Supported by Virtual Servers

Virtual Iron® Enterprise Edition enables administrators to configure and manage multiple guest operating systems (GOSs), of different types and versions, on a single managed node.

Virtual Iron® supports virtual servers running the following OSs and versions.

- RHEL 3 U8 32-bit
- RHEL 4 U4 and U5 AS 32-bit and 64-bit
- RHEL 5 32-bit and 64-bit
- SUSE Linux Enterprise Server 9 SP3 32-bit and 64-bit
- SUSE Linux Enterprise Server 10 SP1 32-bit and 64-bit

- Windows 2000 SP4 32-bit
- Windows XP SP2 Professional 32-bit
- Windows Server 2003 SP2 32-bit and 64-bit
- Windows Vista 32-bit

## Languages Supported

In addition to English, in this release, Virtual Iron supports installations on Japanese and German operating systems. Expanded and localized support will be available in future releases.

# PRODUCT CONFIGURATIONS

Virtual Iron® comes in three editions: the Single Server Edition, Enterprise Edition, and Extended Enterprise Edition.

- Virtual Iron® Single Server Edition (SSE) is designed to run on a single managed node. You can configure and manage many distinct virtual servers on this node, each running a separate guest operating system with a specific set of applications.
- Virtual Iron Enterprise Edition (EE) and Extended Enterprise Edition run on multiple managed nodes. The differences between these editions have to do with the policies that are enabled. Refer to the license information that you purchased for more information.

  Virtualization Manager is installed on a separate node, running either Windows® or Linux®.From a management perspective, the product treats these nodes as a single pool of resources. Virtual servers created in this environment can migrate from one node to another in the event of a failure, and move non-disruptively to another node as needed.

## Management Operations

The scenarios that follow describe how to configure Virtual Iron®. You can configure the product to use a single network. This is the simplest case, and the most often used if you are virtualizing a single managed node. You can also configure the product to use one network for management, and another for virtual server traffic. This scenario is most often the case when managing multiple nodes. To distinguish how these scenarios differ, several terms are used in the explanations that follow.

- A **dedicated management network** is a network that is *entirely dedicated* to management traffic between Virtualization Manager and managed nodes. In this scenario, it is advisable to use the dedicated network to PXE-boot the Virtual Iron® software on each node.
- A **public network** is a network that is used for ordinary network traffic by one or more nodes.

When running Virtual Iron® EE, a set of one or more managed nodes is interconnected with a management node. It is vital for the management and managed nodes to be connected to the same subnet.

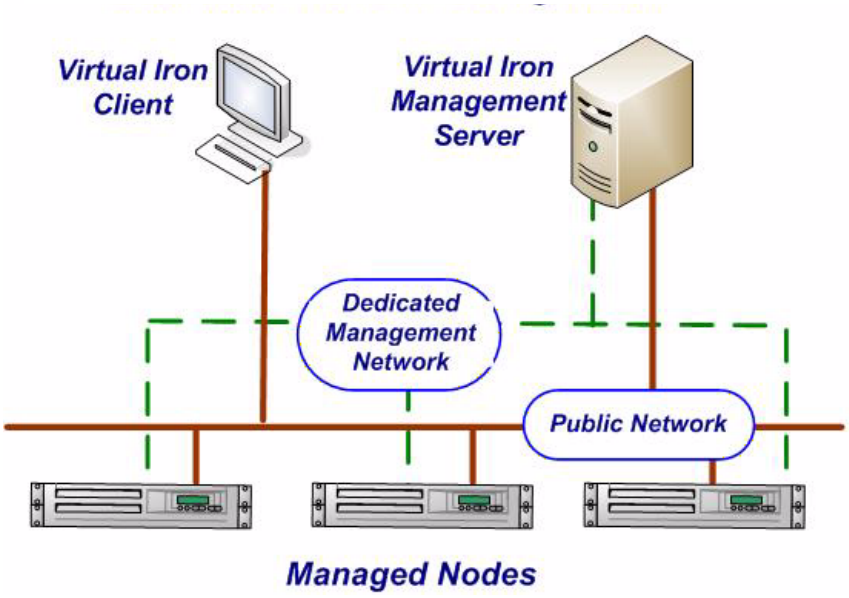
## Product Configuration, Enterprise Edition

If you are virtualizing multiple nodes, connect each managed node to the management server (via the dedicated management network), and to one or more *public networks*.

Figure 8 shows a typical configuration. In this case, three systems are connected by a *dedicated* management Ethernet network, which is used exclusively by Virtualization Manager to PXE-boot and manage these nodes. This network is shown as a dashed green line.

The managed nodes are also connected to a public network; this connection is used by the virtual servers hosted on each managed node. It is never used for Virtual Iron® management traffic.

**Figure 8. Three Managed Nodes, dedicated management network**




## PXE Booting Managed Nodes

To PXE-boot managed nodes, follow these steps:

**Step 1.** Connect all nodes to the machine hosting Virtual Iron® Virtualization Manager.

**Step 2.** Make sure the BIOS of each node is configured so that PXE or Network boot precedes other methods in the boot order.

**Step 3.** Boot each managed node.

# MANAGED NODE CONFIGURATION

The managed nodes you will use in the Virtual Iron® framework need to be specially prepared by editing the BIOS setting of each node. The tasks you perform for each type of node will vary, depending on the vendor. They include:

- Virtualization Processor Settings of Each Node
- Configure IPMI or ILO for each Node
- Disabling Hyperthreading Support

## Virtualization Processor Settings of Each Node

The Virtual Iron® framework operates only in Intel® and AMD® nodes with virtualization technology (VT) support. In nodes sold by some vendors, the Intel®-VT extensions for the node are set to OFF. Be sure the Intel®-VT extensions for each node are set to ON when checking the node's BIOS settings.

## Configure IPMI or ILO for each Node

Some servers are designed to be started up or shut down from a remote console. Two protocols commonly used to provide this capability are IPMI (Intelligent Platform Management Interface) and ILO (Integrated Lights Out). However, some nodes do not support either of these protocols.

If the node or nodes you are managing with Virtual Iron® support one of these protocols, you need to configure the node so Virtual Iron® is enabled to start up and shut down the node from Virtualization Manager™. Please consult the manufacturer's hardware documentation for details on configuring IPMI and ILO on the node.

### CONFIGURING IPMI

To configure IPMI for a node, go to the install directory of the server and modify the control XML file:

VirtualIron\VirtualizationManager\system\generic_ipmi.xml

Open this file and edit the following command options with your User Name and Password:

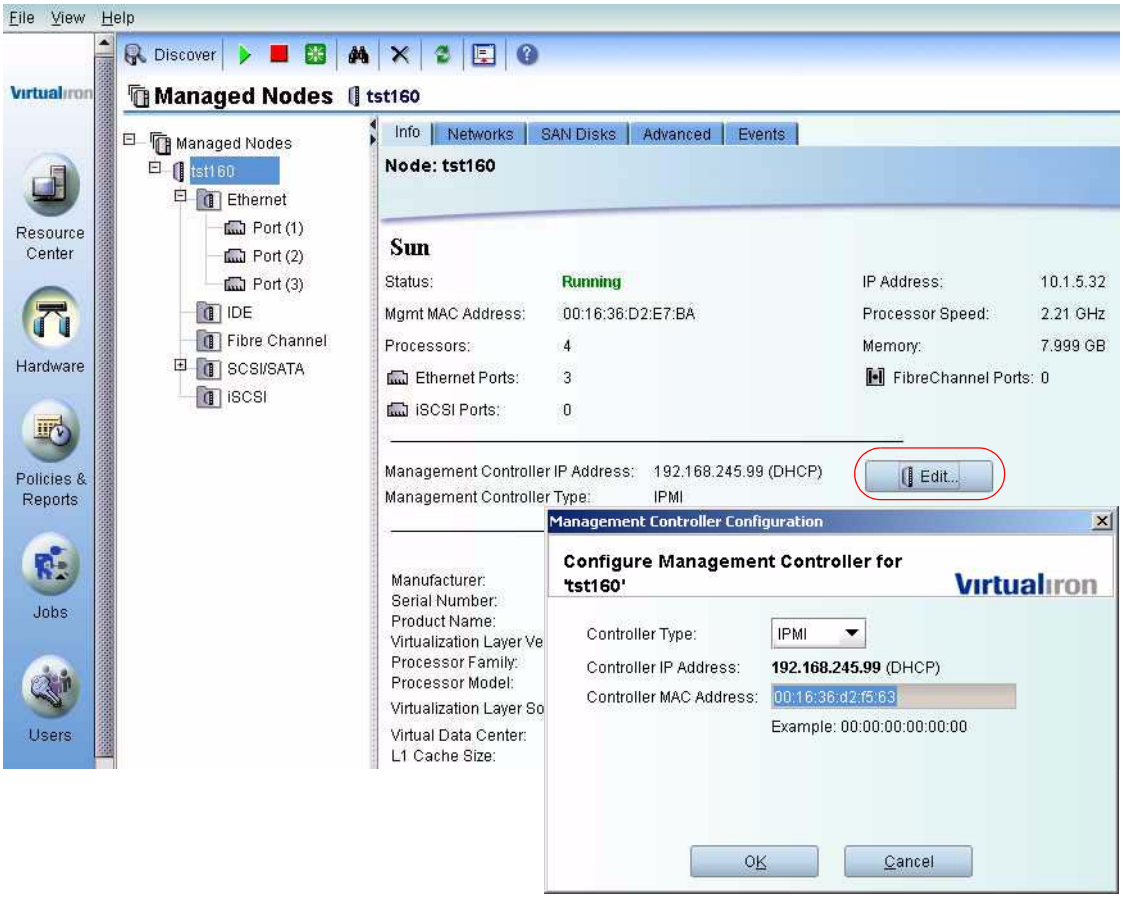
<command-options>-U (Your UserID) -P (Your Password) </command-options>

To view IPMI information, click **Hardware** and select the **Summary** tab. Then select **Edit**. See Figure 9.

### CONFIGURING ILO

To configure ILO for a node, click **Hardware** and select the **Summary** tab. Then select **Edit** and provide ILO MAC address. See Figure 9.

**Figure 9. Configuring IPMI or ILO Information**




## Disabling Hyperthreading Support

Virtual Iron® recommends that hyperthreading be set to OFF on Intel® nodes. To do this, restart your managed node and enter the BIOS on startup. Disable the hyperthreading support in BIOS. On most computers hyperthreading is located in the Main BIOS Settings menu. On HP servers it is in the Advanced menu-->Power-On Options submenu.

**Note:** Turning Hyperthreading ON may adversely affect the performance of certain classes of applications.

# SITE PREPARATION

The sections that follow cover the key considerations relating to the cabling of nodes in the Virtual Iron® framework.

## Define the Physical Infrastructure

Before setting up a lab, adopt a set of cabling conventions to simplify trouble-shooting and adding, replacing, or upgrading nodes.

Some additional planning is needed when implementing virtual infrastructure. In the open Virtual Iron® framework, virtualized nodes are partitioned into administrative entities called *virtual data centers*, or VDCs.

To derive maximum value from your virtual infrastructure, it is important to make network and SAN connections within each VDC in a consistent way. Set up the physical infrastructure that underlies each set of virtualized nodes so that all nodes in each VDC can access the same networks, and the same SAN resources.

To make efficient use of network resources, map out which nodes/ports are connected to which subnets. Use these guidelines:

- Connect each node to the same physical subnets.
- Connect the port/slots in each node in the same manner.

Details on planning these connections are included in the sections that follow.

## Defining Network Connections

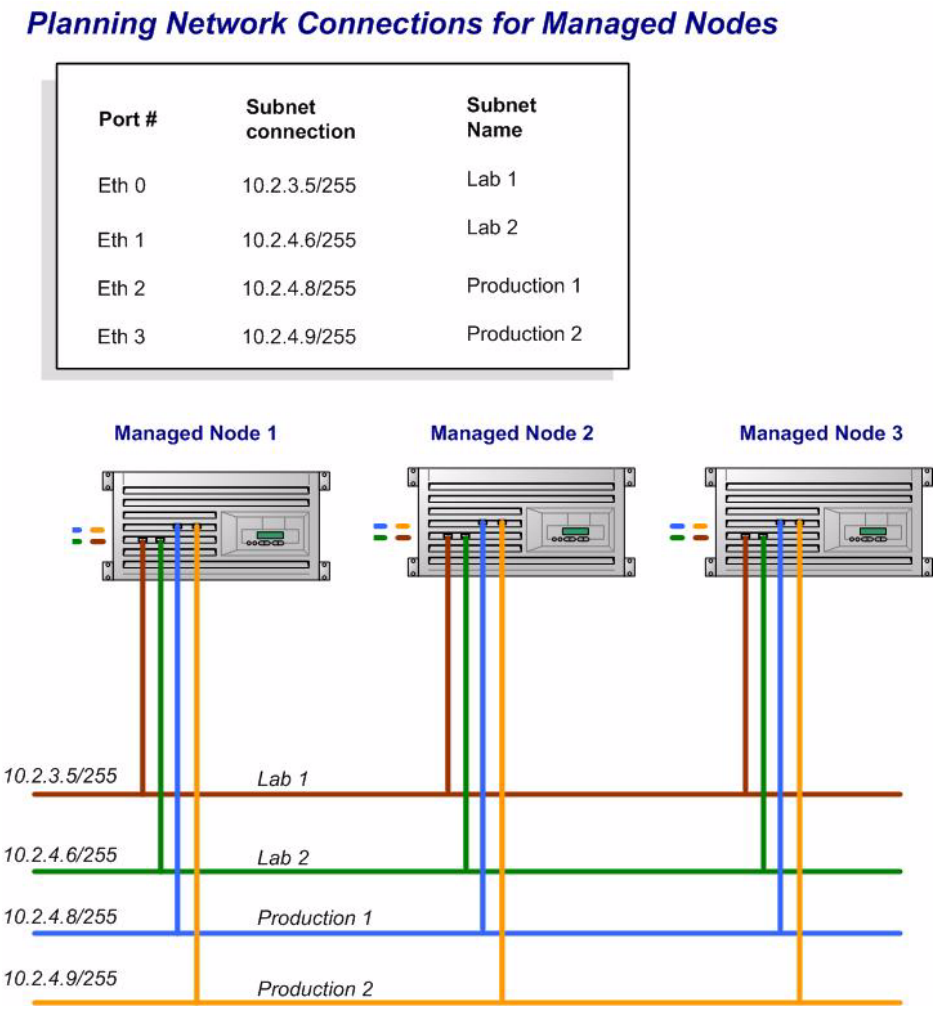
In each VDC, attach each node to the same subnets. As a best practice, each node should have the same connection scheme. For example, connect Eth0 on each node to subnet A, Eth1 to subnet B, and so on.

This scheme gives you the flexibility to migrate a virtual server on one node to another node without losing access to its network(s). In addition, having each node cabled to its subnets using the same-numbered ports simplifies the management, troubleshooting, and configuration of physical nodes.

For example, you may be running a data processing application on a node in network A. This application normally consumes a high-percentage of the cycles available on that node, but it is now running at 5% of capacity. To use resources more efficiently, redeploy the application to another node in the VDC, on network B, C, or D.

Figure 10 shows three nodes, each of which is connected to four subnets. Note that each same-numbered Ethernet port in each node is connected to the same subnet—Eth0 connects each node to subnet Lab 1, Eth1 connects each to Lab 2, and so on.

**Figure 10. Network Connection Scheme for Managed Nodes**

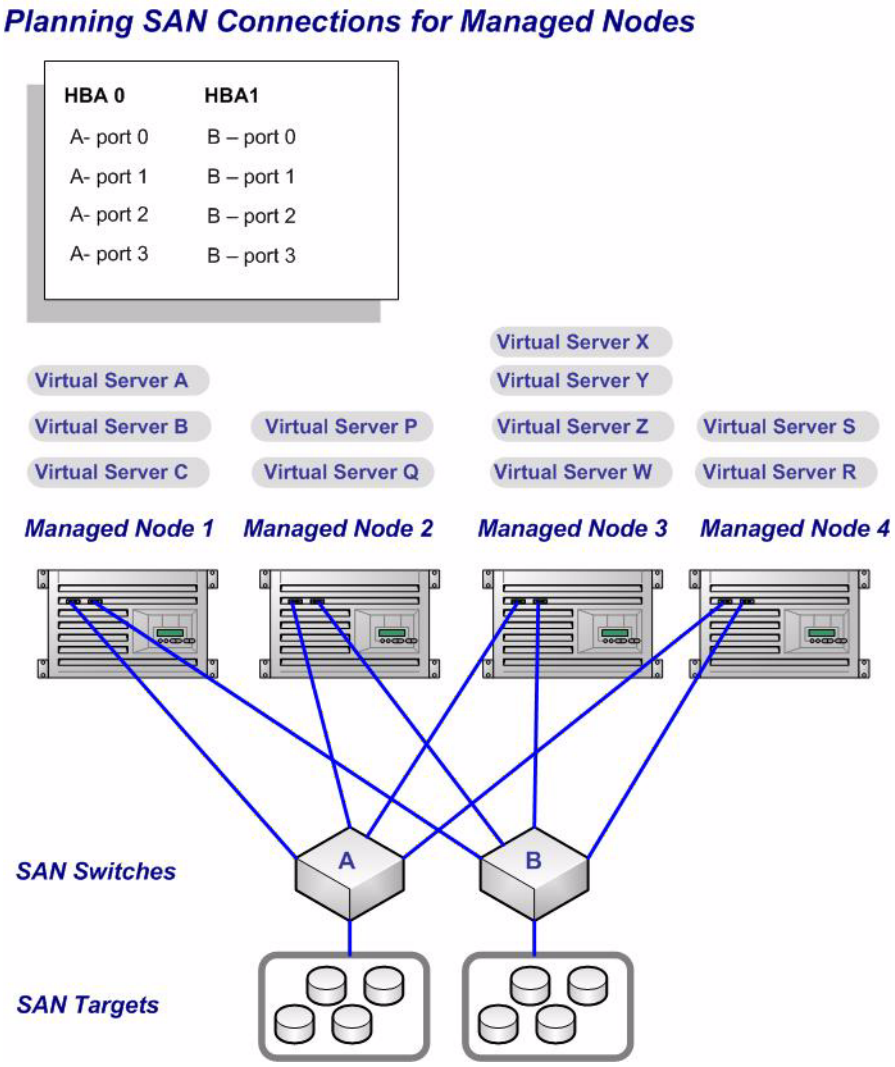


## Connecting Nodes to the SAN Infrastructure

Before you connect nodes to the SAN infrastructure, bear the following considerations in mind.

- Adopt a consistent connection scheme between HBAs/ports and SAN switches.
- Be sure that each node is connected to each enterprise SAN switch. This assures that the virtual servers hosted by each node have access to all targets/LUNs. This is what enables LiveMigration, LiveCapacity, and LiveRecovery between existing nodes.

**Figure 11. SAN Connection Scheme per VDC**



# INSTALLING VIRTUAL IRON®

The following instructions describe how to install Virtual Iron® on multiple managed nodes. For instructions on installing the product on a single server, see the *Virtual Iron® Virtualization Manager™ Single Server Edition Getting Started Guide.*

## Before installation...

Before installing the product, interconnect the *Virtualization Manager node* with *managed nodes* in your data center, and set the managed nodes to PXE or network boot. See Managed Node Configuration for information on preparing managed nodes.

---

**Note:** All anti-virus software applications must exclude the Management Server installation directory. This is because of file permission conflicts, which could cause data corruption. The Virtualization Manager user interface may also run slowly if anti-virus software is running on the management server host. This may occur because some anti-virus software inspects Java applications, resulting in reduced Virtualization Manager client performance. To prevent this, designate Virtualization Manager as a trusted application in the virus-scanning software.

---

Check the requirements provided in Product Requirements. For detailed hardware requirements, check

http://www.virtualiron.com/products/servers.cfm

Install the software on the system designated as the *management server node* in Figure 7. This system hosts the Virtualization Manager®, which is used to configure, start, and manage virtual servers on one or more nodes.

**Step 1.** To install Virtual Iron®, proceed as follows.

**For Linux:**

Execute the bin file as follows:

```
# sh ./VirtualIronInstall4xx.bin
```

**For Windows®:**

Double click this file:

VirtualIronInstall4xx.exe

The following screen appears as the installation begins.

When the download completes, the introductory screen appears. Click **Next** to begin the installation.

**Step 2.** At this point, the installation process checks to see whether standard DHCP port 67 or TFTP port 69 is in use on the installation host.

To PXE-boot managed nodes (as explained in Product Configuration, Enterprise Edition), these ports are required. If either port is in use, a DHCP or TFTP Port in Use window appears warning that Virtualization Manager may not function properly. Resolve this issue before continuing the installation.

**Step 3.** In the next screen, choose **Install** for an initial installation of the product.

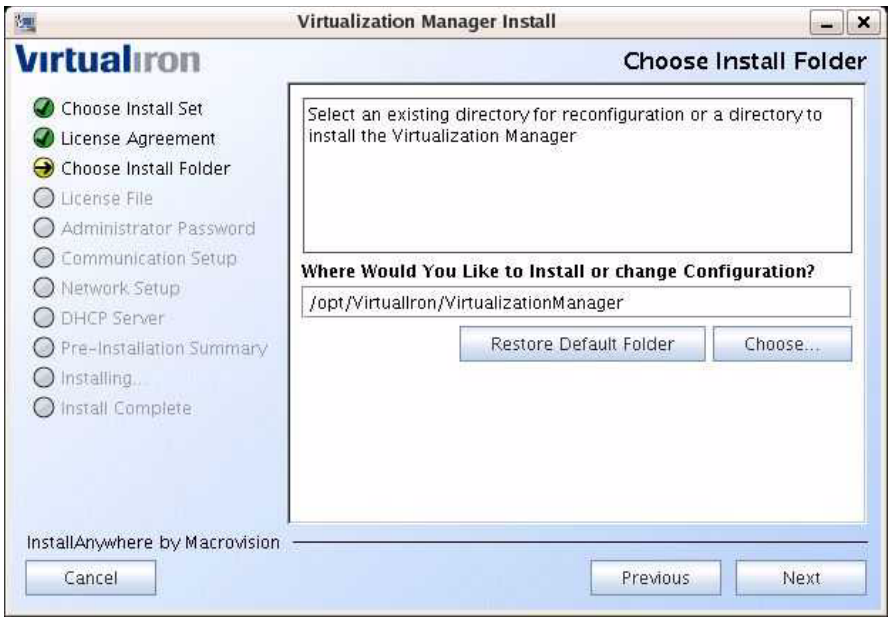
Choose **Reconfiguration** if you need to make changes to an existing configuration. Such changes may include changing the Admin password chosen during the original installation, changing the location of the installation, or changing information on networks.

**Step 4.** Click **Next**.

**Step 5.** If you chose the **install** option, you are prompted to read and accept the Virtual Iron® license agreement. You must accept the agreement to continue the installation.

**Step 6.** Next, choose a location for the installation. You can enter a path for the installation, or choose the default folder. (For Linux, this is **/opt/VirtualIron**. After selecting a location, click **Next**.

**For Linux, you will see this screen:**



**For Windows®, you will see this screen:**


If a previous installation of the product is discovered, the following warning appears. Click **Uninstall** to remove the existing product and install the current version, or **Exit Installation** to exit the installation.


**Step 7.** Enter the location of the Virtual Iron license file. This file is not included in the distribution, but is sent to you by Virtual Iron®. (The example shown is from a Windows® installation.)

**Step 8.** Enter an Admin password for the system. The password and confirmation password you choose must match, and must be 6-32 characters long. *Remember this password as you will need it to log in to the system later!*

If your password and confirmation do not match, an error message appears prompting you to reenter the password.

**Note:** To change the admin password at a later time, re-run the installer in **Reconfiguration Only** mode.

**Step 9.** Choose HTTP or HTTPS for the connection type to use between the Virtualization Manager client and server.

If you choose **HTTP**, the window shown below appears. This allows you to choose a port or use default port 80.

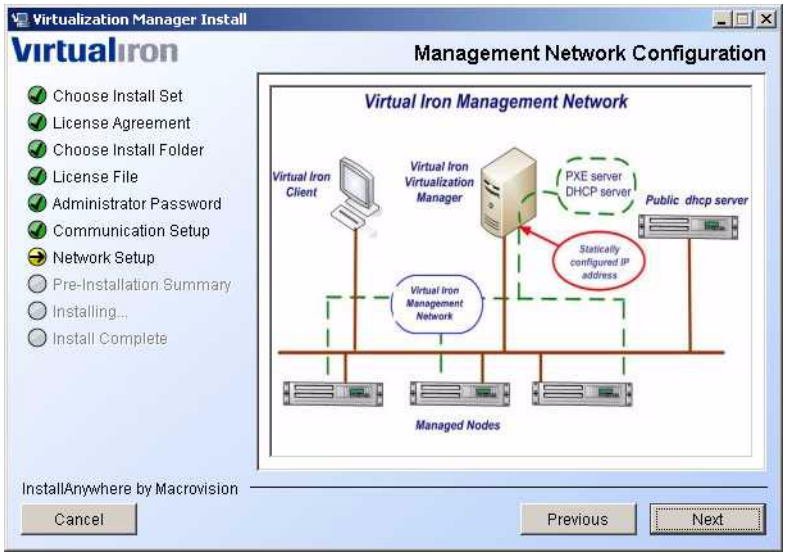

If you select **HTTPS**, select a port or use default port 443. You can also select your own keystore. If you choose to do this, you must provide passwords for the keystore.

The installer validates the availability of the port you have chosen. If the port is unavailable, a pop-up window appears, informing you to choose an unused port.

**Step 10.** If you have chosen HTTPS, the following window appears. (The window shown is from a Linux installation.)

**Step 11.** If you chose a certificate keystore in the preceding step, enter passwords for the keystore and the certificate key.

**Step 12.** The illustration that appears at this point shows a representative configuration of the management network. Note that two networks are present. The Virtual Iron management network is a private network between the Virtualization Manager and all managed nodes. These nodes are also connected to a public network.




Click **Next** to continue.

**Step 13.** Assign the IP addresses that the Virtualization Manager uses to connect to the private management network and the public network.

## VIRTUALIZATION MANAGER AND DATA PROTECTION

Virtualization Manager needs to be deployed and running on a platform that is capable of maintaining critical applications. Although Virtual Servers continue to run even when the Virtualization Manager is not, the Virtualization Manager should be configured as an always-on product.

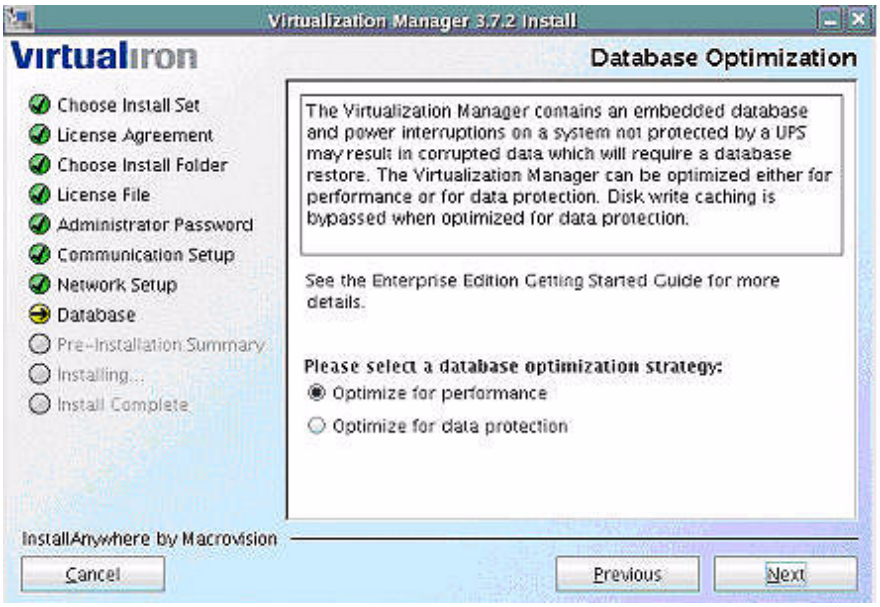
As with any database-based product, database corruption can occur if there is a loss of power or a management server connected to a storage subsystem configured with write-caching is improperly shut down. This could affect the most current statistics collection, configuration changes, and log file updates.

To be fully functional again may require restoring the database with a backup version. As a result, some critical data may be lost. It is a best practice to operate the Virtualization Manager with a UPS (uninterruptible power supply) and to run regularly scheduled backups.

See Performing Backup and Restore Operations for additional information.

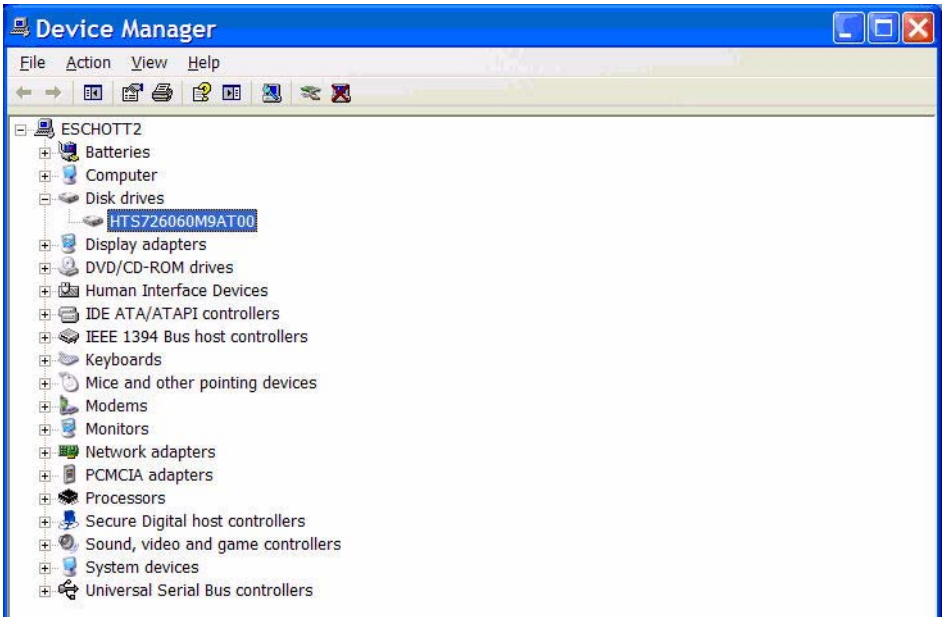
**Step 14.** If your system is not protected by a UPS, there is a risk of database corruption in the event of a power interruption. This would require restoring the database and could result in lost data.

Select **Optimize for data protection** to reduce this risk. This causes Virtualization Manager to wait until the data is completely written to the disk before proceeding. To ensure that performance is not adversely affected, Virtual Iron recommends disks capable of operating at a minimum of 7200 RPM.

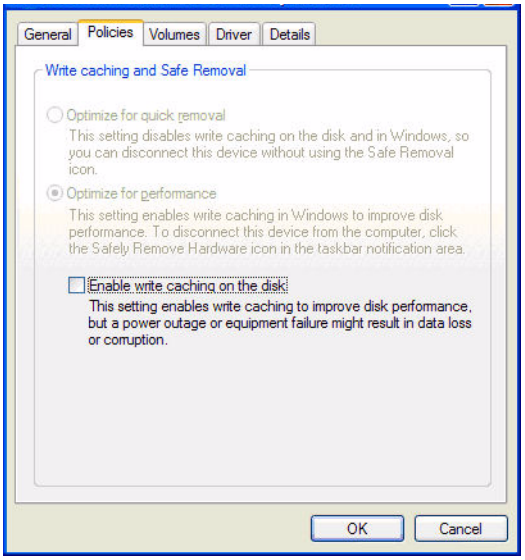



For systems running Windows, if you select **Optimize for data protection**, you also need to disable write caching on the disk that is used to store the Virtualization Manager database. Do the following to navigate to the Device Manager:

- Right-click **My Computer** and then click **Properties**.
- Click the **Hardware** tab.
- Click **Device Manger**.
- Click the plus sign (**+**) next to the **Disk Drives** branch to expand it.
- Right-click the drive on which you want to enable or disable disk-write caching, and then click **Properties**.



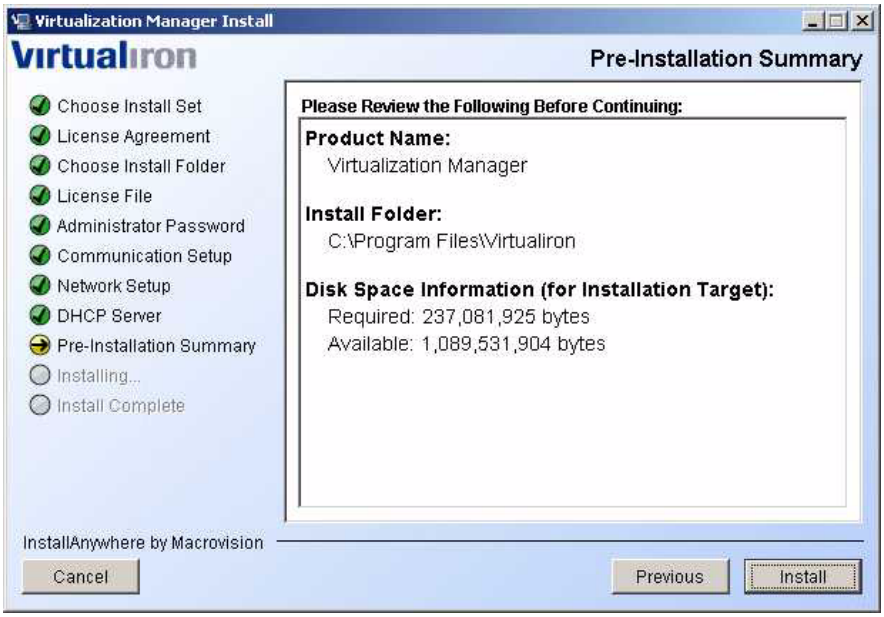

- Click the **Policies** tab.



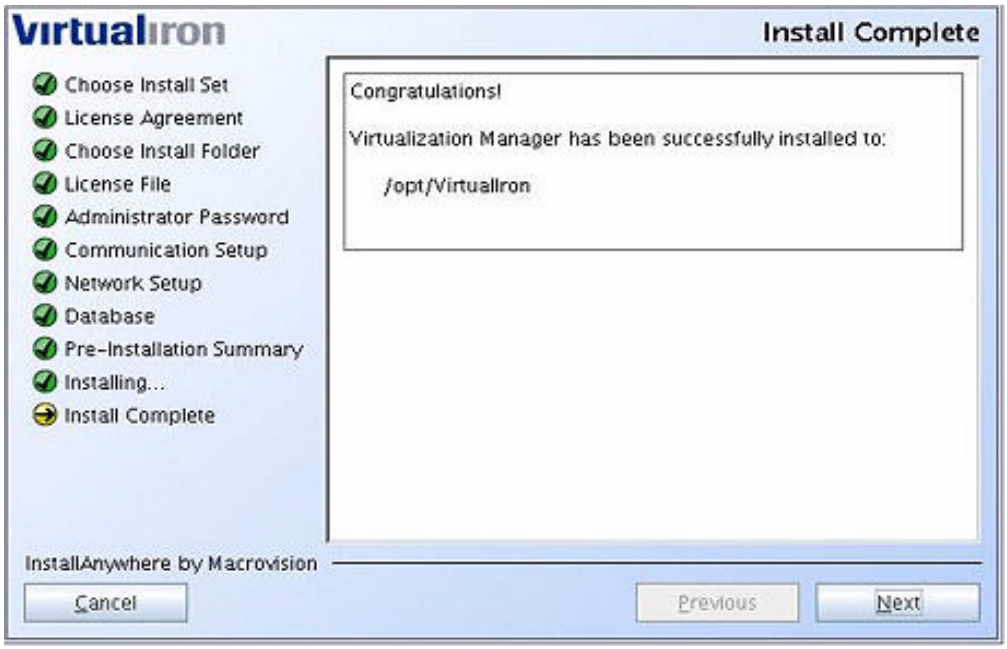

- Click to clear (uncheck) the **Enable** write caching option.

- Click **OK**.

**Step 15.** After making your database optimization selection, the Virtualization Manager Install window displays a pre-installation summary. To proceed with the installation, click **Install**. (The example shown here is for a Windows® installation.)




**Step 16.** A screen appears with the install location. Click **Next**.



**Step 17.** When the installation is complete, click **Done** to close the window. (Example: Windows® installation). Virtualization Manager starts automatically.

3

# CONFIGURING NETWORKS


Connecting to the Virtualization Manager ..... 40
Mapping Physical Ports to Logical Networks ..... 42
Configuring Networks, Enterprise and Single Server Editions ..... 45
Configuring Ethernet Networks ..... 47
Configuring iSCSI Connectivity ..... 49
Configuring VLANs ..... 55
Creating a Failover Network ..... 58

# CONNECTING TO THE VIRTUALIZATION MANAGER

After installing Virtual Iron®, use a web browser to connect to the Virtualization Manager node (the node on which you installed the product).

**Step 1.** For the URL, use the IP address assigned to the management Ethernet interface.

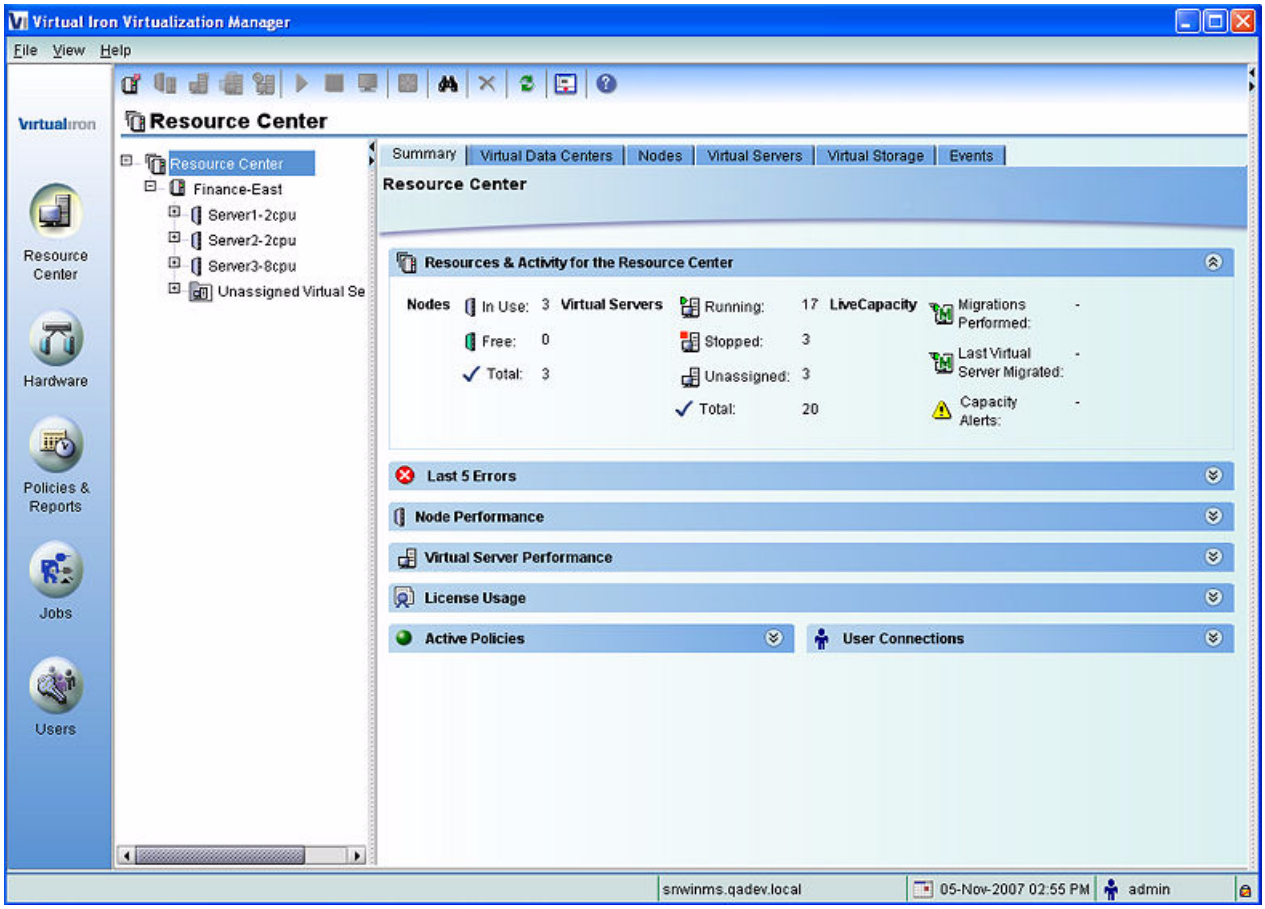
**Step 2.** On the Virtual Iron® screen, click **Virtualization Manager**.

**Step 3.** The application starts, and you are presented with this login screen. Enter the Password you specified when you installed Virtualization Manager, and click **OK**.

**Figure 12. Login Screen**


**Step 4.** Virtualization Manager opens, as shown below. If the Tutorial appears to the right of the Resource Center window, you may close it at any time by selecting **Help** and unchecking **Show Tutorial**

**Figure 13. .Virtualization Manager Interface**



# MAPPING PHYSICAL PORTS TO LOGICAL NETWORKS

Before configuring networks, you will map all available ports to the set of logical Ethernet networks created within Virtualization Manager. This involves the following tasks:

- Logically connecting all ports on each node in the Resource Center to the networks you want them to use.
- Defining and specifying a name or alias for each network. The name should be a recognizable name that has to do with the network's use.

## Defining Networks in a Virtualized Environment

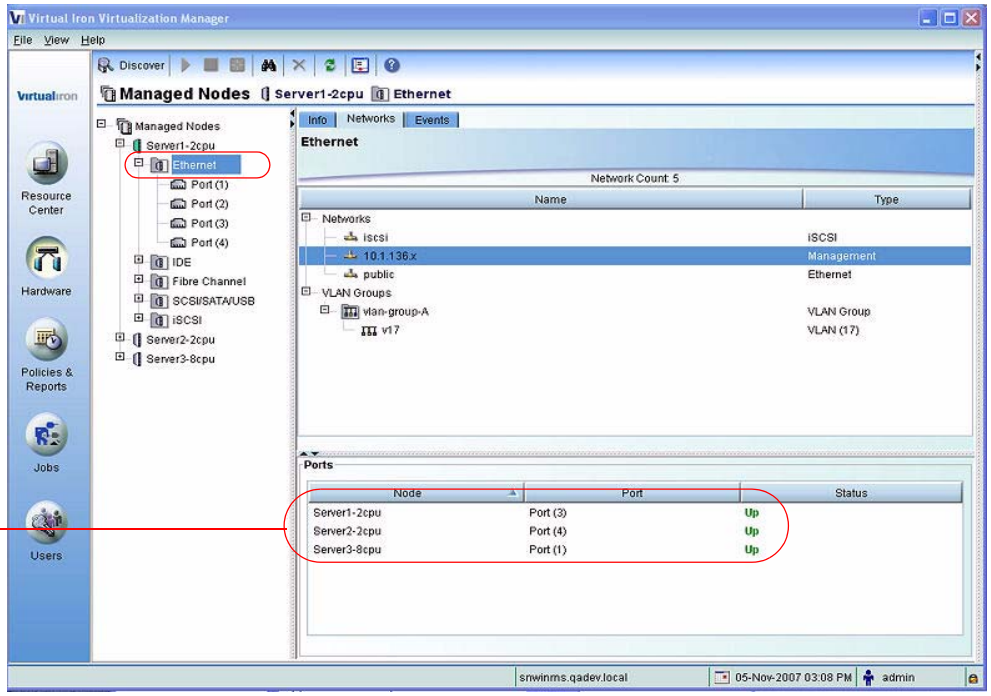
When nodes boot in the Virtual Iron® framework, information about the components of each node is displayed on Virtualization Manager. Each managed node is shown on the Virtualization Manager user interface, along with its Ethernet cards and ports.

**Step 1.** Connect a port to a network: Plug a managed node into a physical network you want it to use.

**Step 2.** In Virtualization Manager, click the **Hardware** button. Select the **Networks** tab.

**Step 3.** Select a network in the Networks tree diagram. The port you connected appears in the bottom of the Networks window with a status of ***Up***, as shown in Figure 14.

**Figure 14. Ethernet card and port information**



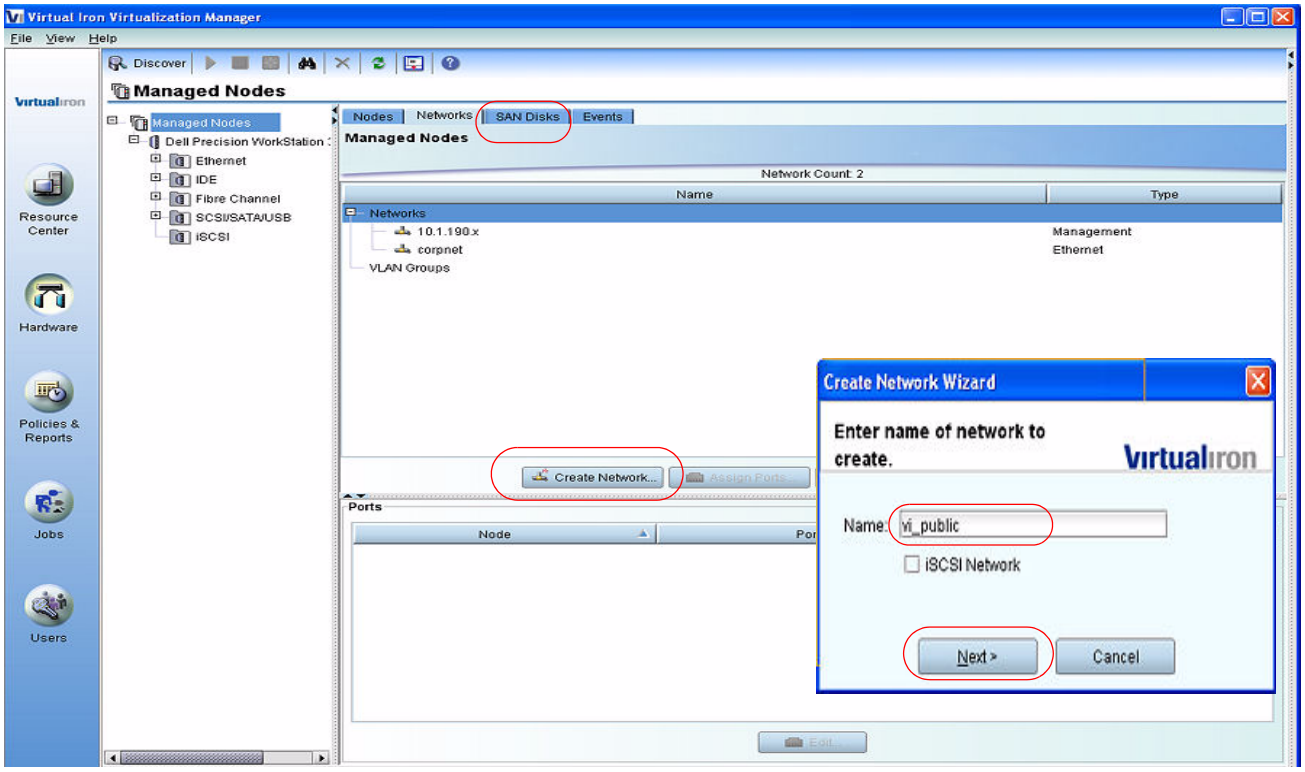

*Ports are Up*

**Step 4.** To enter the names for physical networks used by virtual servers, select the **Networks** tab and click the **Create Networks** button as shown in Figure 15.

**Step 5.** In the Create Network Wizard window, enter the network name and click **Next**.

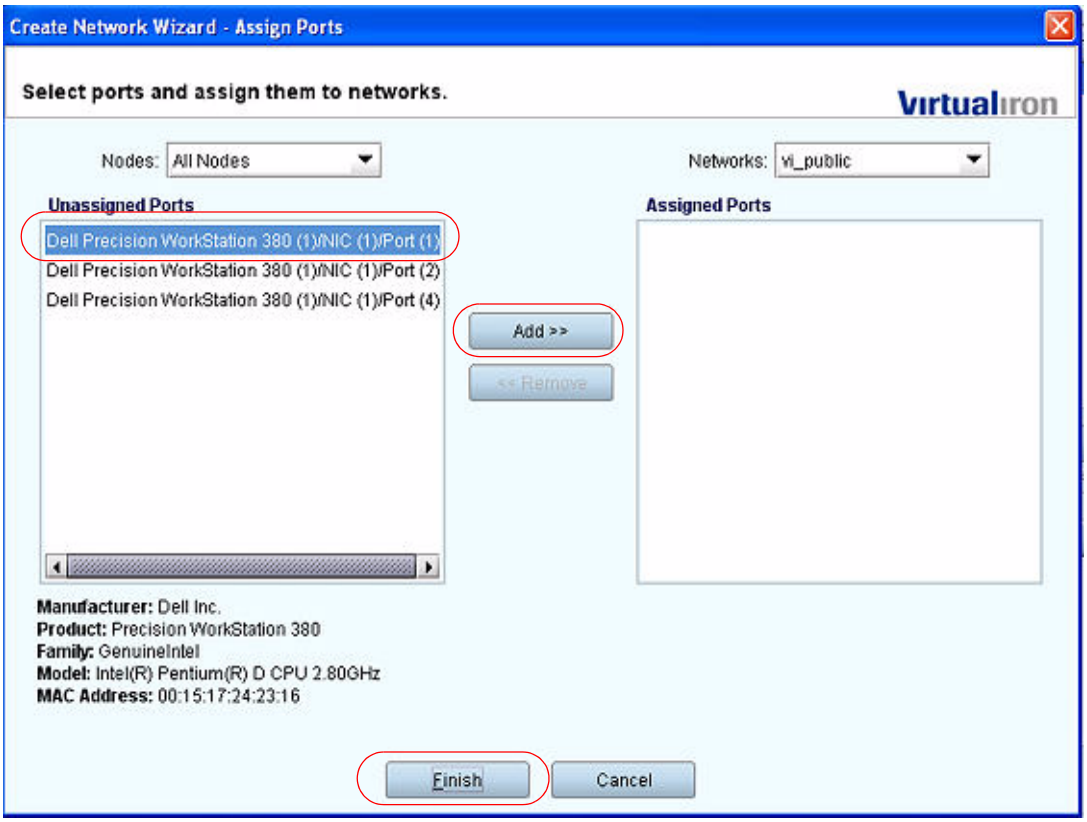
The symbolic names you choose should relate to the uses of the network. This step adds these logical names to the Virtualization Manager database.

**Figure 15. Adding Ethernet Network Names**



**Step 6.** Virtualization Manager displays the window shown in Figure 16. Select the unassigned port and click **Add** to assign the node you just connected to the symbolic Ethernet name chosen for that network. Select the network name from the pull-down.

**Figure 16. Associate a physical card/port with a symbolic network name**




**Step 7.** Repeat this procedure for each card/port, until you have assigned each physical port to one of the symbolic names chosen for your public networks. Click **Finish**.

# CONFIGURING NETWORKS, ENTERPRISE AND SINGLE SERVER EDITIONS

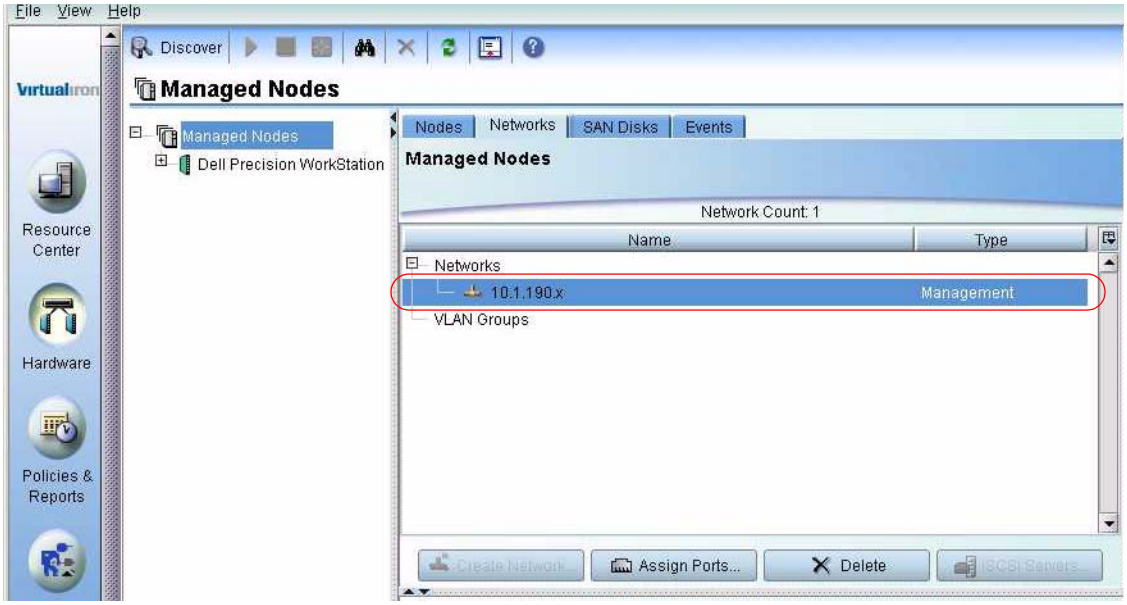
This section describes how to configure Ethernet and iSCSI networks, and how to configure Ethernet ports to support multiple VLANs. It contains the following sections.

- Configuring Ethernet Networks
- Configuring iSCSI Connectivity
- Configuring VLANs

## Default Management Network, Enterprise Edition

Virtual Iron Enterprise Edition (EE) requires that you manage system nodes over a dedicated Ethernet network, instead of a public network. The dedicated management network is detected and displayed for you. By default, the name of this network is its class C IP address. The type of this network is **Management.** See example in Figure 17**.**

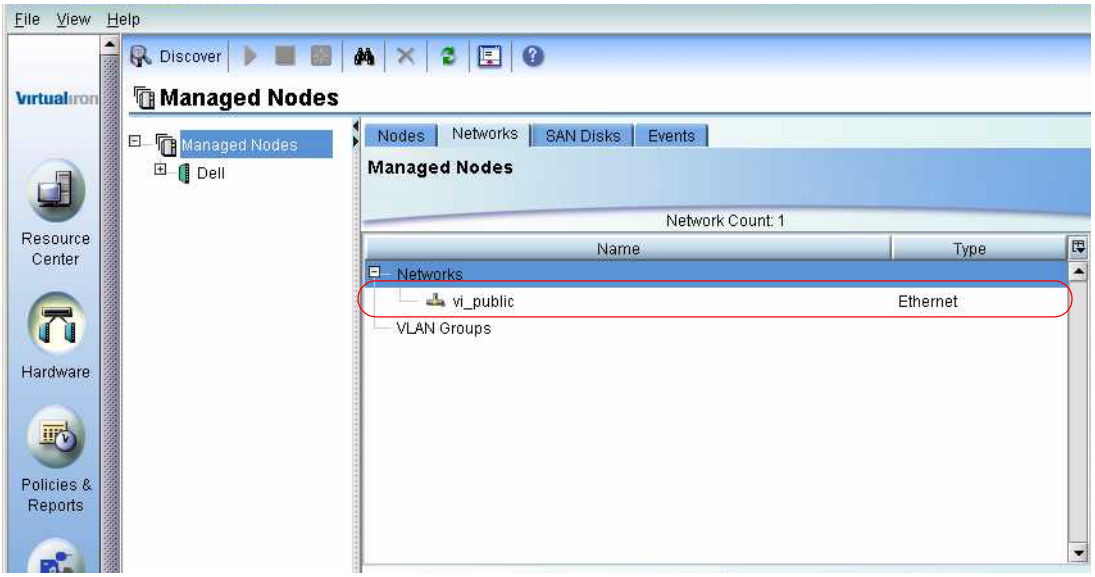
**Figure 17. Initial Network, Configuration - Enterprise Edition**



## Default Public Network, Single Server Edition

If you are using Virtual Iron Single Server Edition (SSE), you are managing a single server over a public network. In this case, the name of this network is **vi_public**. The network's type is Ethernet. An example is shown in Figure 18.

**Figure 18. Initial Network, Configuration - Single Server Edition**



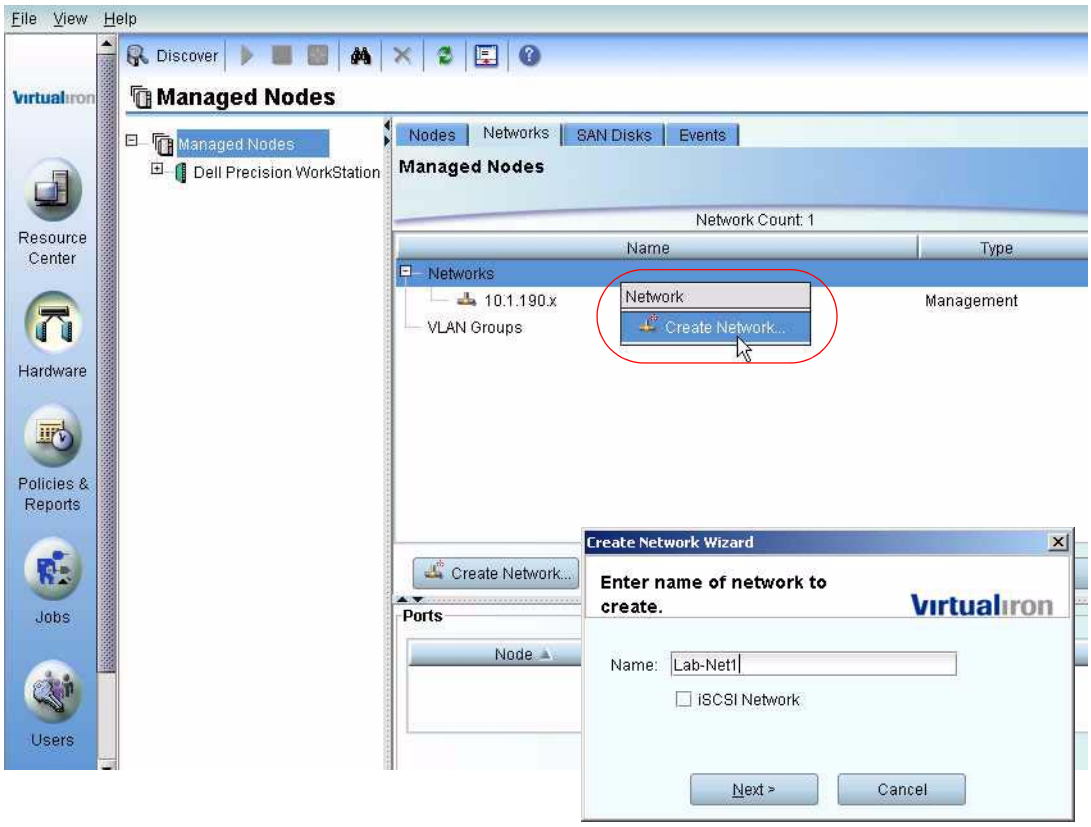
## Configuring Ethernet Networks

To configure Ethernet networks, proceed as follows.

**Step 1.** In the Hardware view, select the **Networks** tab.

**Step 2.** Select and right click **Networks**, and choose **Create Network...** from the pop-up menu as shown in Figure 19.

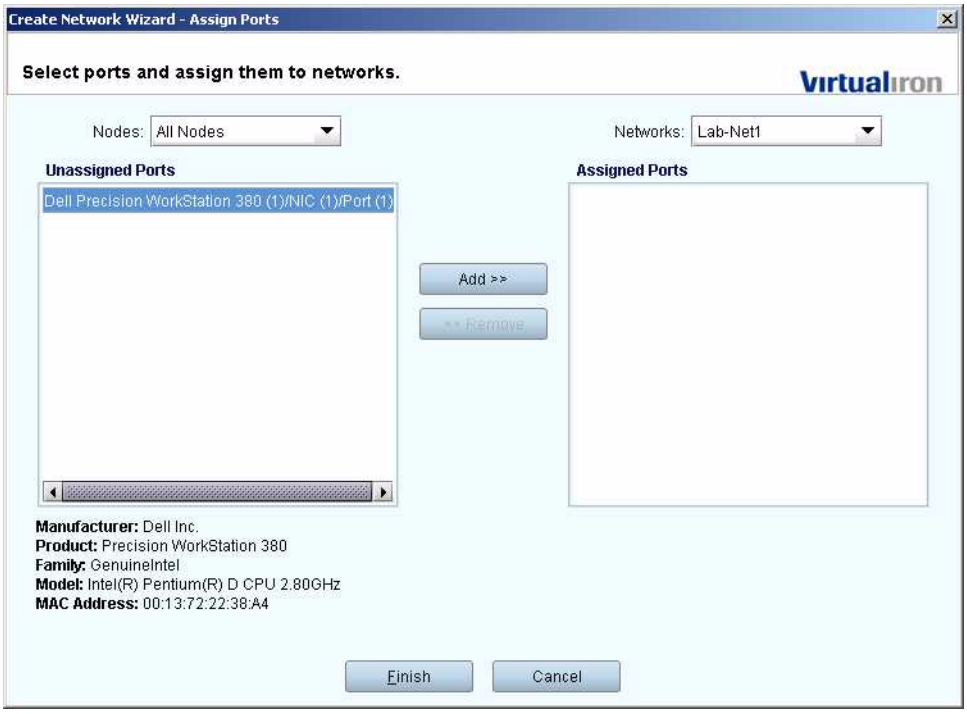
**Figure 19. Configuring Ethernet Networks**




**Step 3.** In the **Create Networks** dialog box, enter a name for the network. At this point, you can designate the network as iSCSI by clicking on the iSCSI button. See Configuring iSCSI Connectivity for more information. Click **Next>>**.

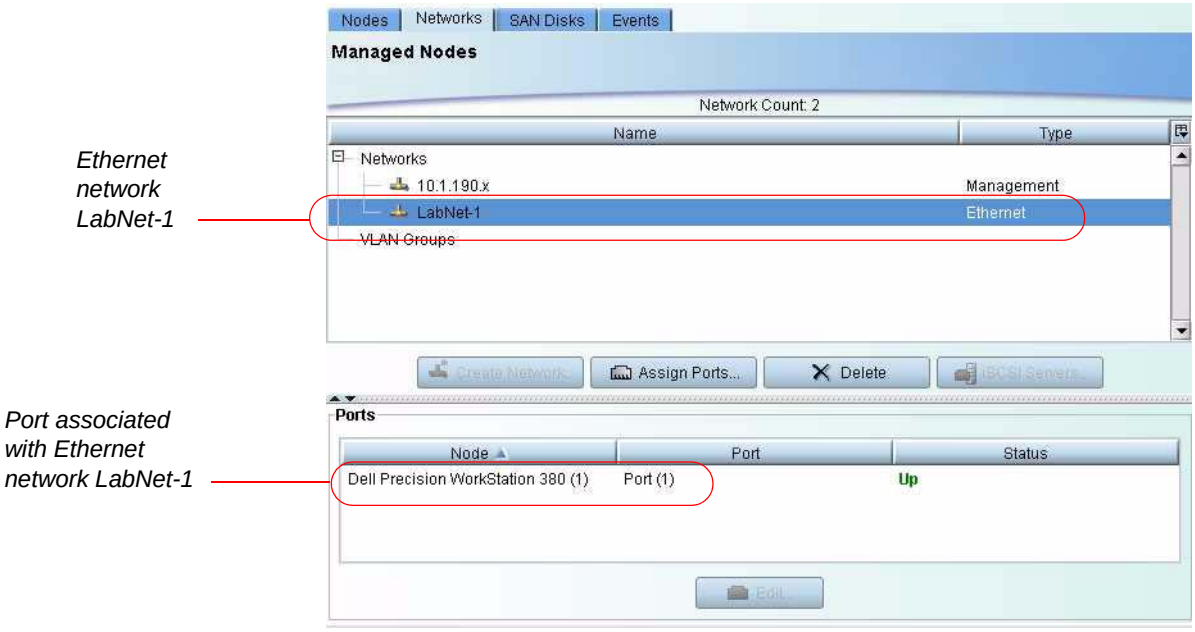
**Step 4.** The Assign Ports window shown in Figure 20 appears. Select a port in the **Unassigned Ports** pane and then click **Add>>**. The port moves to the **Assigned Ports** pane on the right. Click **Finish** when all ports are assigned.-

**Figure 20. Assigning Ports to Networks**




The Ethernet network you have created appears in the Network tab (Figure 21). Its type is Ethernet. Note that the port you have assigned to the network appears in the **Port** area.

**Figure 21. Configured Ethernet Network and Associated Port**




## Configuring iSCSI Connectivity

Internet SCSI (iSCSI) is an IP-based storage networking standard that allows connection to data storage facilities over local and wide area networks and the internet. Though it runs at lower bandwidth than Fibre Channel networks, iSCSI performs the same basic function as Fibre Channel. However, iSCSI has distinct advantages. Since it runs over Ethernet, it does not require an HBA or other dedicated FC device.

Follow these guidelines when configuring switches fro iSCSI networks:

- The iSCSI storage server needs to be on the same subnet as the network you are connecting from.
- Do not mix iSCSI traffic with other LAN traffic. Use VLANs if necessary to isolate the iSCSI network on a switch.
- Use managed 1 GB switches.
- Set all target, initiator and inter-switch ports to 1 GB full duplex (auto-negotiate OFF).
- Set flow control to AUTO on target, initiator, and inter-switch ports.
- When interconnecting switches, make sure you have sufficient bandwidth connections between switches. Use fiber interconnections or Link Aggregated Groups to provide adequate bandwidth.
- In the case of Cisco 2970, enable Cisco's Spanning-Tree PortFast option.

**Note:** Virtual Iron® recommends that the iSCSI network is on a dedicated network that is not accessible to virtual servers. This assures the security of the storage traffic and better performance.

Virtual Iron® supports iSCSI connections between managed nodes and SAN resources.

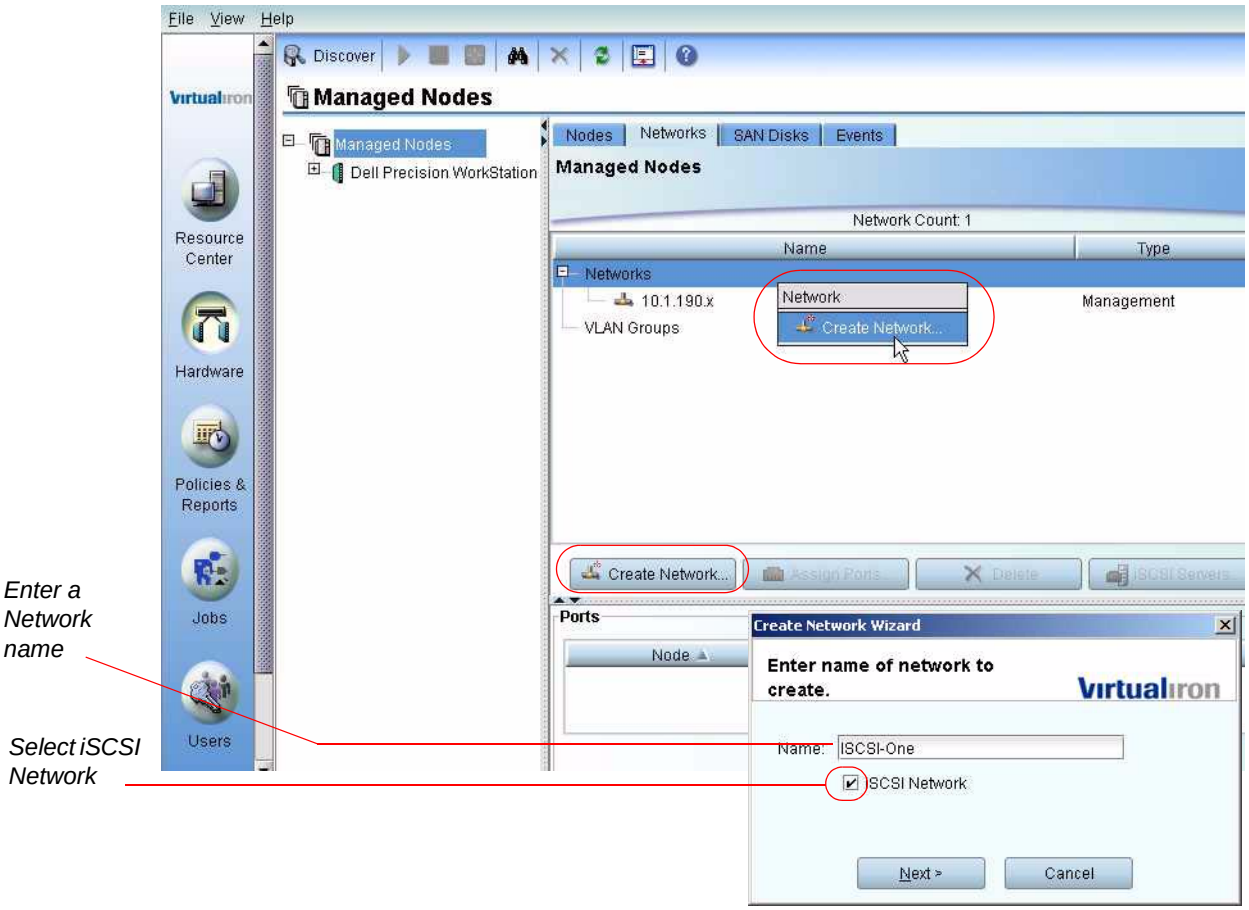
## CONFIGURING AN ISCSI NETWORK AND ADDING ISCSI PORTS

**Step 1.** Click the **Hardware** button. Select the **Networks** tab.

**Step 2.** Select and right click **Networks** and choose **Create Network** as shown in Figure 22, or click the **Create Network** button.

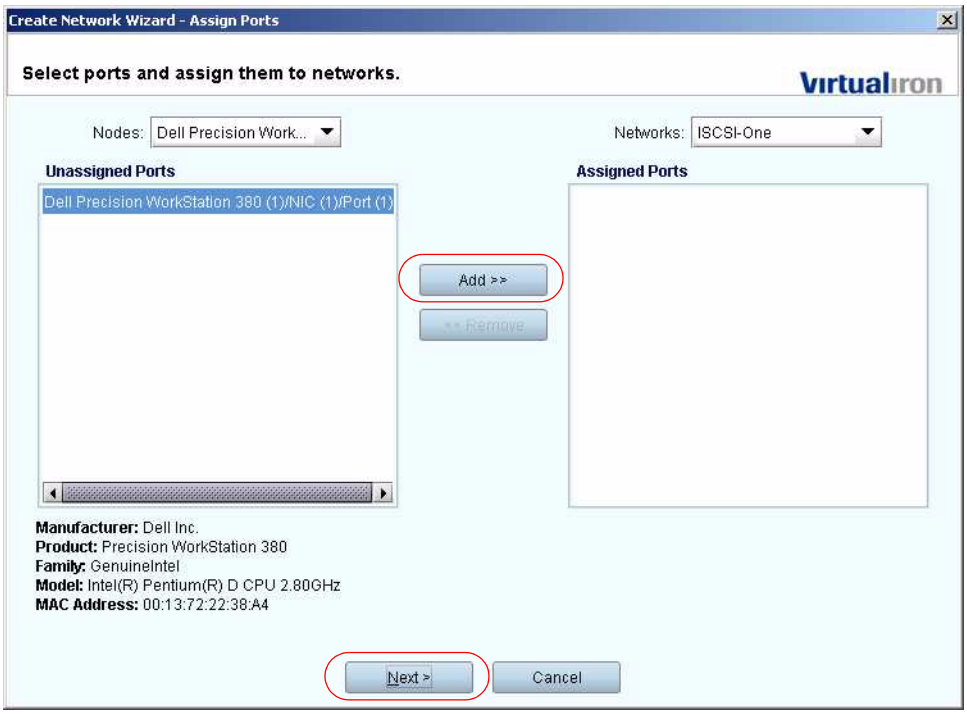
**Step 3.** The Create Network Wizard appears. Check **iSCSI Network** and click **Next>>**.

**Figure 22. Configuring iSCSI Connections**



**Step 4.** The Assign Ports window shown in Figure 23 appears. To assign a port to the iSCSI connection, select the port in the **Unassigned Ports** pane and click **Add>>**. The port moves to the **Assigned Ports** pane on the right. Click **Next** when you have finished assigning ports.

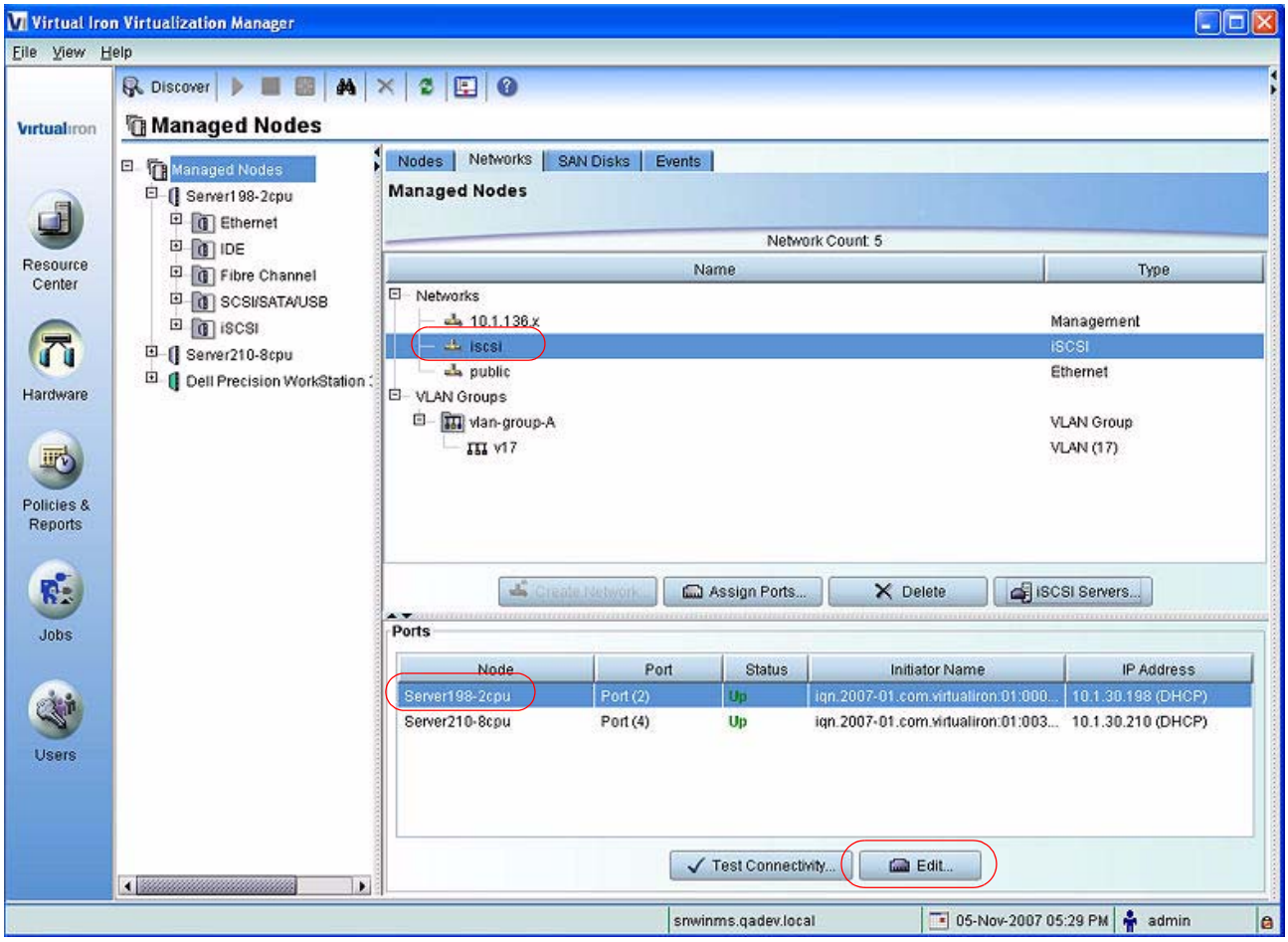
**Figure 23. Assigning Ports to iSCSI Connections**



**Step 5.** To change iSCSI port information, click the **Networks** tab and select **iSCSI**. See Figure 24.

**Step 6.** In the **Ports** section of the window, click the **Edit** button.

**Figure 24. Editing iSCSI Port Information**



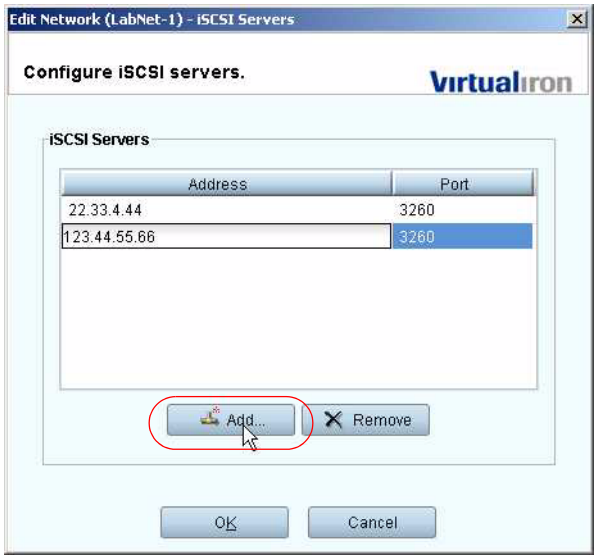
**Step 7.** The Edit iSCSI Port window appears as shown in Figure 25.

**Figure 25. Adding iSCSI Port Information**

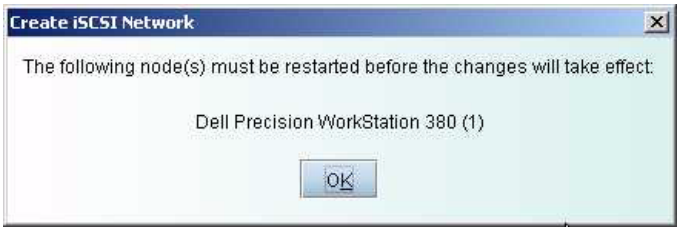

By default, DHCP is used to configure the IP address of the iSCSI port. An initiator name is provided by Virtualization Manager. You can use this window to assign a new initiator name, and/or a static IP address and mask. After making all changes, click **OK** to accept the changes and close the Edit window. Then click **Next>.**

**Step 8.** Use the window that appears next to add the IP addresses of the iSCSI servers reachable on this connection. See Figure 26. Add an alternative connection port for iSCSI servers as needed. Click **Add** to add a new connection, and key in the IP address. Click **OK** when finished.

**Figure 26. Adding iSCSI Server Information**




**Step 9.** The system displays the following message, indicating that you need to reboot the node that owns the iSCSI port you have configured:




In addition, this node is placed in a warning state, indicated by a yellow icon.

After rebooting the node, the iSCSI configuration is complete.

## Configuring VLANs

Virtual Iron supports multiple Virtual LANs (VLANs) on the same port. Each VLAN is essentially an independent logical network operating with other VLANs over the same physical connection.

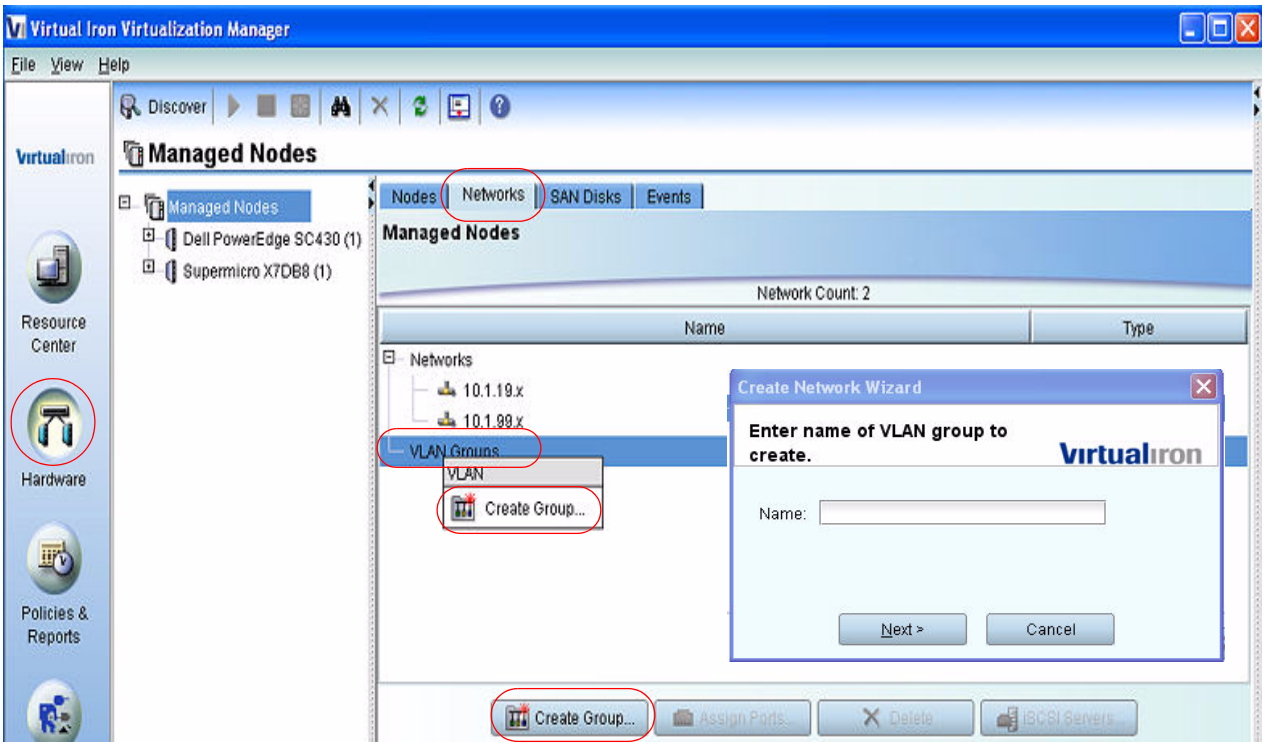
Configuring VLANs involves creating one or more VLAN Groups, each of which can house multiple VLANs. Each VLAN is assigned a distinct VLAN identification. The VLAN ID is used by an attached VLAN switch to segregate traffic among the different VLANs operating on the same link. Once a VLAN is configured, it functions exactly like a separate physical connection.

It is important to coordinate VLAN configuration with the administrator of attached VLAN switches, so that appropriate VLAN IDs are assigned to the VLANs you configure.

**Step 1.** In the **Hardware** view, select the **Networks** tab.

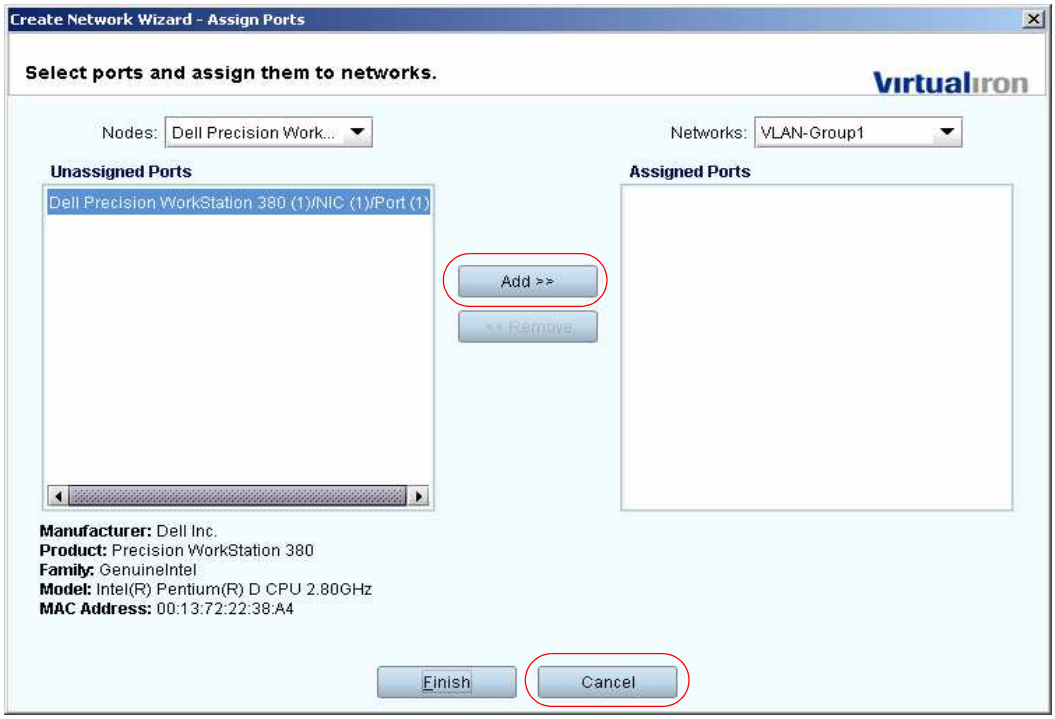
**Step 2.** Select **VLAN Groups**. Right-click your selection and choose **Create Group...** from the pop-up menu as shown in Figure 27, or click the **Create Group** button.

**Figure 27. Configuring VLAN Groups**



**Step 3.** Enter a name for the VLAN Group in the **Create Network Wizard** and click **Next>>**. The **Assign Ports** window shown in Figure 28 appears. To assign a port to the VLAN Group, select the port in the **Unassigned Ports** pane. Then click **Add>>**. The port moves to the **Assigned Ports** pane on the right. Click **Finish** when you have finished assigning ports.

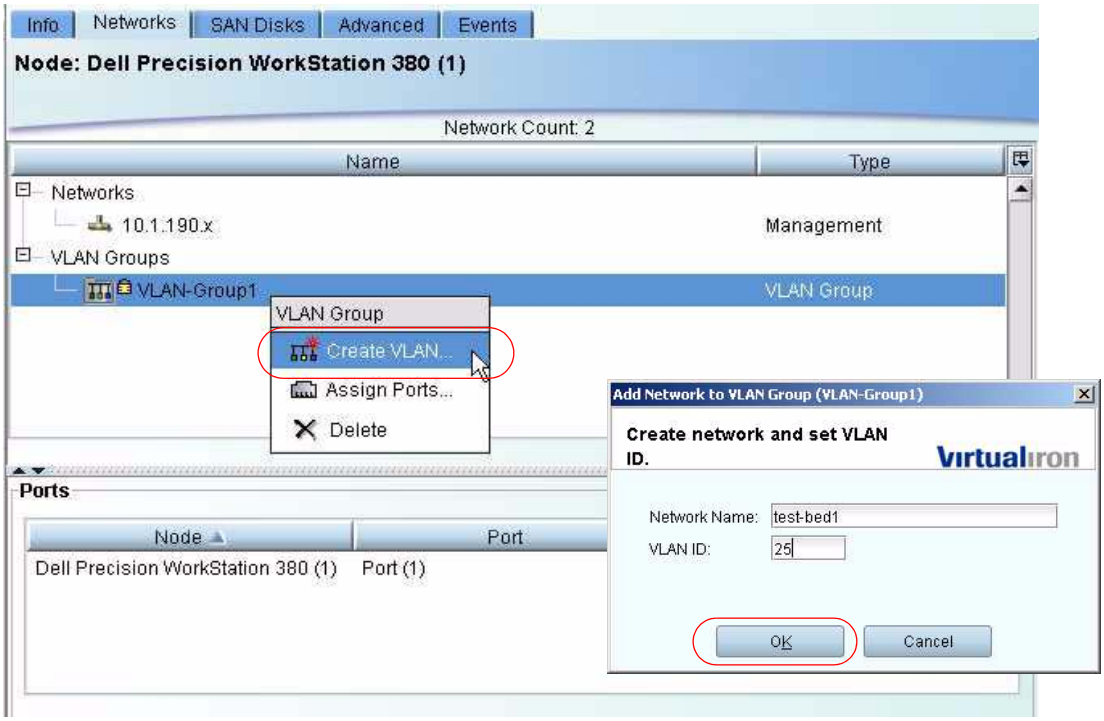
**Figure 28. Assigning Ports to a VLAN Group**




**Step 4.** Select the VLAN group you have created and choose **Create VLAN** from the pop-up window as shown in Figure 29. Add the name of the VLAN connection, and a VLAN ID. VLAN IDs must be in the range of 2 to 4095.

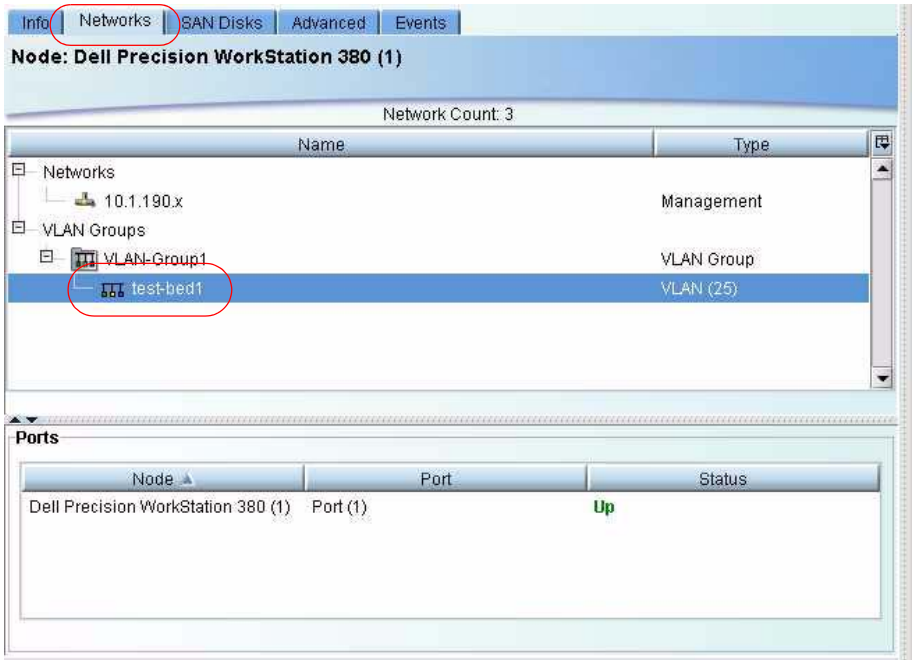
Click **OK**.

**Figure 29. Create VLAN**




**Step 5.** The VLAN Group and VLAN you have created appear in the network window as shown in Figure 30. Repeat this process to add additional VLANs as required.

**Figure 30. VLAN Created**



# CREATING A FAILOVER NETWORK

To protect your network in the event of a failure, you can bond any two physical Ethernet ports in the same node so that they represent a single logical interface. The two ports show the same hardware MAC address.

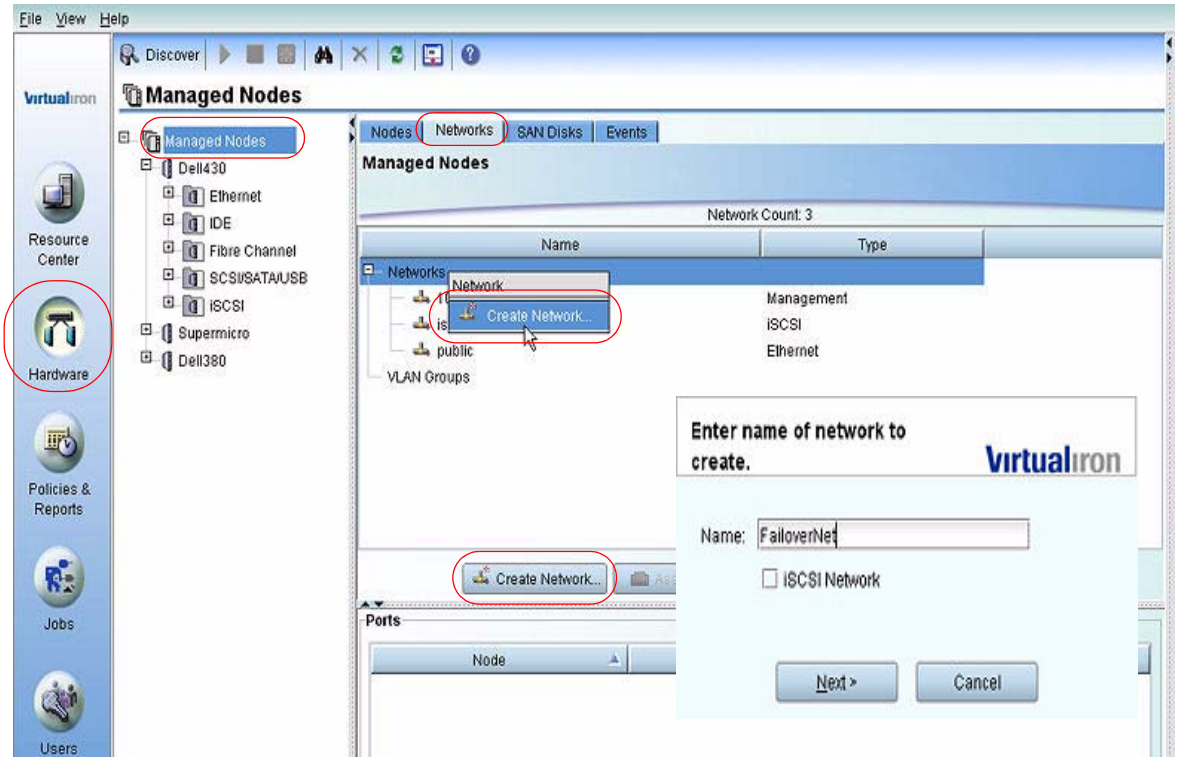
- Failover is not currently supported for iSCSI networks.
- You can bond a maximum of only two Ethernet ports.

You can configure network failover bonds for both Ethernet networks and VLANs.

**Step 1.** Click the **Hardware** button and select the **Hardware** tab. See Figure 31.

**Step 2.** Select **Networks**, right click and select **Create Network**, or click the **Create Network** button.

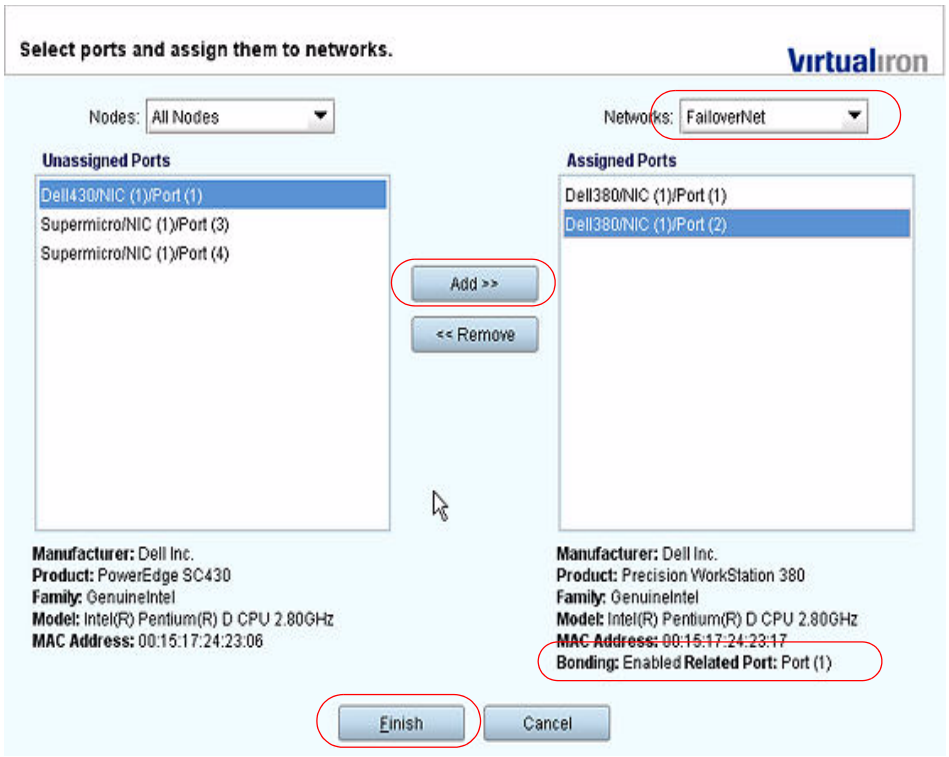
**Figure 31. Create Network Selections**




**Step 3.** In the pop-up window, enter a name for the failover network.

**Step 4.** Select the ports you want to bond for failover from the Unassigned Ports list. Click **Add**. Note that once you have assigned the ports, information related to the bonded ports appears at the bottom of the Assigned Ports list. See Figure 32.

**Figure 32. Assign Bonded Failover Ports**




**Step 5.** Click **Finish** to bond the two ports.

**Step 6.** Add your network to your virtual server. See Configuring Ethernet Networks.

# 4

# USING ADMINISTRATION MANAGER®

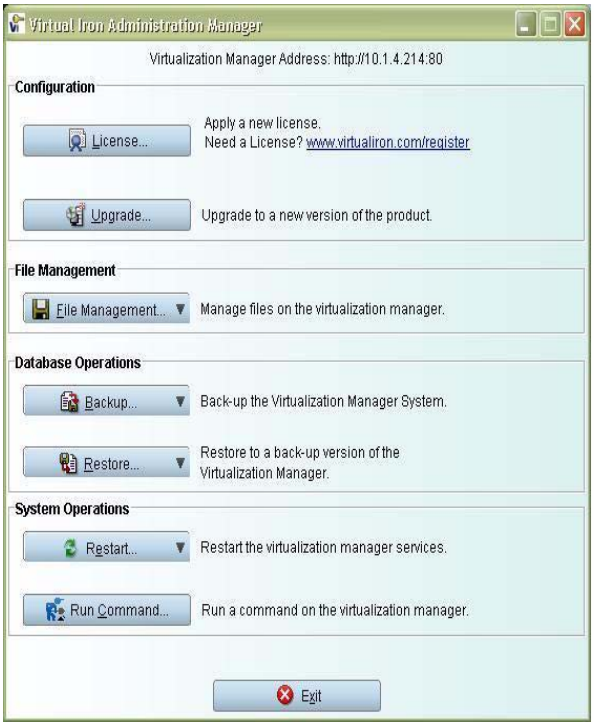

Using the Administration Manager ..... 63
Reviewing Which Features You Are Running ..... 64
Receiving a New License for Additional Features ..... 64
Upgrading to a New Version of Virtual Iron ..... 64
Put/Get Files on the Virtualization Manager ..... 64
Backing up the Virtualization Manager Database ..... 66
Restoring to a Backup Version of the Database ..... 66
Restarting Virtualization Manager Services ..... 67
Reloading Virtualization Manager ..... 67
Running a Command on Virtualization Manager ..... 68

## ABOUT THE ADMINISTRATION MANAGER

The Virtual Iron® Administration Manager application is available from the product launcher page. The Administration Manager presents different controls for the Single Server and Enterprise Editions of Virtual Iron®. Currently, only the Single Server Edition supports **Upgrade**, **Restart** or **Run Command** from the Administration Manager. Figure 33 shows the controls available for each version of Virtual Iron®.

**Figure 33. Administration Manager, Single Server and Enterprise Editions**

**Single Server Edition**




**Enterprise Edition**

# USING THE ADMINISTRATION MANAGER

The Virtualization Manager Administration Manager provides access to a number of key tasks. These include:

- Receiving a New License for Additional Features
- Upgrading to a New Version of Virtual Iron (SSE only)
- Put/Get Files on the Virtualization Manager
- Backing up the Virtualization Manager Database
- Restoring to a Backup Version of the Database
- Restarting Virtualization Manager Services (SSE only)
- Reloading Virtualization Manager (SSE only)
- Running a Command on Virtualization Manager (SSE only)

Access the Administration Manager from the product launcher page as shown in Figure 34. This figure shows the controls that appear in the Single Server Edition. When you launch the Administration Manager, you are prompted for your Admin user name and password. Use the name and password you chose during installation.

**Figure 34. Administration Manager**

## Reviewing Which Features You Are Running

To review the Virtual Iron features you are currently running, see Accessing License Information.

## Receiving a New License for Additional Features

If you want to purchase additional features, contact your Virtual Iron Sales Representative. You will receive a new license file (vi.license) via email. The new feature set is activated upon your acceptance of the new license; you do not have to reinstall Virtual Iron software.

## Upgrading to a New Version of Virtual Iron

If **Update Manager** (see File Menu in Using Virtualization Manager®), notifies you of an upgrade, visit Virtual Iron's website for upgrade instructions and documentation links.

http://www.virtualiron.com/services/

If you are using Virtual Iron® Single Server Edition (SSE), you may use the **Upgrade** option, as shown in Figure 34 to upgrade to a new version of the product.

---

**Note:** After an upgrade, it is a best practice to delete all previous versions of Virtualization Manager. From your computer's **Start** menu, select **Run**, and enter **javaws -viewer**. Delete all previous versions.

---

## Put/Get Files on the Virtualization Manager

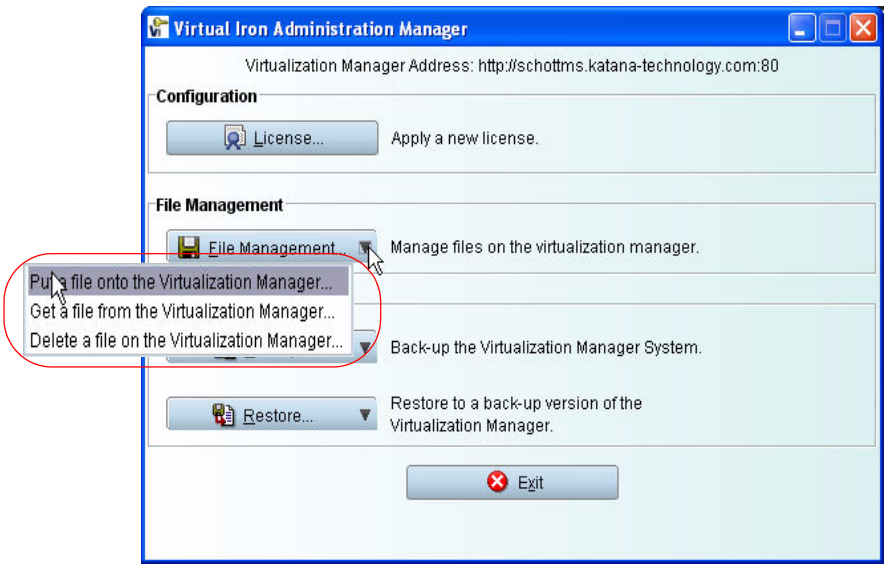
To move files to and from Virtualization Manager, bring up the Administration Manager and click the down arrow to choose **Put a file...** or **Get a file...**, as shown. For example, you can move an iso to the NBD (Network Block Device) directory on Virtualization Manager, making this image available for booting by virtual servers.

---

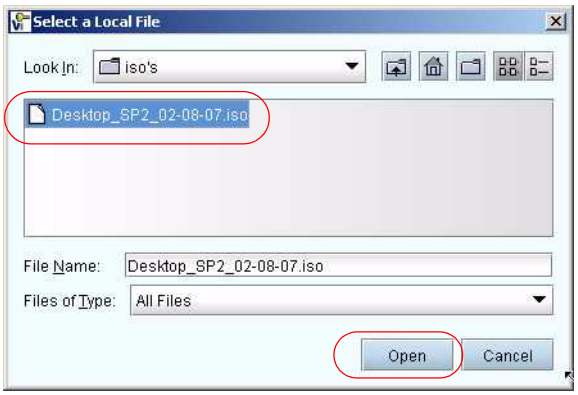
**Note:** When performing put or get operations, proceed with caution. Administration Manager does not warn if moving a file will overwrite a file in either the source or destination directory.

---

**Figure 35. Put, Get, Delete Options in VI Administration Manager**




Browse the folders on your system to find an appropriate ISO image. Click **Open** as shown.



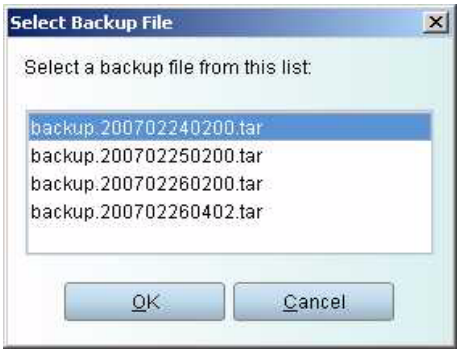

Choose a destination directory on the Virtualization Manager server for the iso, and click **Save**. *Do not enter a file name in the file name field.*

## Backing up the Virtualization Manager Database

Choose **Backup** to create a backup of the current database. When the backup operation completes, you are informed of the filename as follows.


## Restoring to a Backup Version of the Database

Choose **Restore** to restore a backed up database. You are provided with a list of available backup copies to choose from.




**Note:** If you are running Virtual Iron® Enterprise Edition, Restore is not supported in the Administration Manager. See Restoring the Configuration Database for instructions on restoring a backed-up system.

## Restarting Virtualization Manager Services

If you are using Virtual Iron® Single Server Edition (SSE), use this option to restart Virtualization Manager's services. Restarting these services automatically disconnects all clients connected to the management server. All data in the database remains intact.

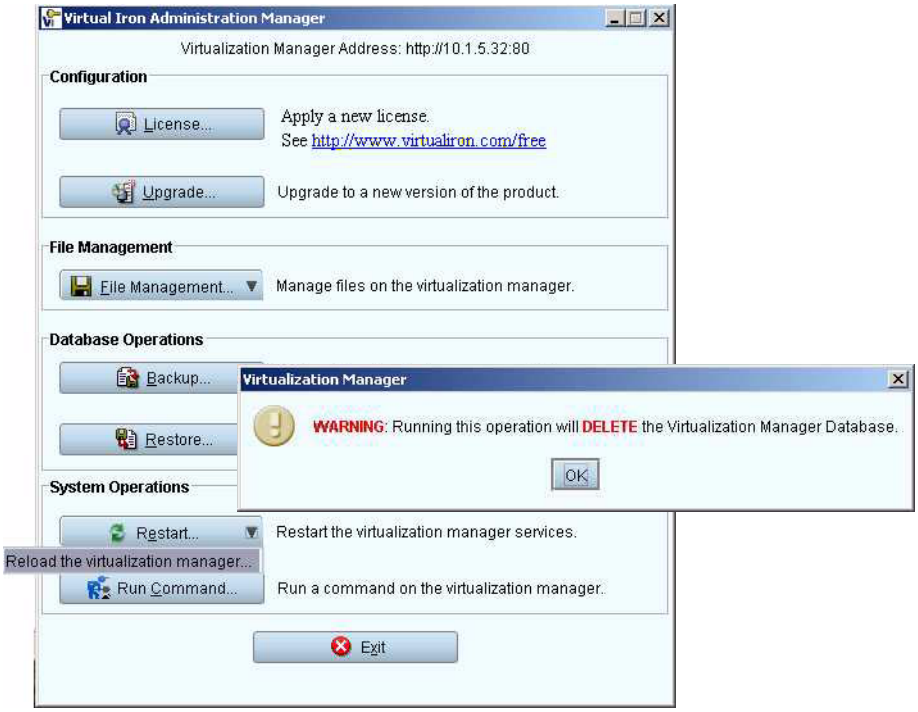

## Reloading Virtualization Manager

Use the **Reload** command if you want to delete the current management server database and start with a new database. Access **Reload** from the **Restart** button as shown:

---

**Note:** ***Information deleted from a database can not be recovered***. Take this action with caution and under special circumstances. When you attempt to **Reload**, a warning appears. To proceed, click **OK**. To cancel, close the warning dialog.

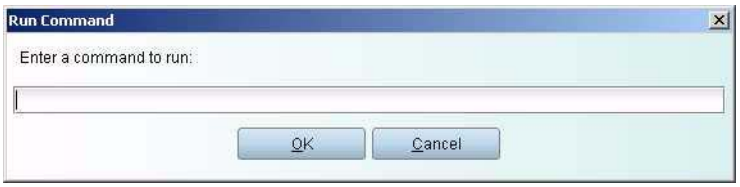
---



## Running a Command on Virtualization Manager

If you are using Virtual Iron® SSE, use the **Run Command** option to run a command on the Virtualization Manager server.

**Note:** The ability to run commands on the management server is provided for advanced debugging purposes. It is not intended for day-to-day operations. This command requires familiarity with the UNIX operating system.



5

# USING VIRTUALIZATION MANAGER®

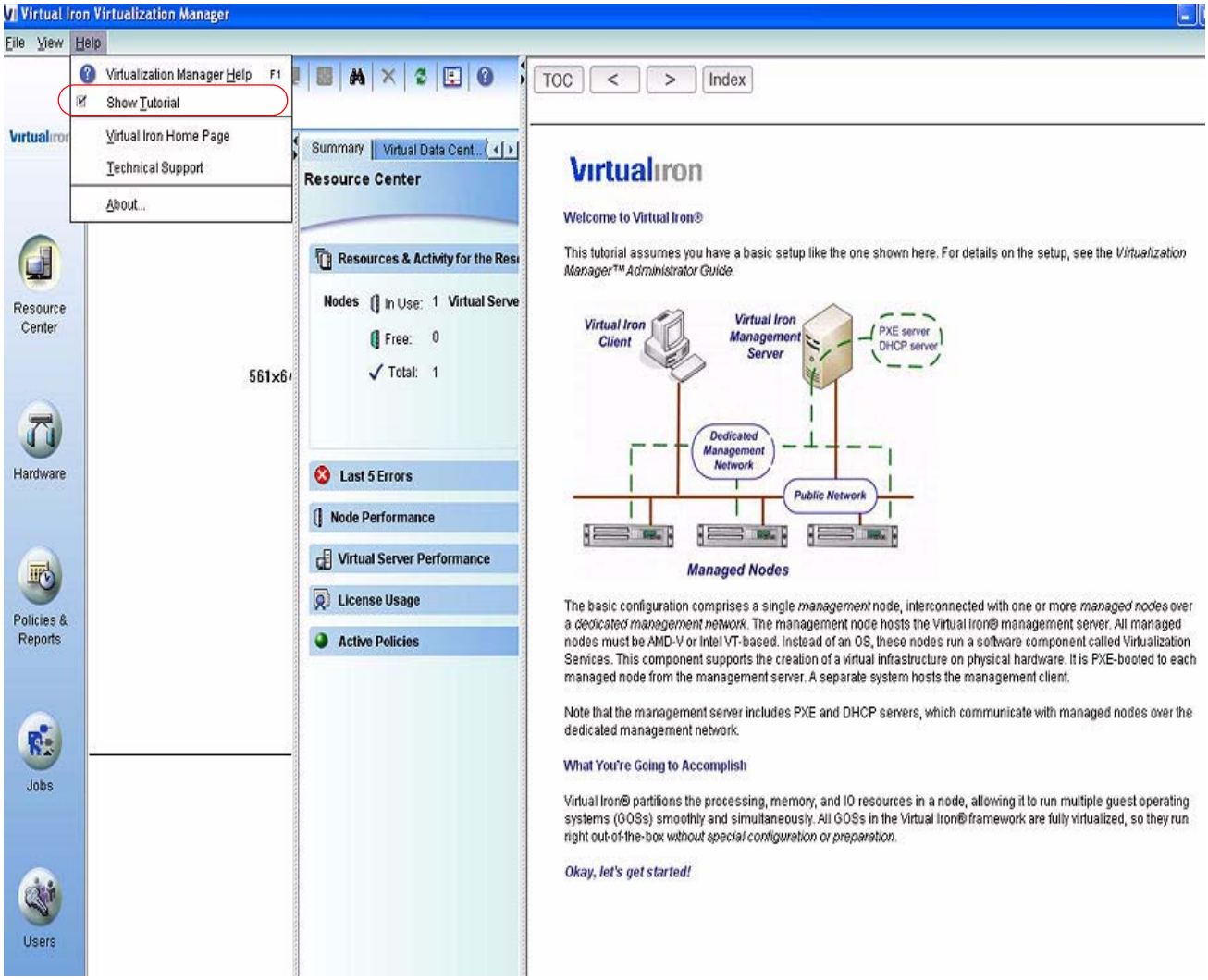

Using the Integrated Tutorial ..... 70
Virtualization Manager Overview ..... 71
Using the Pull-down Menus ..... 72
Using the Application Toolbar ..... 76
Using the Navigation Tree ..... 82
Using the Action Toolbar ..... 84
About the Jobs Framework ..... 85
Performing Job Operations ..... 88

# USING THE INTEGRATED TUTORIAL

Virtual Iron® includes a tutorial that opens when you first connect to Virtualization Manager. The tutorial provides a high-level look at the product, with instructions on how to configure and start a virtual server.

The tutorial takes about 10 minutes and provides an introduction to the design of the management framework and the controls that make up the client interface. You can open or close the tutorial at any time by clicking the **Show tutorial** check box on the **Help** pulldown (see Figure 36).

**Figure 36. Open the Tutorial**



# VIRTUALIZATION MANAGER OVERVIEW

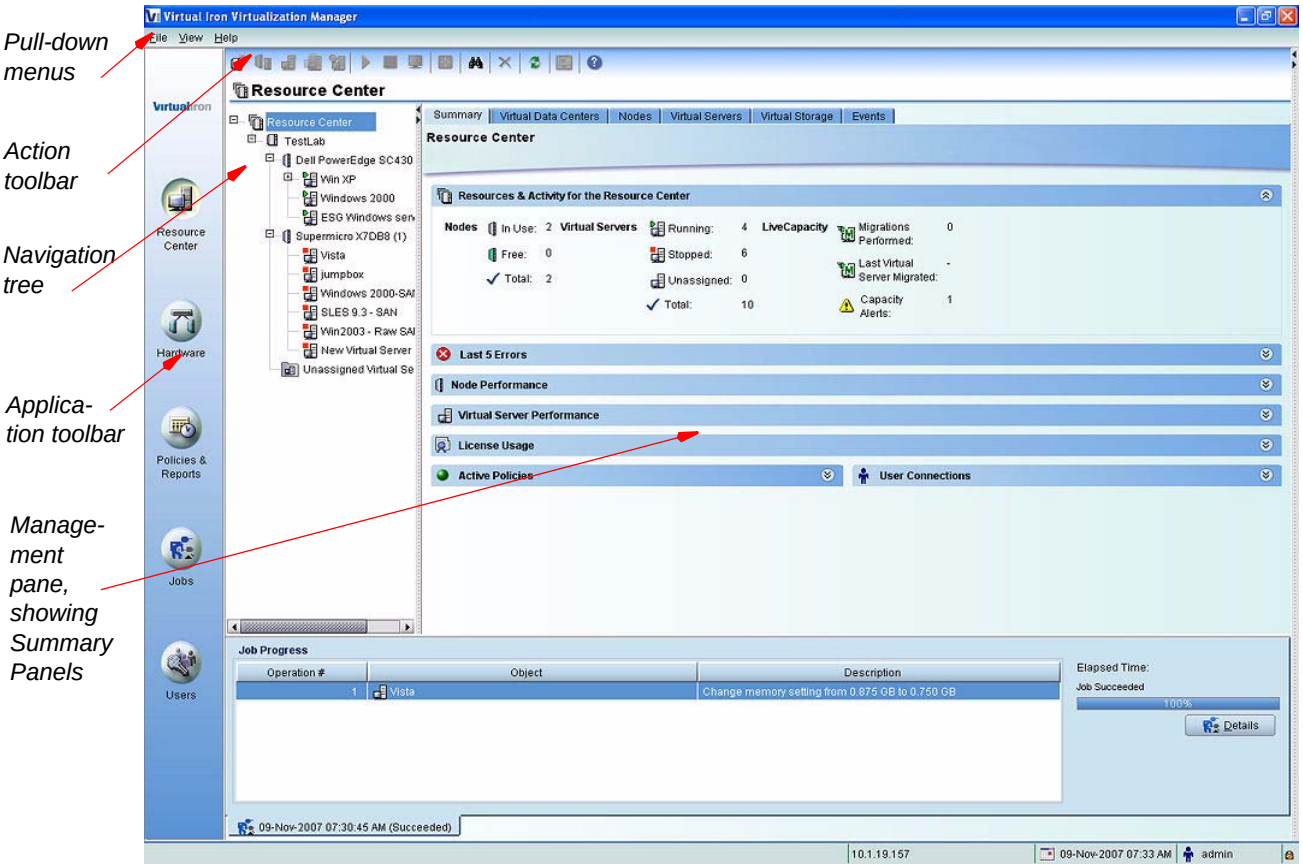
Installing and configuring Virtual Iron® creates a *virtualization environment* in which to create and manage *virtual servers* on a set of *managed nodes*. Management for this environment is provided by Virtual Iron® Virtualization Manager™, a transaction-based framework that consists of Virtualization Manager, an integrated database, and a web-based management user interface.

The Virtualization Manager client provides a set of work areas, buttons, pull-down menus, and tabs for access to various functions and configuration screens. The client organizes these controls in five areas (see Figure 37):

- Pull-down menus
- Application toolbar
- Navigation tree
- Action toolbar
- Management pane and Summary panels

The sections that follow describe each set of controls and their relationship to one another. Using the integrated tutorial is the best way to familiarize yourself with the product.

**Figure 37. Overview of Client Design**



# USING THE PULL-DOWN MENUS

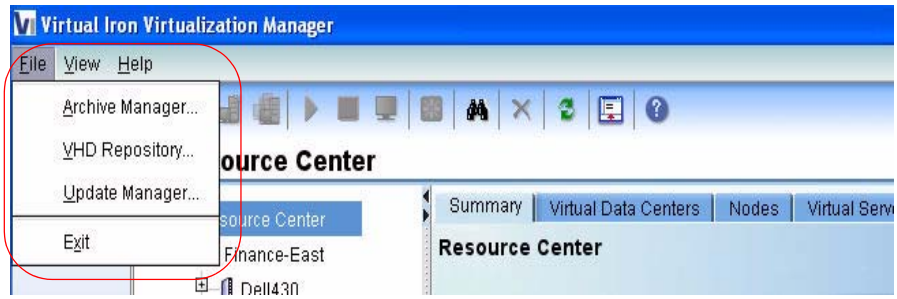
Virtualization Manager contains a set of standard pull-down menus which are discussed briefly in the sections that follow. Some functions (**Break-locks...** and **Verify Database...** for example) are explained in detail in Performing Administrative Tasks.

**Figure 38. Pull-down Menus**


## File Menu

Use the File menu to manage your archives, import or export hard drive images, and configure software update notifications.

**Figure 39. File Menu Options**



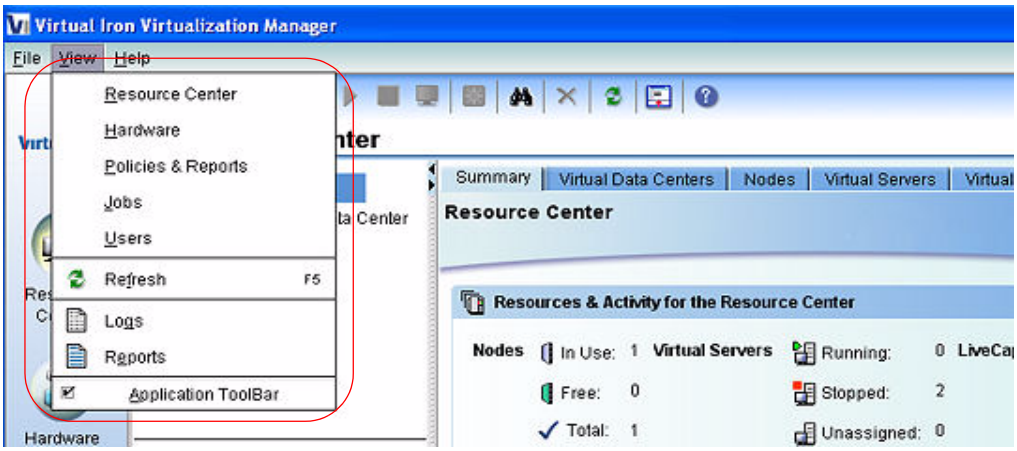

The File menu supports the following:

- **Archive Manager**—Moves all jobs and associated events that are older than a specified date to a location in the Virtualization Manager database. See Configuring the Archive Manager.
- **VHD Repository**—Imports or exports a virtual hard drive image to or from the Virtualization Manager VHD repository and your local computer. See VHD Repository.
- **Update Manager**—Virtualization Manager checks, according to a period you specify, whether there is a new version available for download. If there is, you are notified via email. Allows monthly, weekly, or immediate notification of Virtual Iron software updates.
- **Exit**—Exits Virtualization Manager and closes the client user interface.

## View Menu

Use the View menu to hide or show the Application Toolbar, refresh screen data, or access logs and reports.

**Figure 40. View Menu Options**




- The first group of options in this menu open the same views as the icons on the toolbar. If you choose to hide the toolbar, use this menu to access the screens associated with the **Resource Center**, **Hardware**, **Policies & Reports**, **Jobs**, and **Users** options. See Using the Application Toolbar.
- Click **Refresh** to update the client UI with the latest information from the Virtualization Manager database.
- Click **Logs** for access to node logs. These can be useful to Virtual Iron® customer support.
- Click **Reports** for an index of all reports stored in the database. See Report Types for information on generating reports.
- Deselect **Application Toolbar** to hide the Application toolbar (the set of icons just below the pull down menus).

## Help Menu

The Help menu contains links to documentation, Virtual Iron technical support, and licensing information.

- **Virtualization Manger Help**—Select this option or press the **F1** key to open Virtual Iron Online Help, the electronic version of the *Virtual Iron System Administrator Guide*.
- **Show Tutorial**—The *Virtual Iron Tutorial* takes you through the steps for setting up a virtual server. Check or uncheck the box in the menu to open or close the tutorial.

- **Virtual Iron Home Page**—This option is a link to Virtual Iron's website. Of particular interest is the **Services and Support** option, which contains links to the following:
  - Product documentation
  - A searchable knowledge base
  - Compatibility and requirements lists
  - Other support resources, such as upgrading and conversion procedures and access to Virtual Iron forums and blogs
  - Professional services
- **Technical Support**—This option provides a login window for email correspondence with technical support personnel.
- **About**—This option opens the About Virtualization Manager window which contains tabs for viewing the current software version, licensed and unlicensed features on your system, and an end-user license agreement. Information concerning licensed features is described in more detail in the next section.

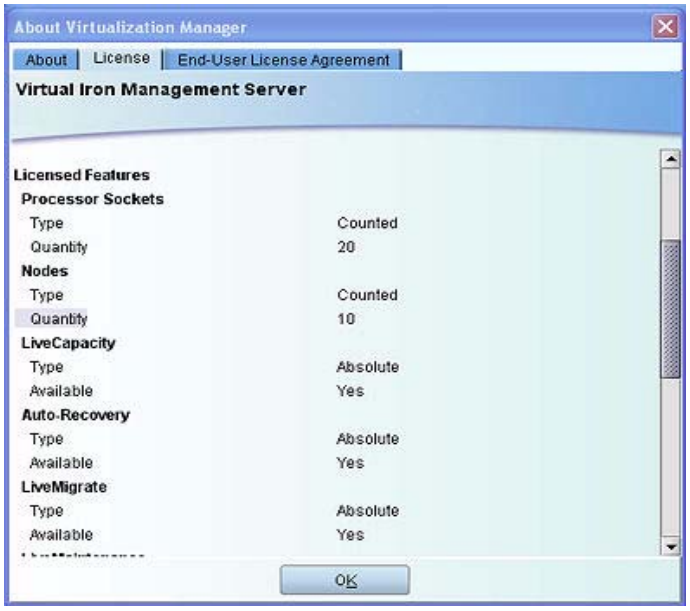
## Accessing License Information

Each Virtual Iron® license supports a specific number of sockets that may contain a single-core or multi-core CPU. Each license allocates 10 MAC (Media Access Control) addresses for each socket. The MAC addresses are associated with virtual NICs (VNICs). During VS configuration, VNICs are assigned to VSs to enable them to connect to distinct subnets.

### DETERMINING WHAT YOUR LICENSE SUPPORTS

To determine which features you are currently running, and the number of supported sockets, choose **Help > About**. Select the **License** tab as shown in Figure 41.

**Figure 41. Virtual Iron Management Server Licensed Features Window**




The Virtual Iron Management Server window displays information pertaining to your system, including your account number, The number of sockets in use, the management server's MAC address, and the features you are currently licensed, or not licensed, to use.

---

**Note:** In this context, each *socket* houses a processor: a single chip that contains one or more cores. Each *core* consists of one or more execution units, and a set of shared execution resources (such as cache and I/O).

---

To obtain additional features, contact your Virtual Iron representative.

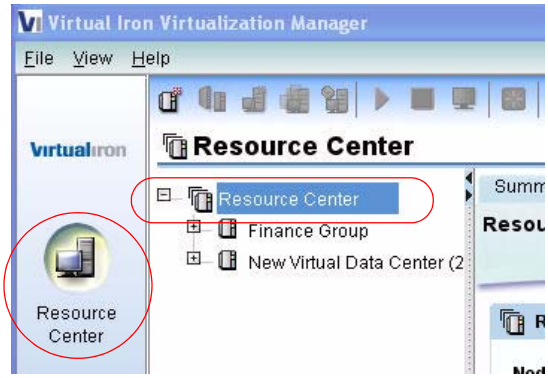
# USING THE APPLICATION TOOLBAR

The Application Toolbar buttons define the functional areas for operations performed in the Virtual Iron® framework.

## Resource Center

Click **Resource Center** in the Application toolbar to manage virtual data centers (VDCs), managed nodes, and virtual servers. It is in the Resource Center that you create VDCs, assign managed nodes to VDCs, and then create and configure virtual servers on the nodes. Resource Center is the top-level object in the navigation tree. A sample of the tree is shown in Figure 42.

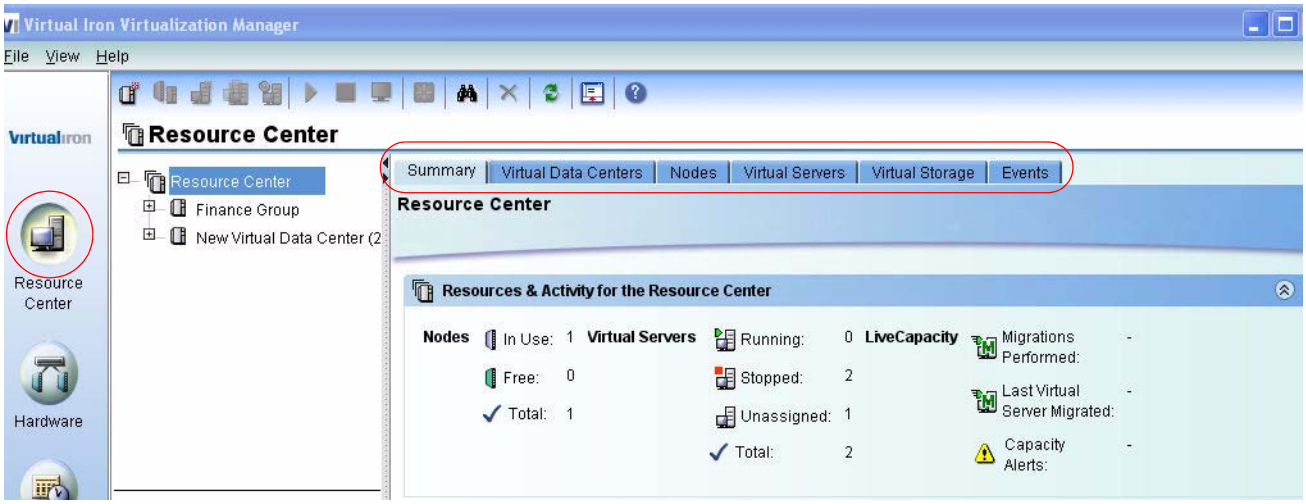
**Figure 42. Resource Center, Selected in Navigation Tree**




### RESOURCE CENTER TABS

Click the tabs in the Resource Center management pane to configure and provide information on nodes, VDCs, and virtual servers. Click the **Events** tab for information on all objects in the Resource Center. See Figure 43.

**Figure 43. Resource Center Tabs**

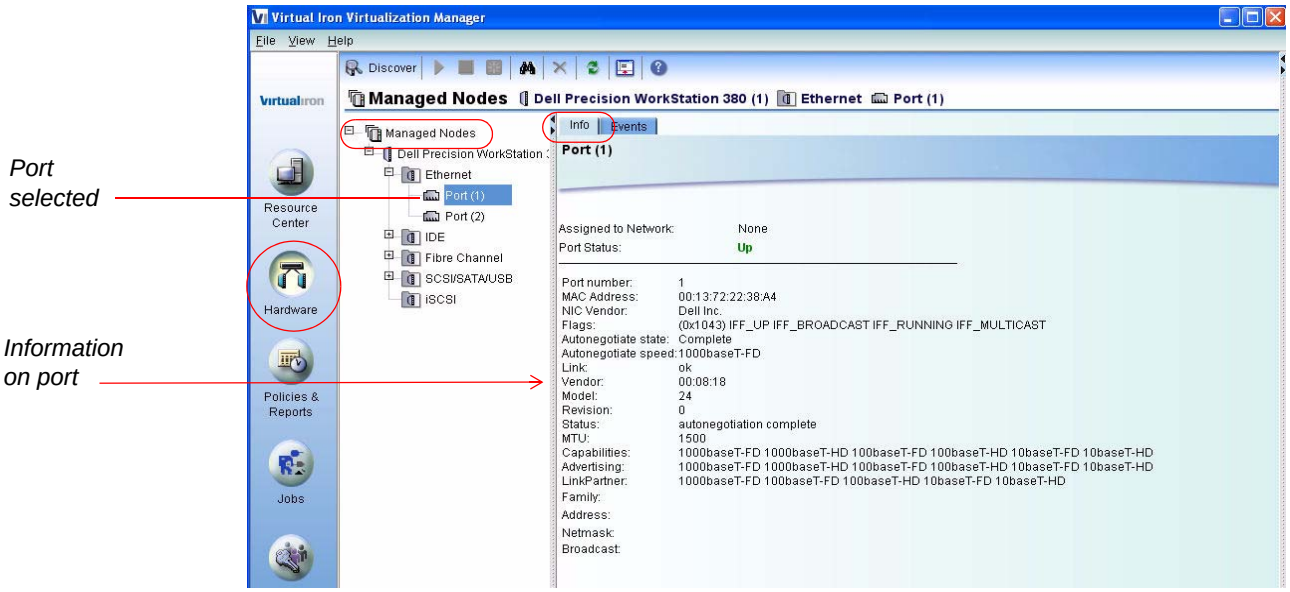


## Hardware

Click **Hardware** in the Application toolbar for information on *managed nodes* and their components, and to configure these components.

Figure 44 shows a sample display of the Hardware view with two nodes, tst111 and tst119. Each of these nodes has an Ethernet card, CD ROM drive, and a Fibre Channel card. In this case, an Ethernet port is selected. Information on the card is displayed in the **Info** pane.

**Figure 44. Hardware View, Ethernet Port Selected**




## Policies and Reports

When you click **Policies and Reports** in the Application toolbar, options for Reports, User Policies, and System Policies are listed in the navigation tree. The Policies and Reports pane shows which policies are configured and scheduled. Note the Policy Key in the title bar, which indicates status.

Select from the options to configure policies that affect virtual servers in the environment or to generate reports according to criteria you specify. Note that for some reports you may choose either HTML or CSV (comma separated values) for the output format.

### REPORTS

- **EventReport**—Use the tabs associated with this option to set the frequency, date range, and event type to be reported: Informational, Warning, or Error.
- **JobReport**—Use the Summary pane to set the frequency or date range for a report that shows all jobs performed during that period.

- **NodeReport**—In the Summary pane, specify report criteria for all nodes or specific nodes in the virtual data center. In addition, you can apply these criteria to all or a selected virtual data center, and whether the report output is applied to groups, volumes, or virtual disks.
- **VirtualDisksReport**—You may select various combinations of specific types and states of virtual disks. You may choose to limit output to groups, volumes, or virtual disks.
- **VirtualServerReport**—You may select various combinations of criteria for virtual servers from all or a specific virtual data center.

### USER POLICIES

Configure these policies to alert a user of specific events, configure criteria for rebooting selected nodes, or scheduling backups.

- **EmailNotifier**—Set up email notification for specified users whenever a specified node, virtual server, or virtual data center experiences a specified event category.
- **RebootDataCenter**—Use this option to set reboot rules for all data centers or each data center.
- **SystemBackup**—Use this option to set the location for a backed-up Virtualization Manager database, and the number of backups to retain.

### SYSTEM POLICIES

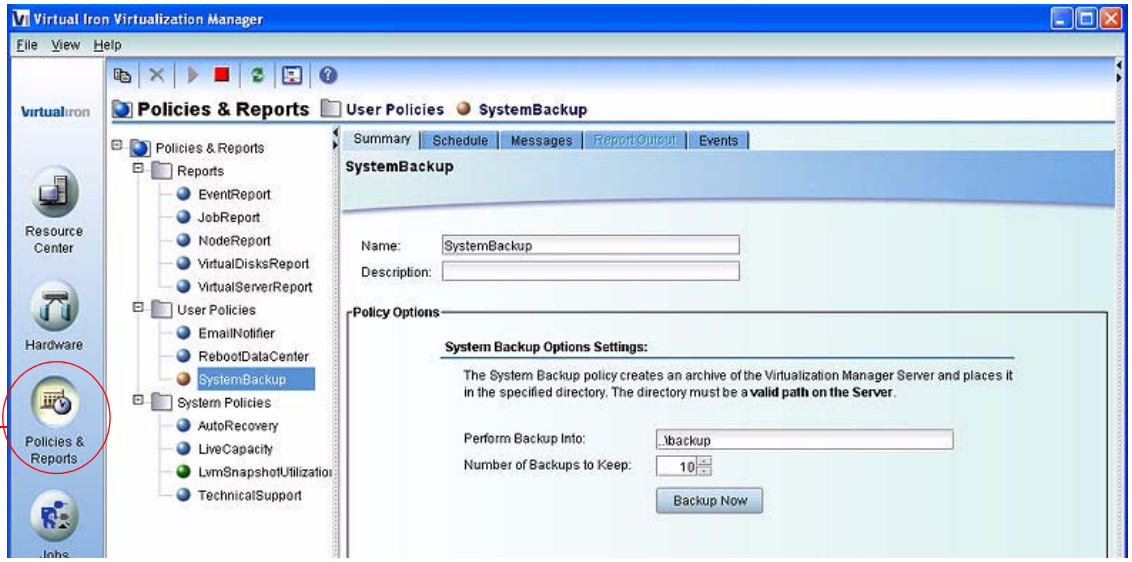
System policies apply to the environment as a whole.

- **LiveRecovery**—**LiveRecovery™** provides high availability for virtual servers by automatically moving them to a new physical server if their managed node fails.
- **LiveCapacity**—LiveCapacity™ optimizes virtual server use across a shared pool of resources. It automatically moves running virtual servers to a new physical server in a VDC if any of the servers exceed a specified CPU threshold for a fixed period of time.
- **LvmSnapshotUtilization**—The snapshot utility provides hot backup of logical disks and virtual servers. The snapshot is linked to but independent from the original entity, and uses only a fraction of the parent's logical disk size.
- **TechnicalSupport**—Select this option to access Virtual Iron Technical Support via email.

Figure 45 shows a sample of the Policies and Reports area. See About Policies and Reports for more information.

**Figure 45. Policies and Reports View**

*Configure policies, generate reports*



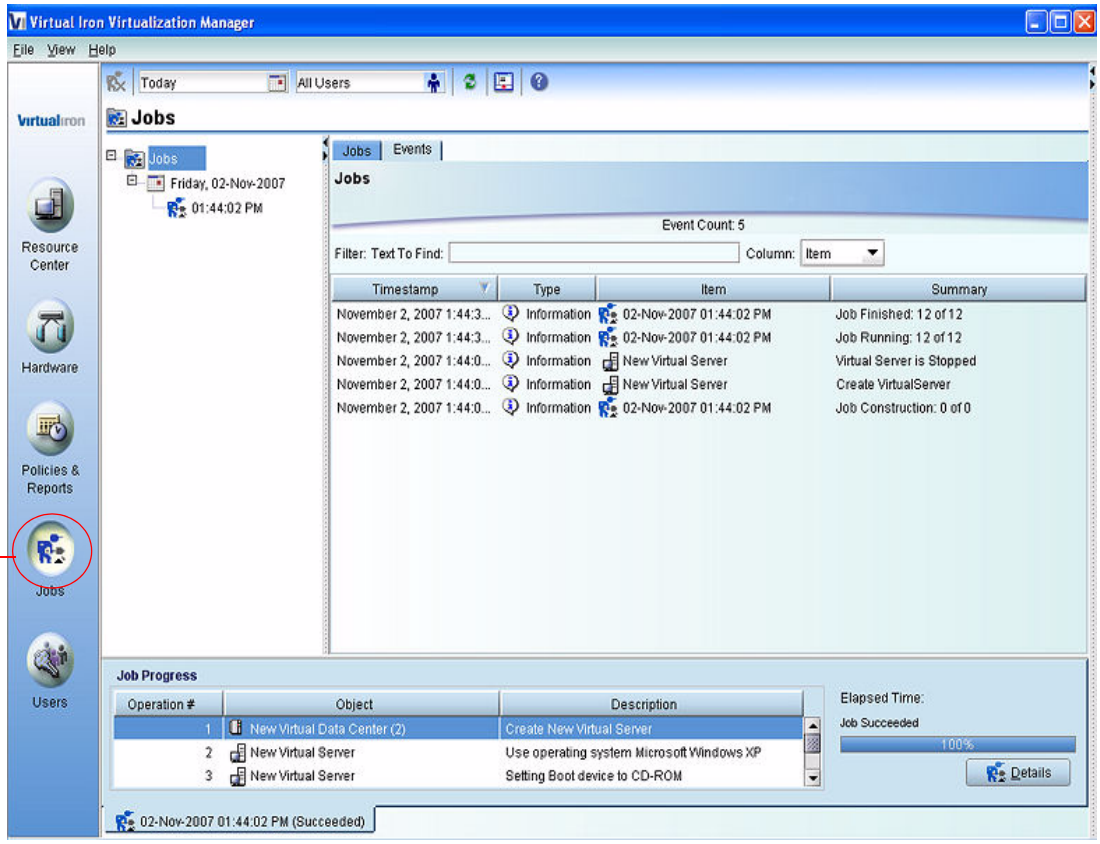

## Jobs

Click **Jobs** in the Application toolbar for information on current and past tasks that have been completed in the environment. A job is a set of one or more operations made within the environment that have been entered to the Virtual Iron® database. Examples of operations include:

- Adding or deleting a user
- Adding, renaming, or deleting a VDC or VS
- Reconfiguring a VS (for example, increasing or decreasing allocated memory, adding processors)
- Discovering physical resources
- Adding, changing, or deleting policies

A sample of the Jobs view is shown in Figure 46.

**Figure 46. Jobs View**

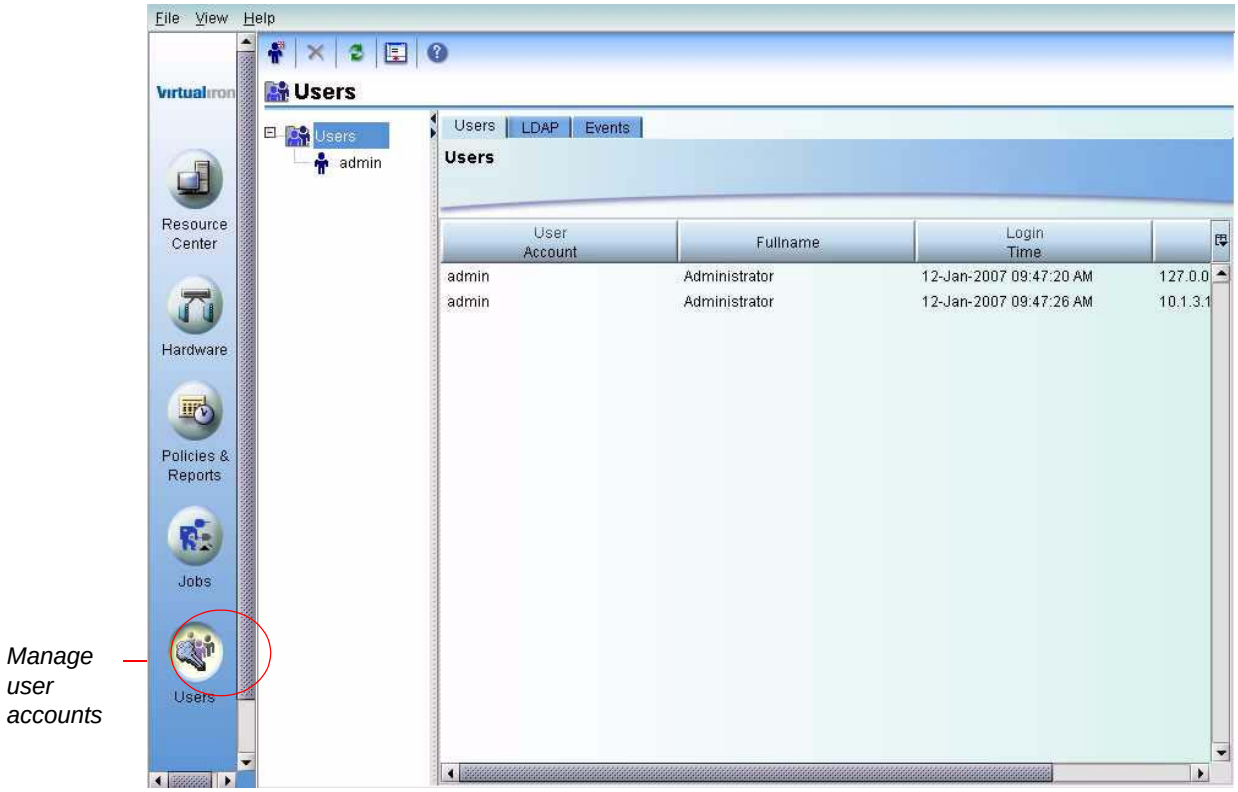



*Get info on jobs*

## Users

Click the **Users** button in the Application toolbar to create and manage Virtual Iron® user accounts. Each user account has a unique name and password.

**Figure 47. Users View**



# USING THE NAVIGATION TREE

The navigation tree shows the relationship between managed objects within the virtualization environment. These objects are both physical and virtual, and include managed nodes (and node components), virtual data centers, and virtual servers created with the software.

The content of the navigation tree changes, depending on the button you click in the Application toolbar.

A sample of the navigation tree for **Resource Center** is shown in Figure 48. This view shows the relationships between Virtual Data Centers (**VDC**), managed nodes, and the virtual servers (**VS**) hosted by those nodes. In this example, **VDC** *Finance East* contains three nodes, named *Dell 380*, *Dell 430*, and *Supermicro*.

**Figure 48. Navigation Tree, Resource Center View**

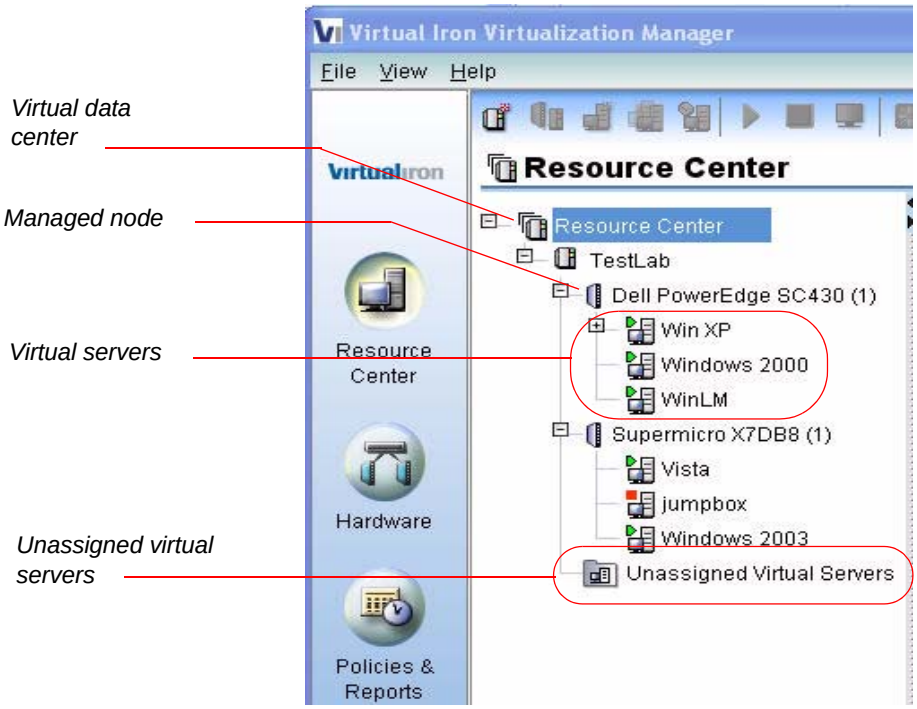
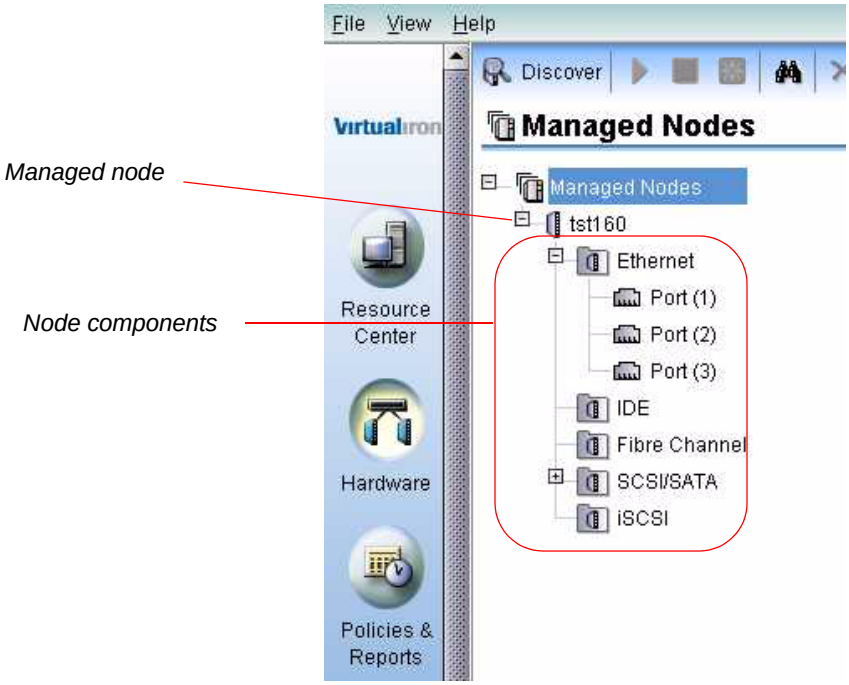


Figure 49 shows a sample navigation tree as it might appear in the **Hardware** view. This view exposes the components of each managed node.

**Figure 49. Navigation Tree, Hardware View**



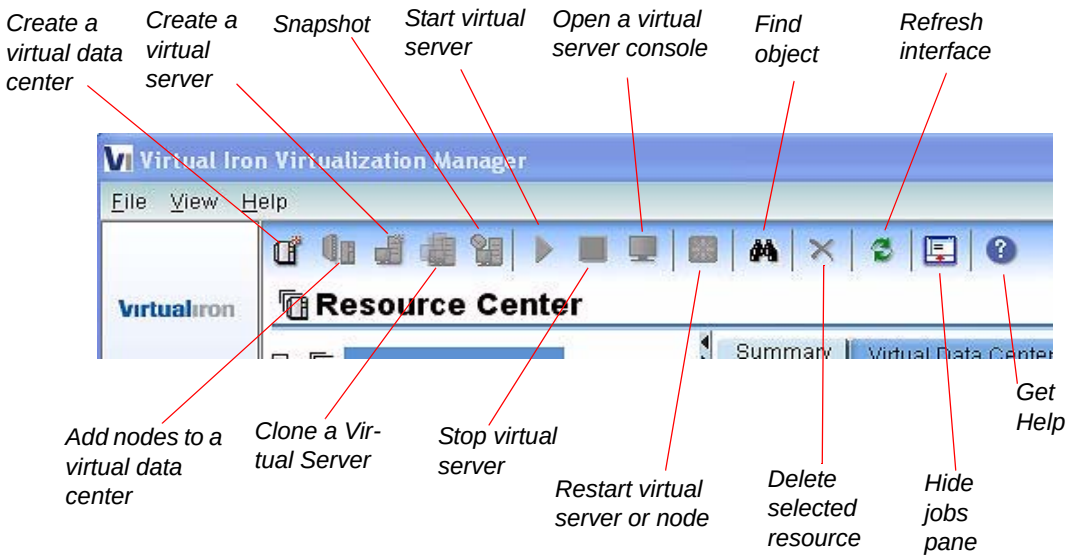
# USING THE ACTION TOOLBAR

The pull-down menus and Action Toolbar are used together to set the context for operations and to perform specific actions in the virtualization environment.The Action Toolbar is positioned just below the pull-down menus. The icons in the Action Tool bar are arranged sequentially to support the work-flow required to create virtual servers. Use the button in the toolbar to create objects in the virtualization environment. Examples include:

- Creating a virtual data center
- Adding a node to a virtual data center
- Creating a virtual server
- Cloning a virtual server
- Getting a snapshot of a virtual server
- Starting a virtual server
- Creating a virtual server console
- Finding an object in the environment

See Figure 50.

**Figure 50. Action Toolbar Icons**



# ABOUT THE JOBS FRAMEWORK

Virtualization Manager uses a Job Operations framework that supports a flexible approach to the reconfiguration of physical and virtual objects.

## Managing in a Multi-User Environment

Virtualization Manager is designed for use in an environment in which a number of users may have access to the same objects. Virtualization Manager maintains an accurate and consistent view of the virtualization environment while users perform separate and simultaneous jobs.

Each configuration change is a *job*—a transaction performed by a single user. The steps that follow describe how resources are locked and released at the start and conclusion of each job.

### WHAT'S IN A JOB?

A job is a configuration change that affects one or more physical or virtual objects. Examples of user operations that can be included in a job are:

- Renaming a virtual data center or other object
- Adding or deleting a virtual data center
- Adding VNICs or to a Virtual Server
- Moving a Virtual Server from one VDC to another
- Deleting a Virtual Server
- Changing the minimum and maximum values for a virtual server's memory and/or CPUs

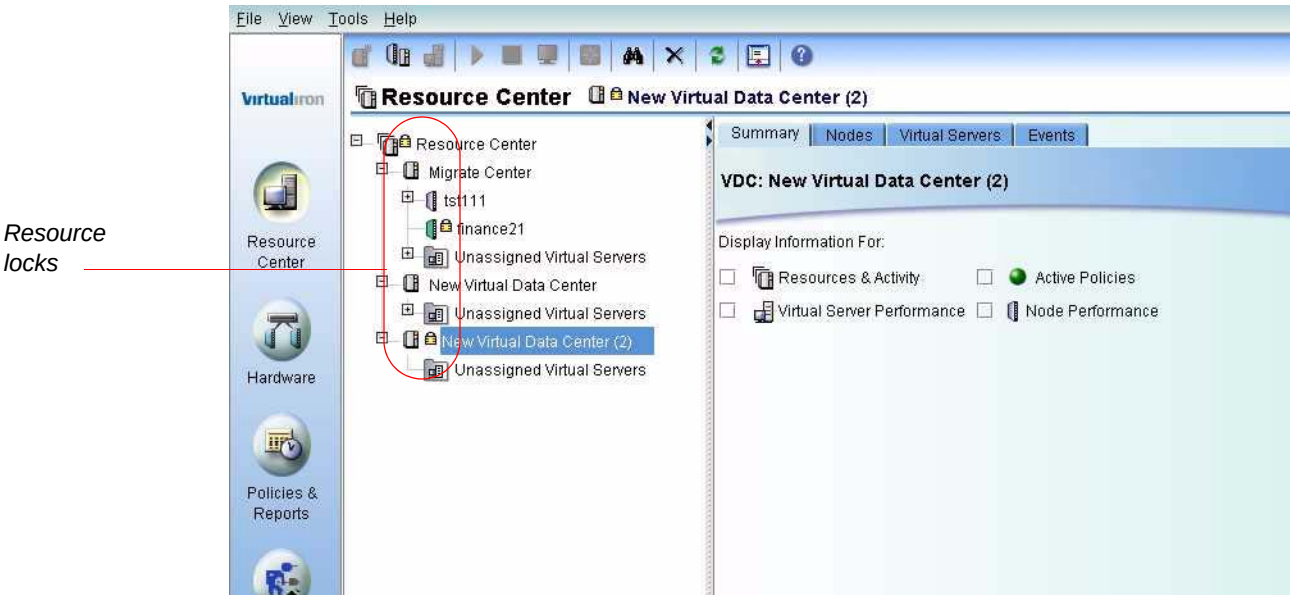
### ACTIONS AND JOB OPERATIONS

A single job can contain one or many individual operations.

The Job Operations framework employs **Resource locks** which appear on the management UI to show that a resource involved in a job is locked until the job completes.

In Figure 51, note the yellow lock icons that mark the resources that are currently included in a job. Until the job completes, these resources are *Under Construction*. While in this state, they cannot be managed by any other user.

**Figure 51. Management UI, Showing Resource Locks**




## Jobs and Resource Locking

Objects involved in a job are locked to all other users in the Virtualization environment until the job is completed or cancelled. Only a user with the same permission level on the object can unlock it. This assures that a consistent and accurate view is maintained for all users.

The state of locked objects cannot be known until the locks are cleared. The state of the virtualization environment is always accurately reflected by the state of objects that are *not* locked.

### LOCKS AND MULTIPLE USERS

The locked state is indicated by a small lock icon which appears in the navigation tree, or in the case of Free or Unassigned nodes, in the drop-down combo boxes accessible via the management pane.

A number of different users may perform jobs simultaneously, provided they are performed on different objects. For example, suppose User A has created *Finance-One* virtual data center and begins a job by moving nodes into another virtual data center. At the same time, User B modifies the resources of *Commodities* virtual data center. Assuming each user is working at the Virtualization Manager™ UI (rather than via an API), each would have a separate job pane for his jobs, and would see the other's objects (as well as his own) as locked. The objects remain locked until the jobs are completed.

Prior to completing a job, a lock can be cleared in two ways:

- By logging out the user who initiated the lock. This action can be performed by the user, or by the virtualization environment administrator.
- By direct action of the virtualization environment administrator.

As a job completes, its progress is shown in the Jobs progress pane. All locks are cleared when a job completes.

## JOB FAILURE AND ROLLBACK

Job operations are validated by the Virtualization Manager as they are added to the Job tab. *The failure of any operation cancels the entire job and all other operations it specifies.* The state of the virtualization environment is rolled back to what it had been prior to the start of the job. All locks in the operation are released.

## JOBS AND EVENTS

When a job operation fails, one or more events may be generated and displayed on the Virtualization Manager™ UI. Events are flagged with yellow icons in the navigation tree. See Job Failure and Rollback.

To get information on failed events, click **Events** in the application toolbar. This displays the Virtualization Manager™ event log.

## JOB STATES

While a Job is in progress, the job tab can have any of the states defined in Table 1.

Table 1. Jobs Tab States

| | Meaning |
|---|---|
| In Progress | A Job is running. |
| Complete | The Job has completed. |
| Failed | The Job has Failed. The virtualization environment has been rolled-back to its previous state and all locks have been released. |
| Aborting | The Job has been Aborted via console Abort command. The virtualization environment has been rolled-back to its previous state and all locks have been released. |

# PERFORMING JOB OPERATIONS

The sections that follow explain how to perform job operations within the virtualization environment™.

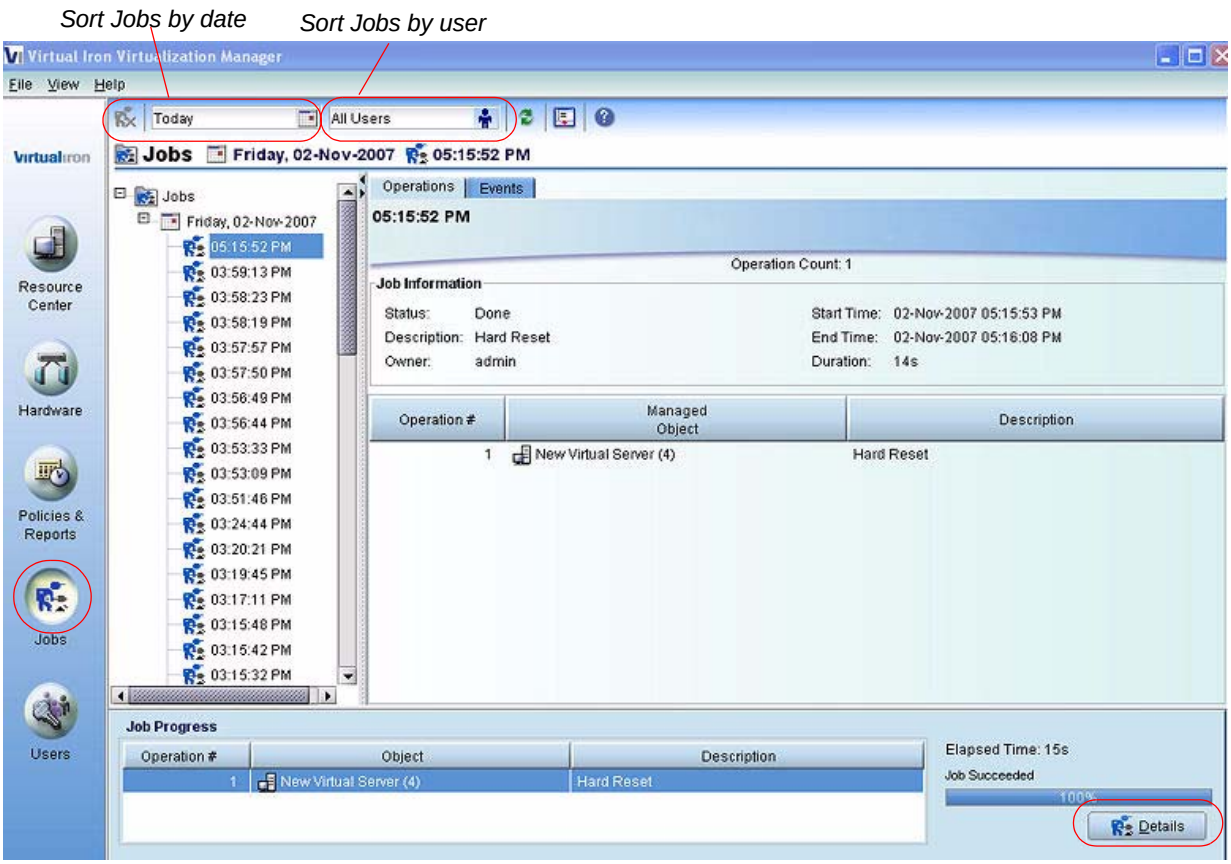
- About the Jobs View
- Starting a Job
- Aborting Jobs
- Determining the Cause of Job Failure
- Closing Job Tabs

## About the Jobs View

The Jobs view provides comprehensive information on all completed, queued (pending), and in-progress jobs in the virtualization environment. The information is compiled in a time-stamped list. Jobs can be sorted and viewed by date or by user.

The jobs view is primarily used to get a global view on jobs, to evaluate information on jobs completed or aborted in the past, or for Administrative users, to cancel a job in progress. Figure 52 shows the jobs view.

**Figure 52. Jobs View: Operations Tab**



## Starting a Job

A job begins when you make any change within the virtualization environment. Each change you make appears in the Job Operations tab as a discrete operation. Job operations can be comparatively minor actions, such as renaming a virtual server. Operations may also have a wider scope, such as the creation of a new virtual data center or virtual server, or the movement of a node from one virtual data center to another.

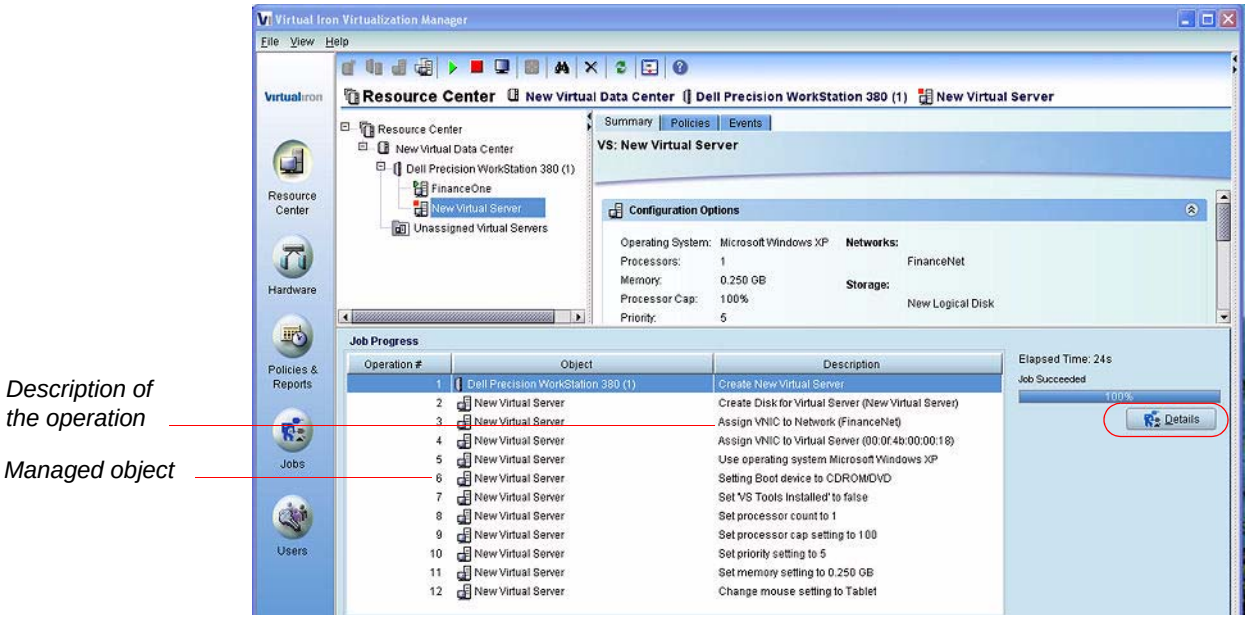
As an example, these actions include:

- Creating virtual data centers
- Creating and renaming virtual servers
- Starting or stopping virtual servers
- Changing virtual server processor or memory settings, or boot parameters

Performing any of these actions changes the configuration of the virtualization environment. This starts a *Job*, and opens a Job Operations tab at the bottom of the management pane to show the job's progress. See Figure 52.

Note that if you click Details, the Jobs view shown in Figure 53 appears.

**Figure 53. Job Operations Tab Containing an Operations Queue**




Note that the nature of each operation is captured in the Description field. The Object field shows the object under management within a numbered operation. These objects are locked until the job completes, or the operation itself is cancelled. Objects are unlocked when a job completes or when a job is aborted. Until an object is unlocked, it cannot be managed by any other user in the virtualization environment.

## Aborting Jobs

Before a job completes, the **Abort** button appears in the Job Progress portion of the window. If you want to cancel a job before it is completed, the Virtualization Manager™ displays a warning message. Click **Yes** to continue with the Abort operation, or **No** to allow the job to run to completion.

If you abort a job, all operations queued in Job Progress roll back to the pre-job state. Note that some job operations such as renaming an object, complete quickly. Others, such as adjusting the memory used by a virtual server, take longer.

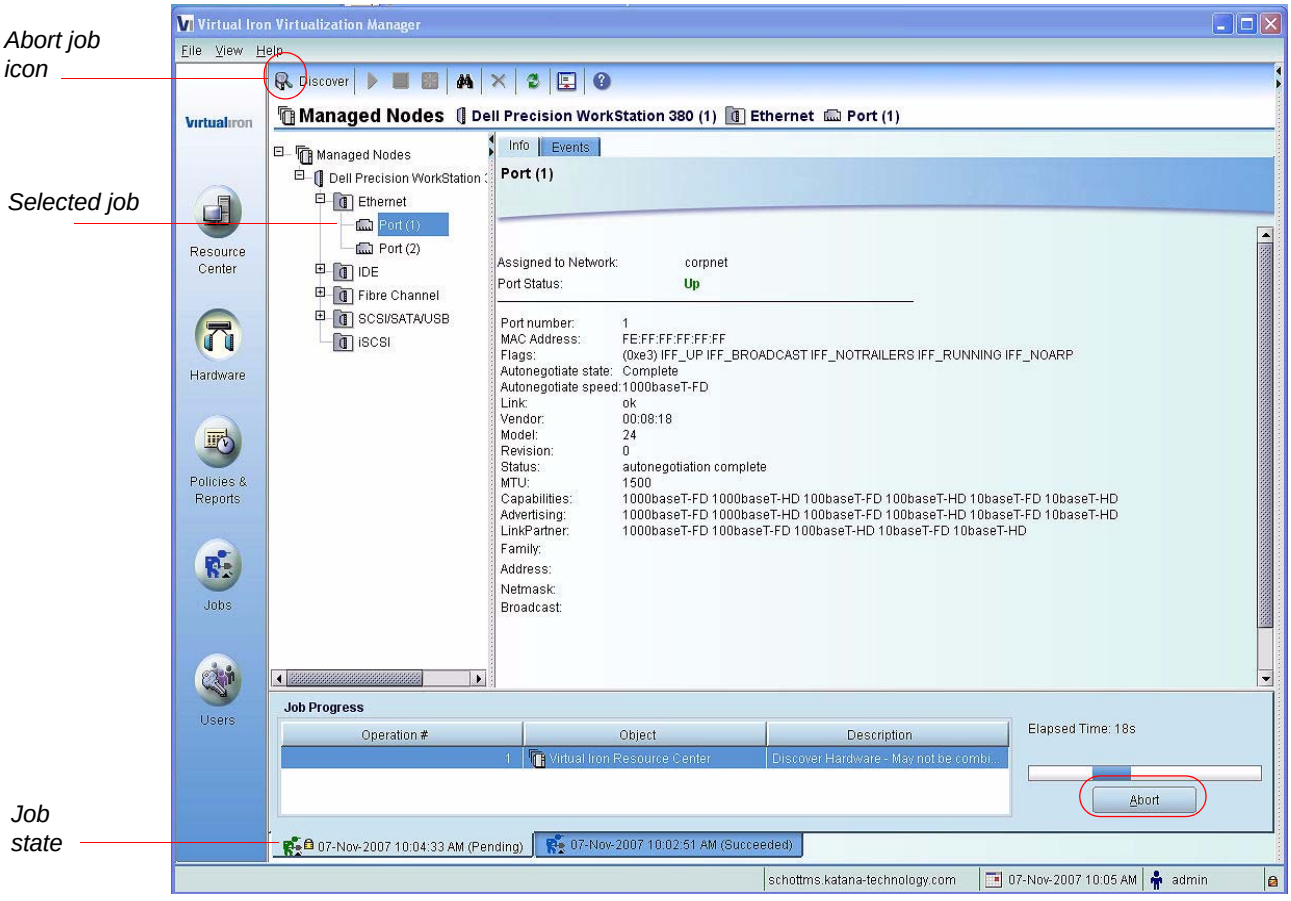
### ABORTING A JOB IN THE JOBS VIEW

If a job is running or fails to complete, an Admin user can abort the job from the Jobs view.

Locate the job in the navigation tree.

Select the job and click **Abort**.

**Figure 54. Aborting an Under Construction Job**



## Determining the Cause of Job Failure

If a job succeeds, all the operations associated with it are implemented in the virtualization environment. A Job Succeeded message appears in the Job Progress area.

If the job fails, the state of the virtualization environment returns to its pre-job state. A job failure presents **Error** and **Details** buttons on the tab. Click **Details** to see high-level information on all operations in the job. Click **Error** to open a pop-up containing information on the specific operation that failed within the Job.

## Closing Job Tabs

When you create a job, the Job Progress area remains on-screen. To clear it, press the F5 key, or click the Job control icon shown in Figure 55.

**Figure 55. Job Control Icon**

6

# CONFIGURING STORAGE


Configuring Storage ..... 94
Discovery and Management of Physical Disks ..... 96
Configuring Logical Disks ..... 98
Exporting and Importing ..... 103
Cloning Disks ..... 108
VHD Repository ..... 110
Snapshots And Disk Space Usage ..... 112

# CONFIGURING STORAGE

Virtual Servers (VSs) can be configured to access two types of disks:

- **Logical disks**—High-performance disks that can be assigned to one or more virtual servers. The size can be smaller than the underlying physical disk. Supported on Fibre Channel, iSCSI, and local storage.
- **Raw SAN disks**—High performance. One or more virtual servers use one entire physical LUN.

**Note:** For best performance, Virtual Iron recommends that all storage be in logical disks.

The following table summarizes the functional differences between these disk types.

| | Logical | Raw |
|---|---|---|
| Shareable between VSs | X | X |
| High-performance | X | X |
| Supported on iSCSI SAN | X | X |
| Supported on Fibre Channel SAN | X | X |
| Supported on local storage | X | -- |
| Ability to subdivide physical disk | X | -- |
| Cloning capability | X | -- |
| Dynamic VHD file import | -- | -- |
| Fixed VHD file import | X | -- |
| Export capability | X | -- |

## Advantages of Managed Storage

Virtualization Manager presents a unified framework for controlling local or SAN disks that are accessible to managed nodes and their VSs. In this framework, you create one or more *disk groups* (DGs), and subdivide them into one or more *logical disks*. Logical disks have additional utility in that they can be copied (cloned) and exported for use by other virtual servers. Neither of these capabilities is available in the management of raw SAN disks.

Overlaying a storage framework on available physical storage has distinct advantages. All physical LUNs can be administered from Virtualization Manager. Following initial information exchange with the SAN administrator, the Virtualization Manager administrator can use this framework to configure and manage logical disks on the SAN.

# DISCOVERY AND MANAGEMENT OF PHYSICAL DISKS

Virtual Iron supports three types of physical disks:

- Fibre Channel SAN disks
- iSCSI SAN disks
- SATA, SAS, or parallel SCSI node-local disks

Local IDE drives are not supported.

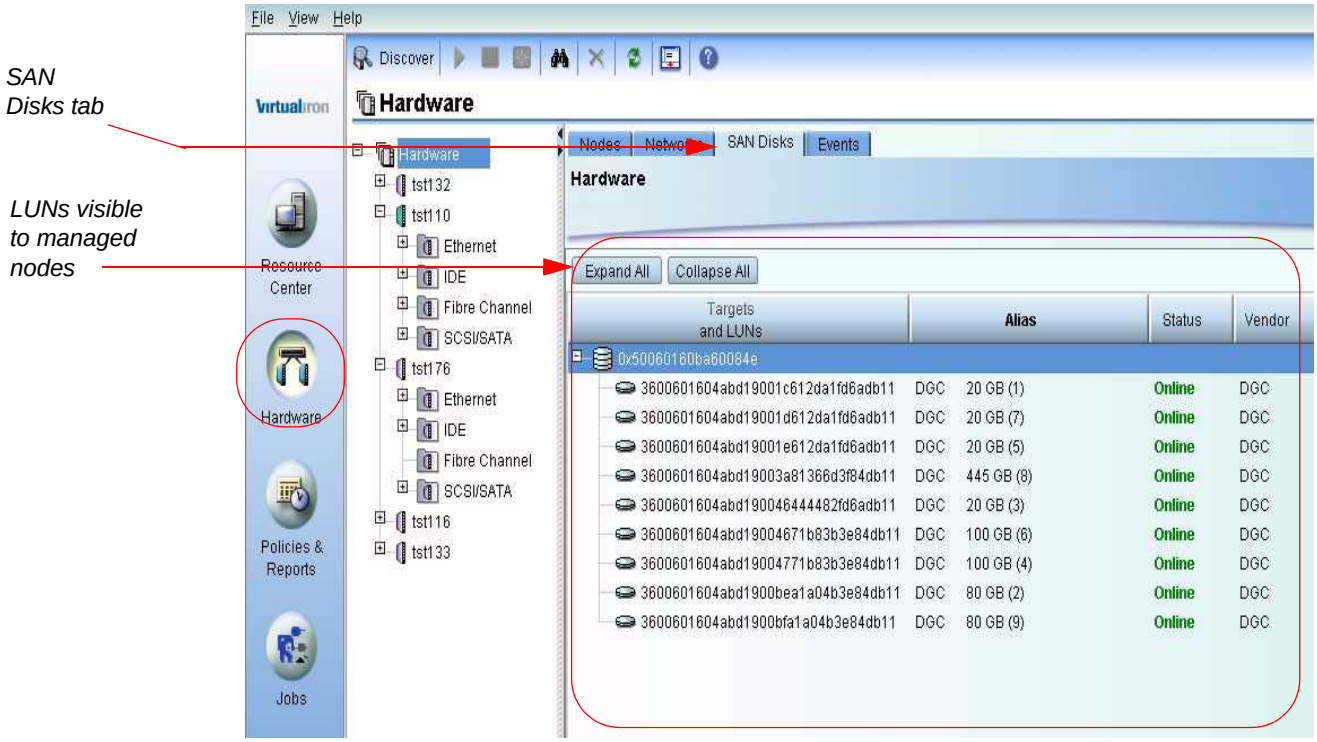
All physical disks are automatically discovered during the node boot process. If you reconfigure LUNs while a node is running, before adding them to the system, perform a Rescan to update the management server: In Virtualization Manager, right-click the managed node and select **Rescan SAN Ports**. This step assures synchronization between the management server and your environment.

To access physical SAN resources, the managed node hosting it requires a host bus adapter (HBA) or network interface card (NIC). Each HBA has a unique WWNN or iqn, which you need to provide to your SAN or iSCSI administrator. The administrator makes specific LUNs visible to managed nodes in the Virtual Iron® framework.

Once this information has been configured in your SAN infrastructure, SAN targets and LUNS become visible to the managed nodes programmed to access them.

Click the **Hardware** button to view the LUNs accessible to all managed nodes. Then click on Hardware at the top of the navigation tree, and select the SAN disks tab. A sample view is shown in Figure 56.

**Figure 56. LUNS available to All Managed Nodes**

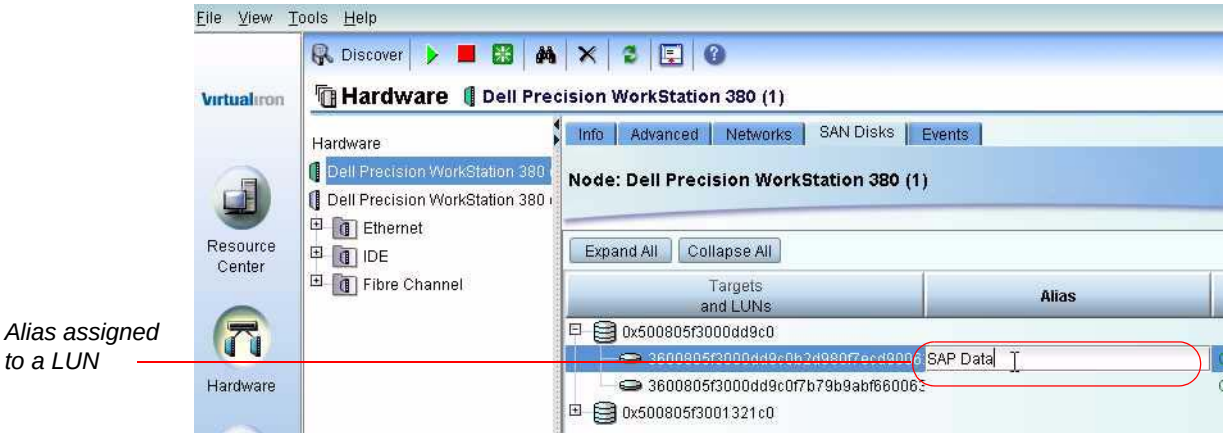



## LUNs and Aliases

Virtualization Manager allows you to assign an alias to each LUN. Examples of aliases are “Windows 2003 + SQL Server” or “SAP data.”

To assign an alias to a LUN, select the LUN and double-click in the **Alias** column beside it in the **SAN Disks** window. Enter the alias in the field. An example is shown in Figure 57.

**Figure 57. Alias assigned to a LUN**

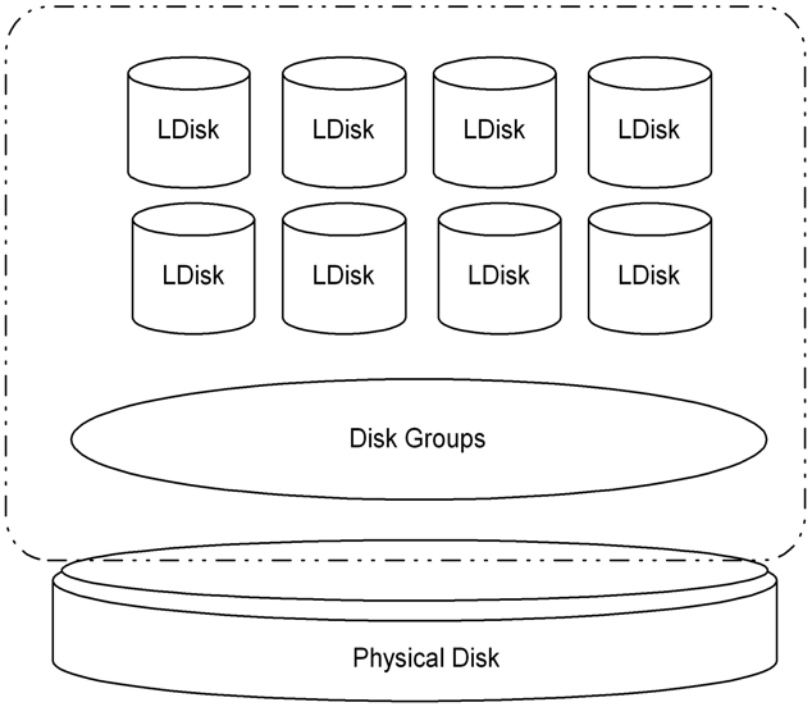


# CONFIGURING LOGICAL DISKS

The Virtual Iron Virtualization Manager supports the creation and assignment of logical disks on local drives or SANs. Before you configure logical disks, read the following section to understand how logical disks are organized within *disk groups* (DGs).

The illustration in Figure 58 shows the relationships between physical disks, DGs, and logical disks.

**Figure 58. Virtual Iron® SAN Storage Management**




## Disk Groups and Logical Disks

Each disk group is essentially a storage container. Disk groups consist of one or more SANs or local disks. Virtual Iron® enables you to make use of the storage contained in a DG by subdividing it into one or more logical disks. The process for creating logical disks on a local drive is the same as for creating them on a SAN.

Logical disks can be copied (or cloned) for use by other VSs, and they can also by administratively exported or imported from a directory within Virtualization Manager.

Once you create logical disks, they are visible to all VSs hosted on the VDC.

## Creating Disk Groups

Follow this procedure to create disk groups. After you create the disk groups, you can assign them to VSs later in this procedure.

**Step 1.** Begin by creating and assigning nodes to a Virtual Data Center as described in Creating Virtual Data Centers.

**Step 2.** To create a disk group, click the **Resource Center** button and:

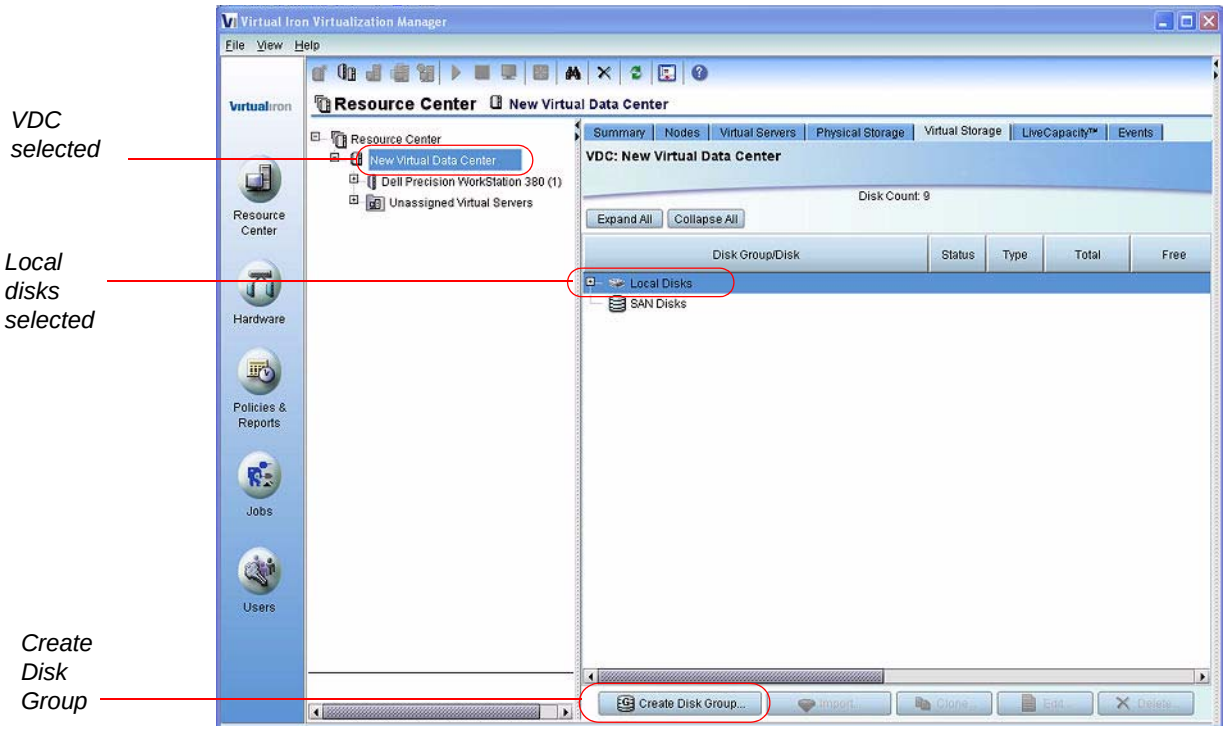
**A.** Select the VDC in the navigation tree.

**B.** Select the **Virtual Storage** tab.

**C.** Select either Local Disks or SAN Disks

**D.** Click **Create Disk Group...** In Figure 59, a local disk has been selected.

**Figure 59. Create Disk Group**



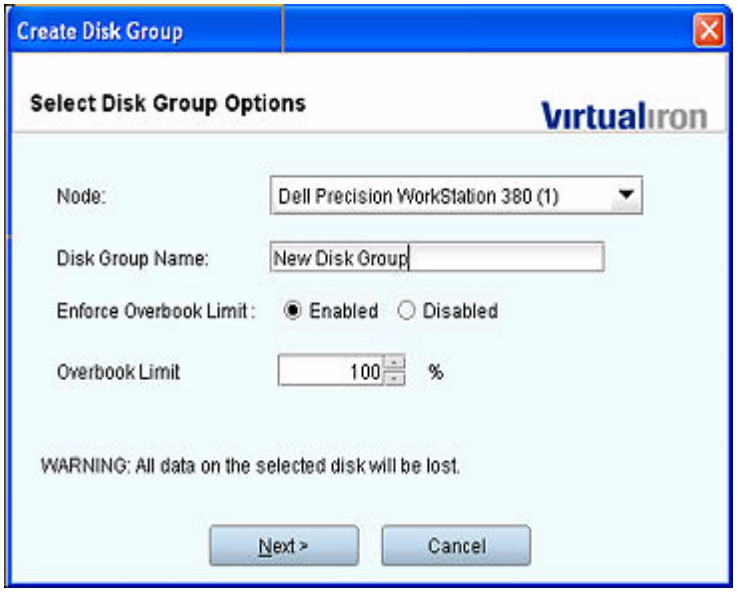
**Step 3.** The Disk Group Wizard appears (Figure 60) with all nodes in the VDC listed in the Nodes pulldown.

The DG Name **New Disk Group** is assigned to the group by default. Enter a name for the disk group.

Leave the default values for **Enforce Overbook Limit** (Enabled) and **Overbook Limit** (100%). These fields are related to the Snapshot feature. See Snapshots and Overbooking for detailed information.

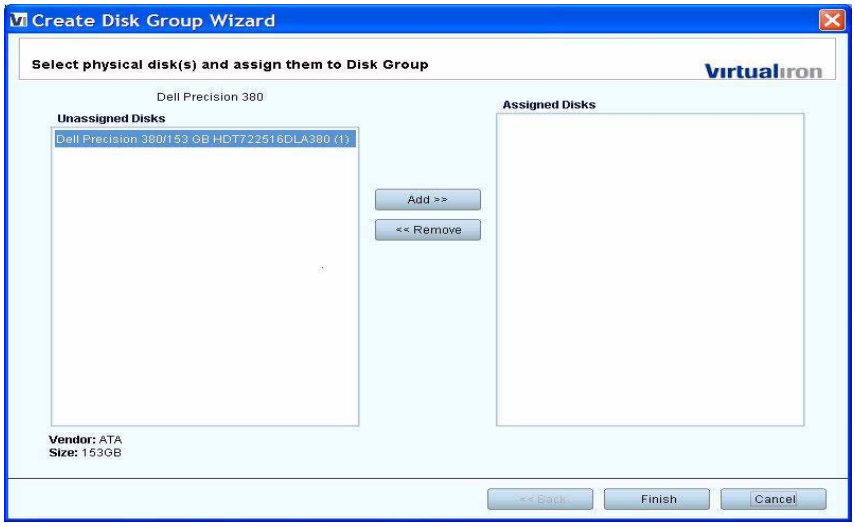
**Step 4.** Click **Next>>** to continue.

**Figure 60. Begin DG Wizard**




**Step 5.** Each DG must be mapped to a physical disk. In the next window (see Figure 61), choose the disk on which to place the disk group. In Virtual Iron®, each physical disk can be allocated to one and only one disk group. You can add disks to the disk group at creation time, or dynamically when the disk group is in operation, if you need additional storage space.

**Figure 61. Assigning a Disk to the DG**



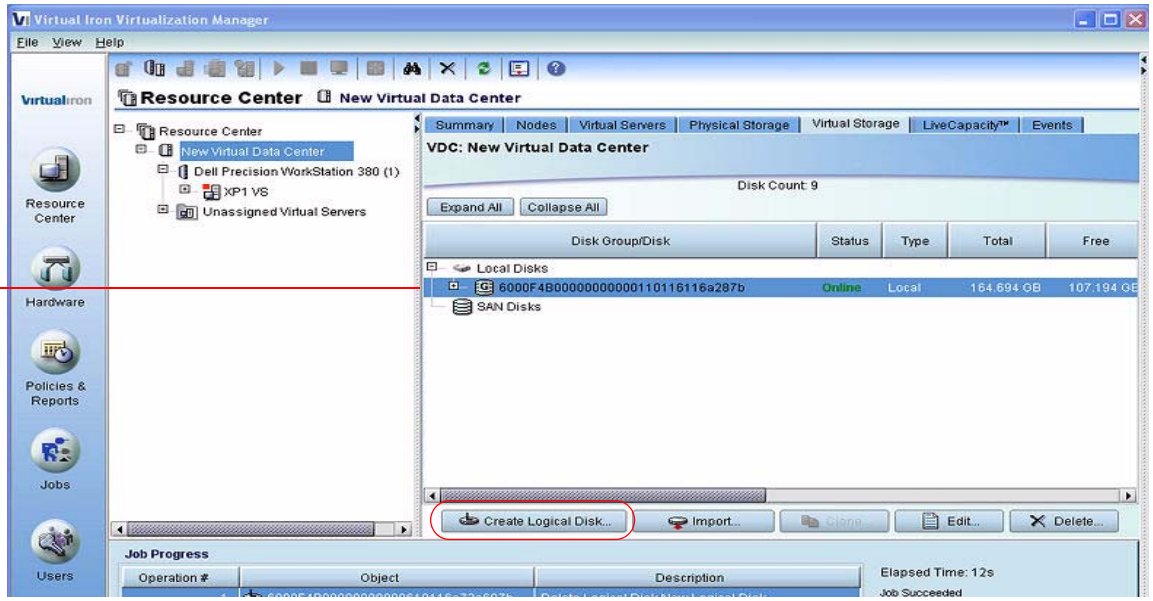

To assign a disk to the DG, select the disk in the Unassigned Disks pane. Then click **Add>>** and **Finished**. The new DG appears in the window as shown in Figure 61.

## Creating Logical Disks

**Step 1.** Select a disk group as shown in Figure 62.

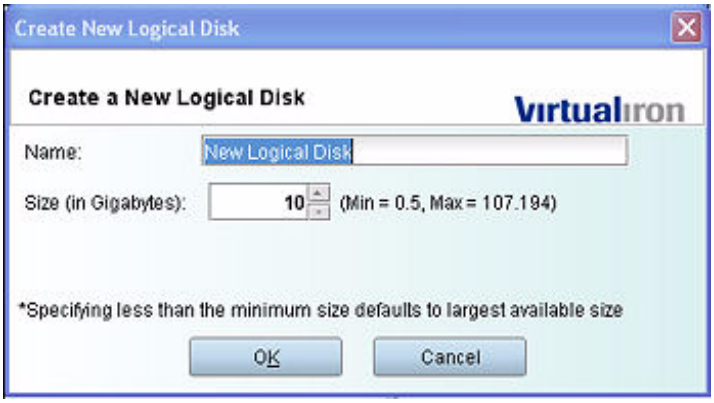
**Figure 62. Select Disk Group**

*Select Disk Group*




**Step 2.** Click **Create Logical Disk** (see Figure 63). The window shown in Figure 63 appears.

**Figure 63. Create a New Logical Disk**




**Step 3.** Assign a name to the logical disk, and a size in GB. By default, the name assigned by Virtualization Manager is New Logical Disk.

**Step 4.** Click **OK**. The new logical disk is added to the tree in the Logical Disks tab.

# EXPORTING AND IMPORTING

Use the export and import functions to move VHD files on the Virtualization Manager from and to the disk groups in your data center. This is also useful if you want to move a logical disk to a new disk group in a different VDC.

There are two types of VHD files, each of which is stored differently in the data center:

- **Dynamic**—As data is written to the dynamic disk, the file grows as large as the maximum size that was specified when it was created. Unused space is not included in the image, reducing the size of the dynamic disk file. If you import a dynamic VHD, the file is imported to a virtual disk.
- **Fixed**—A fixed-size hard drive is one in which space is allocated when the VHD is created. The size of the disk does not change when data is added or deleted. If you import a fixed VHD, the files are imported to a logical disk.

## Enterprise Edition

Commonly used VHD files on the Virtualization Manager may be made available to multiple users. Use the import and export functions to move VHD files to the Virtualization Manager for use in virtual servers.

### EXPORTING A LOGICAL DISK

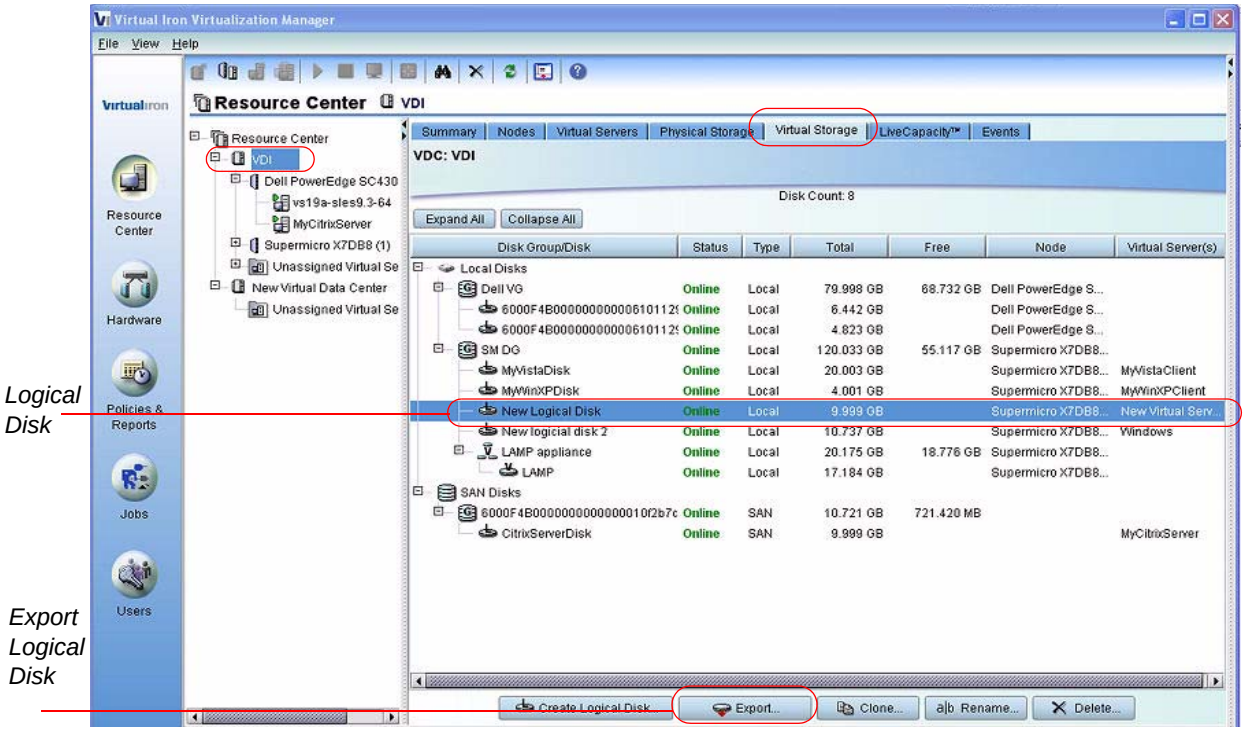
To export a logical disk using Virtual Iron® Enterprise Edition, proceed as follows:

**Step 1.** Select the logical disk to be exported in the navigation pane and click the **Virtual Storage** tab.

**Step 2.** Select the logical disk in the VDC pane.

**Step 3.** Click **Export**.

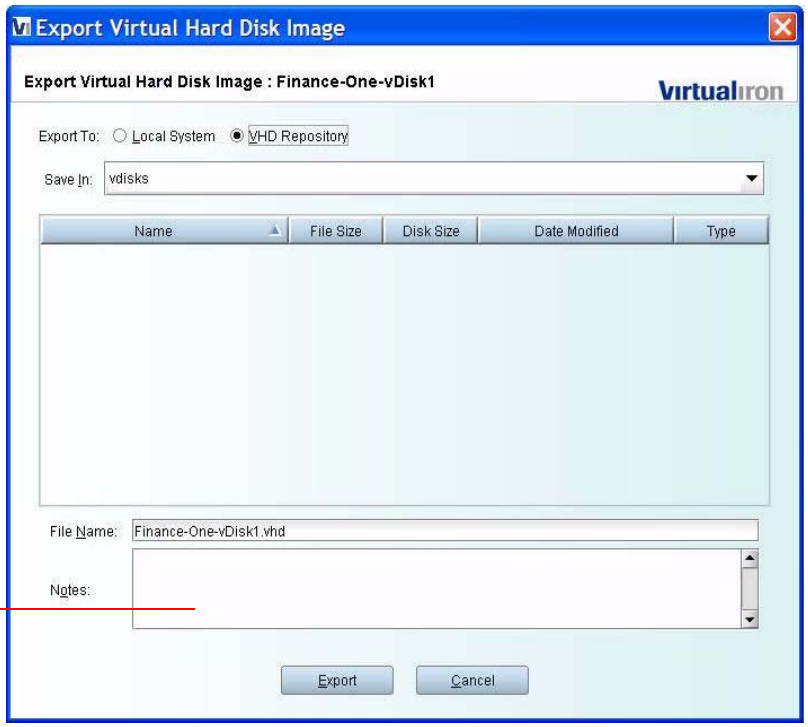
**Figure 64. Exporting a Logical Disk**




**Step 4.** Virtualization Manager displays the **Export Virtual Hard Disk Image** window shown in Figure 65. The window shows the contents of the logical disk directory on Virtualization Manager. You may enter notes on the content of the Logical Disk in the Notes pane.

Click **Export** to complete the operation.

**Figure 65. Contents of Logical Disk Directory**

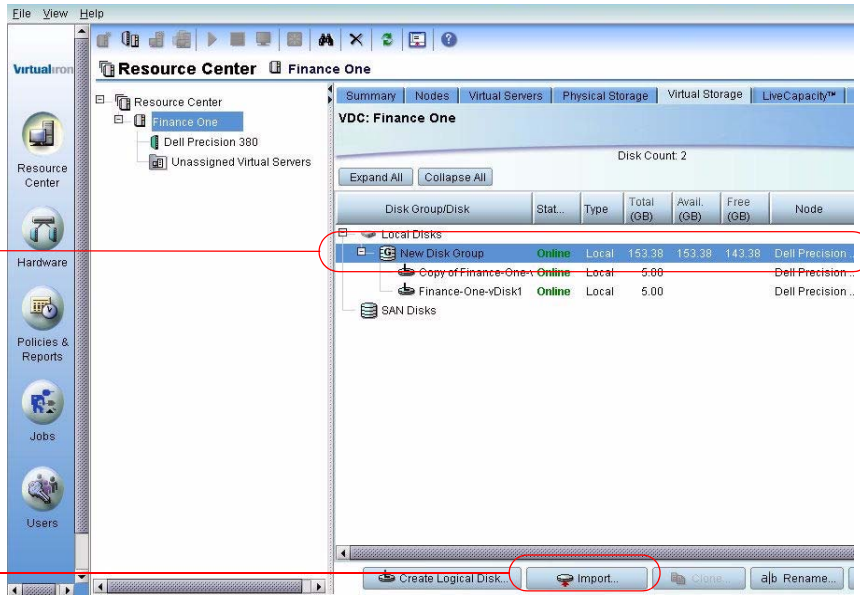



*Add optional notes on the exported Logical Disk*

## IMPORTING A VIRTUAL DISK

**Step 1.** To perform an import operation, select the disk group into which you wish to import a cloned logical disk. Click the **Import** button as shown in Figure 66.

**Figure 66. Importing a Logical Disk**




*Logical Disk selected for import*

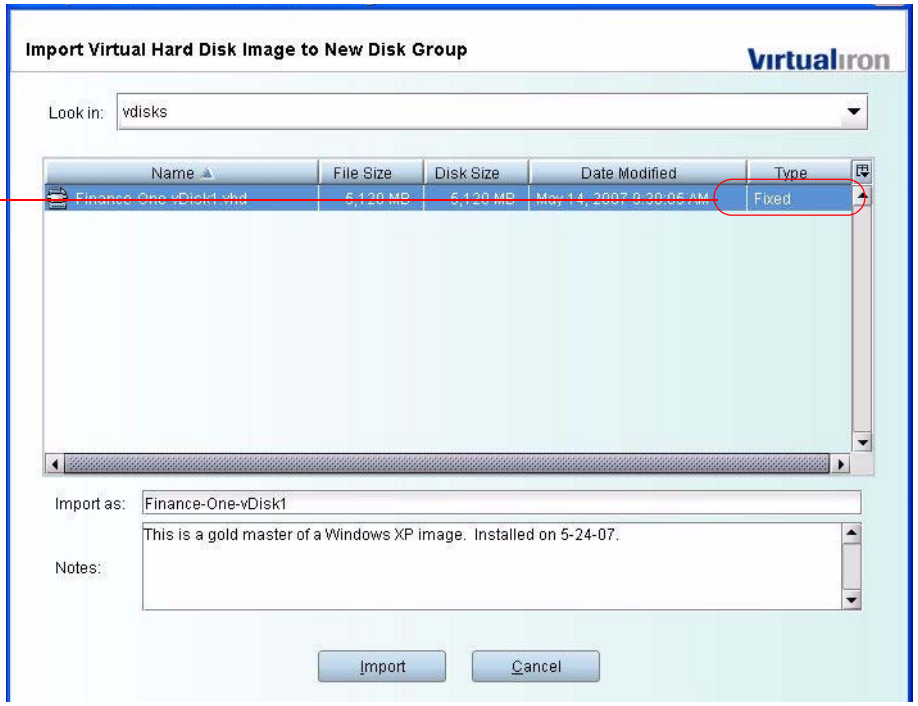
*Import Logical Disk*

**Step 2.** Virtualization Manager displays the **Import Virtual Hard Disk** window shown in Figure 67. The window shows the contents of the logical disk directory on the Virtualization Manager.

Choose the logical disk you want to import, then click **Import** to complete the operation.

**Figure 67. Import Virtual Hard Disk Image Window**

*Note the Type: Fixed or Dynamic*




## Single Server Edition

In the Single Server Edition, all logical disks are stored on the node under management, which is also the Virtualization Manager. Exporting a logical disk moves it from one location on the Virtualization Manager to the virtual disks directory. Use the Administration Manager (see Put/Get Files on the Virtualization Manager) to get the file from memory, and place it in a new location.

**Note:** VHD files cannot exceed 18 GB.

### EXPORTING A VIRTUAL DISK

**Step 1.** Select the logical disk and click **Export** as shown in Figure 64.

**Step 2.** Navigate to the Virtual Iron® launcher page, and start the Administration Manager (see Using the Administration Manager). Choose **File Management -> Get a File...** as shown in Figure 68.

**Figure 68. Getting a File from the Virtualization Manager**


**Step 3.** Select the logical disk you had exported earlier, and click **OK**.

## IMPORTING A VIRTUAL DISK

**Step 1.** Select the logical disk and click **Import** as shown in Figure 66.

**Step 2.** Navigate to the Virtual Iron® launcher page, and start the Administration Manager (see Using the Administration Manager). Choose **File Management -> Put a File...** as shown in Figure 68.

# CLONING DISKS

Virtual Iron® allows you to clone (copy) logical disks and their associated content to any other disk group under management. Note that logical disks can only be cloned when they are not in use by a virtual server.

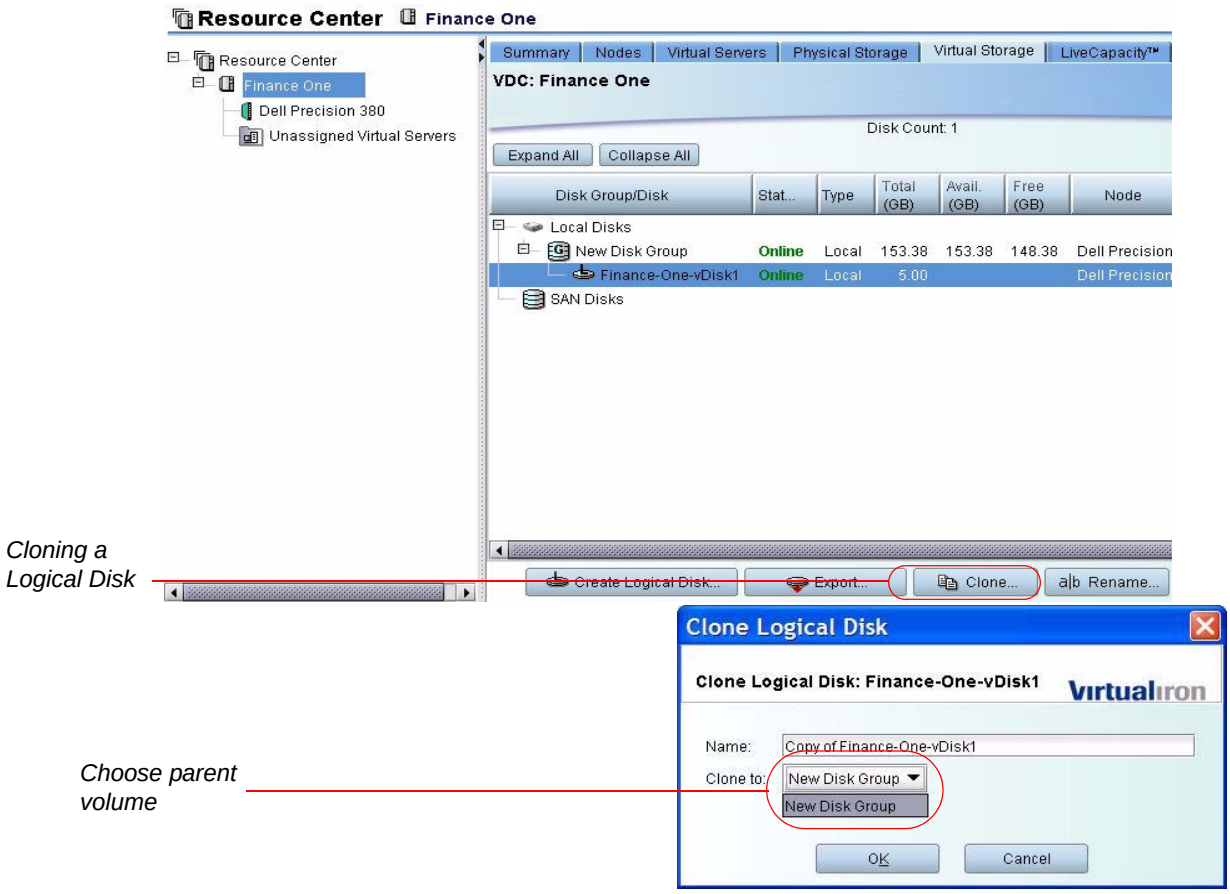
Virtual disks may be cloned to logical disks or other virtual disks.

| | To: |
|---|---|
| Logical Disk—Fixed | Logical Disk—Fixed |
| Virtual Disk—Dynamic | Logical Disk—Fixed<br>or<br>Virtual Disk—Dynamic |
| Virtual Disk—Fixed | Logical Disk—Fixed |

## Cloning Logical Disks

To clone a logical disk, select the logical disk in the window, as shown in Figure 69.

**Figure 69. Cloning a Logical Disk**




Choose a name for the logical disk, and use the pull-down menu to choose a volume for the cloned disk's parent. Click **OK**. The cloned logical disk is created on the disk group you specified.

Note that Virtualization Manager only presents volumes eligible to support the disk you are cloning. If a disk you are cloning has .5GB, only volumes with at least this much space are presented on the pull-down menu.

The cloning operation may take several minutes. The progress bar that appears is updated every 10-15 seconds.

# VHD REPOSITORY

For Virtual Iron EE, the Virtual Hard Disk (VHD) image is a complete copy of a virtual computer's operating system and its applications. You may import or export a VHD image to or from the Virtualization Manager VHD repository and your local computer. Note that when you change the directory used as the VHD repository of the VHD files, you change it for all users.

## VHD File Naming Conventions

Exporting to a repository results in a VHD image file from which you can create virtual disks. You can't import directly from a local computer to a VHD repository.

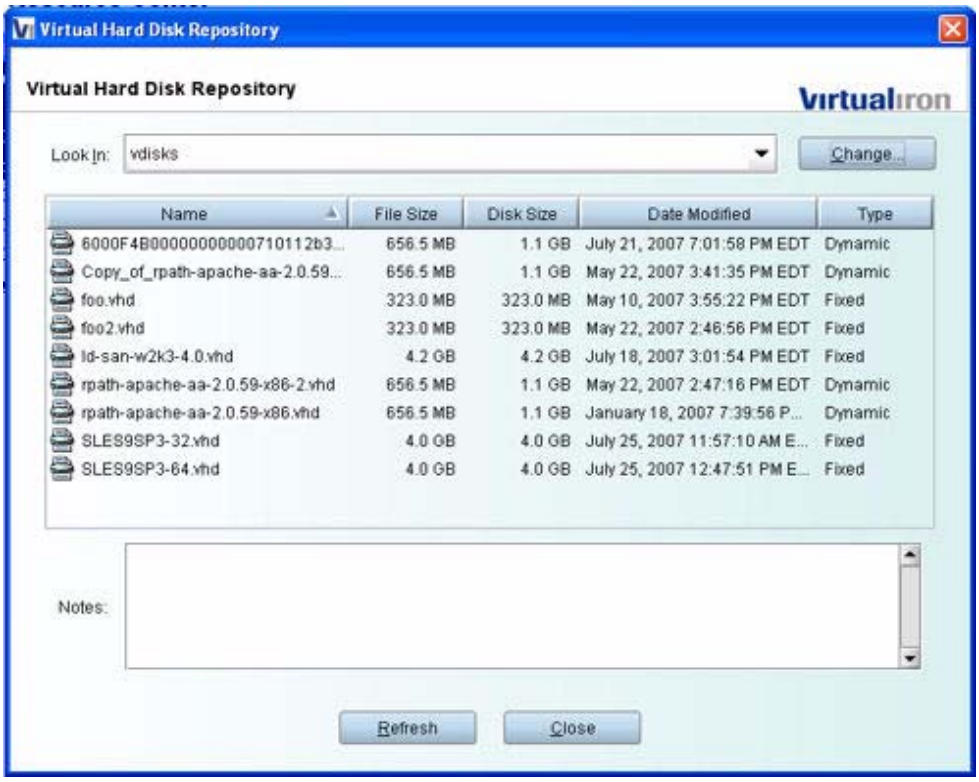
Importing from a repository allows you to save a VHD image file that has been added to the VHD repository from a managed node, into a repository's virtual disk.

## Exporting or Importing VHD Image Files

Note that if you change VHD directories to a local computer, you can change it back to the default Vdisks Directory.

**Step 1.** In the Virtualization Manager **File** menu, select **VHD Repository**. The following screen appears.

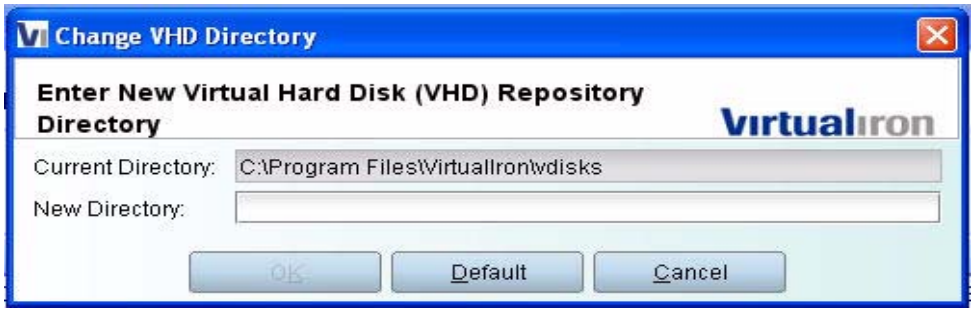
**Figure 70. Virtual Hard Disk Repository Screen Showing VHD Image File**



**Step 2.** Select a location from the pulldown menu, or click **Change**.

**Step 3.** If you clicked **Change**, the following dialog box appears:

**Figure 71. Change CHD Directory Dialog Box**




**Step 4.** Enter a new directory location or click **Default**.

- **UNIX Linux**—For UNIX Linux management servers, UNIX Linux naming rules and directory separator characters apply. for example, to set the repository to the directory /opt/storage/vdisks:

defaultVHDRepositoryPath = “/opt/storage/vdisks”

- **Windows**—For Windows management servers, Windows-specific UNC syntax is required. This consists of the drive letter and colon, for \ characters (\\\), and the path. Specify subdirectories in the path with two \\ characters. For example, to set the VHD repository to the directory NAS Storage\VHD Repository on the g: drive:

defaultVHDRepositoryPath = “g:\\\NAS Storage\\VHD Repository”

If you specify a directory for the VHD repository, the directory is created after you restart the Virtualization Manager. If you specify an invalid directory, or if the directory can not be created, an error is logged and the directory remains set to the last valid directory.

# SNAPSHOTS AND DISK SPACE USAGE

A snapshot disk contains data from a disk at a specific moment in time. Since snapshot disks are temporary, the system will minimize the physical memory disk space needed to maintain them. For example, after configuring a virtual server and confirming that it is operating correctly, you can take a snapshot of the virtual server and its disk to capture its current state. Then, if you want to test some changes that you think might adversely affect the virtual server, if an error occurs, you can use the virtual server or the snapshot to quickly recover. See Virtual Server Snapshots for additional information and detailed configuration procedures.

The advantages of using Snapshot are:

- The initial size of the snapshot is a small fraction of the size of the parent virtual server.
- A snapshot can be taken whether the virtual server is on or off. Volatile memory is saved in an image file.
- The snapshot captures the state of a logical disk. This data is linked to, but independent from, the parent logical disk, so it can be used by other virtual servers.
- Snapshots take a fraction of the time of needed to clone a disk. Cloning also creates an independent disk, but uses more space.

## Snapshots Example

Since Snapshot disks are temporary, the system will minimize the physical memory needed to maintain them. When you initially create a snapshot, a 10% default size is used.

For example, if your virtual server has a disk of 10 GB, your snapshot of this disk will be allocated 1 GB. How can a 10 GB disk be copied into a 1 GB space and maintain all the data? Through a process of maintaining pointers to the original disk's contents, the system uses less space to capture the data.

If any data changes on the original disk, the original data in this example is moved onto the snapshot disk area and the 1 GB space is used. If there are many changes on the original disk and the 1 GB space begins to fill, the system automatically increases the size of the Snapshot disk, using the threshold values and the **LVMSnapshotUtilization** system policy. See LVM Snapshot Utilization for policy configuration.

You can select a snapshot disk from the **Virtual Storage** tab at the **Node** level and then select the **Edit** button. The following dialog box is displayed:

Notice that the size of the snapshot disk and the default threshold and target settings are shown. The system monitors the size of your snapshot disk. When it gets to 50% full, the snapshot disk spaces grows until your current usage is at 30% of the space. In this example, once you have used about 500 MB of your 1 GB space, the snapshot will grow to be 1.5 GB, where 500 MB is about 30% of the 1.5 GB.

While you can think of the snapshot disk as an exact copy of your original disk, the Virtual Iron snapshot algorithm optimizes disk space usage to preserve as much disk space as possible.

## Snapshots and Overbooking

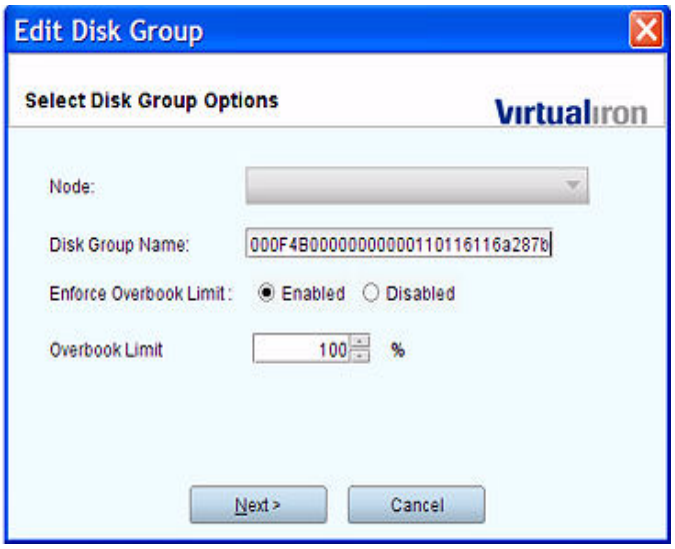
When you do a snapshot of your logical disks, the system optimizes the space needed to maintain the snapshot data. However, the system also maintains expansion space for the snapshot to grow. Use the Overbooking value to specify the amount of space to use, and to allow the system to go over, or overbook, the specified expansion space.

Here's an example: You have created a 100 GB disk group and then created the following disks for your virtual servers to use:

| Logical Disk Size | Snapshot Size | Snapshot Expansion Size |
|---|---|---|
| 20 GB | 2 GB | 18 GB |
| 30 GB | 3 GB | 27 GB |

At this point, your overbooking is **Enabled** and set to **100%**, the defaults for all disk groups. You can not create any more logical disks since you are currently using the 100 GB space: 20 + 30+ 2 + 3 +18 + 27 GB.

**Figure 72. Setting Overbook Limit for Snapshots**




Assuming that your snapshot disks will most likely not grow to consume their entire expansion size, you can adjust the overbooking value to take advantage of this. By changing the Overbook Limit to 150%, you can create another logical disk as shown:

| Logical Disk Size | Snapshot Size | Snapshot Expansion Size |
|---|---|---|
| 20 GB | 2 GB | 18 GB |
| 30 GB | 3 GB | 27 GB |
| Additional logical disk | | |
| 25 GB | 2.5 GB | 22.5 GB |

The 150% Overbook Limit allocates an additional 50 GB: 25 + 2.5 + 22.5 GB.

7

# CREATING AND CONFIGURING VIRTUAL SERVERS

This chapter explains how to create and configure VDCs and VSs.


Creating Virtual Data Centers ..... 116
Assigning Nodes to Virtual Data Centers ..... 118
VDCs and Unassigned Virtual Servers ..... 121
Virtual Servers ..... 124
Cloning Virtual Servers ..... 133
Virtual Server Snapshots ..... 136
Installing a Guest OS ..... 139
Installing VSTools on Virtual Servers ..... 141
Special Considerations for Windows 2000 OS ..... 151
Starting and Stopping Virtual Servers ..... 152
Launching a Virtual Server Console ..... 154
Configuring Policy-Based Management ..... 155
Moving Virtual Servers and Nodes ..... 161
Provisioning VSs with Gold Masters ..... 167

# CREATING VIRTUAL DATA CENTERS

A virtual data center (VDC) is an administrative entity that consists of one or more managed nodes. Each VDC functions as a true data center—a group of nodes that have been segregated to meet specific business needs.

The hardware resources in each VDC are only available to the VSs hosted by them. In the same way, other VDCs function as a separate set of physical resources. The many VDCs into which you can separate all the nodes under management can be likened to the partitions into which a large computer might be divided.

## VDCs are Containers for Virtual Servers

Before you create VSs, you need to create the VDC that will house them.

**Step 1.** In the Application toolbar, click the **Resource Center** button. Click the **Create new Virtual Data Center** icon as shown.

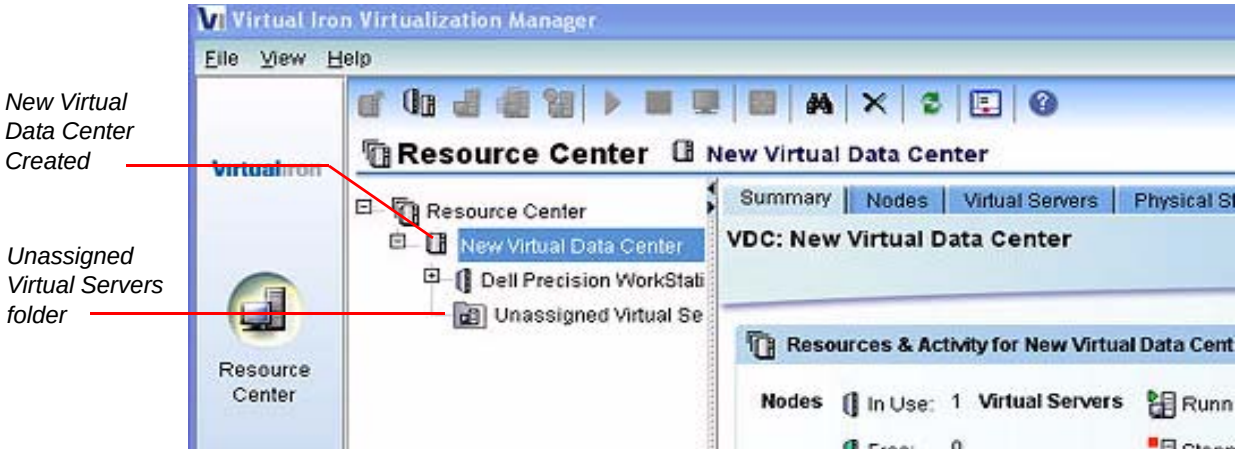
**Figure 73. Creating a VDC**


**Step 2.** The new VDC appears in the navigation tree. The yellow lock icons indicate that you are creating or changing an object. While you are performing this operation, the objects cannot be managed by other users.

**Figure 74. VDC in Navigation Tree**

**Step 3.** The new Virtual Data Center appears in the navigation tree. Another folder called *Unassigned Virtual Servers* appears below the VDC. This folder serves as storage area attached to a VDC. It is a place to move VSs that are shut down. It is also a staging area—a place to configure VSs for later deployment in the VDC. For more information, see VDCs and Unassigned Virtual Servers.

**Figure 75. The Unassigned Virtual Servers Folder**



# ASSIGNING NODES TO VIRTUAL DATA CENTERS

Now that you have created a VDC, add at least one managed node to it.

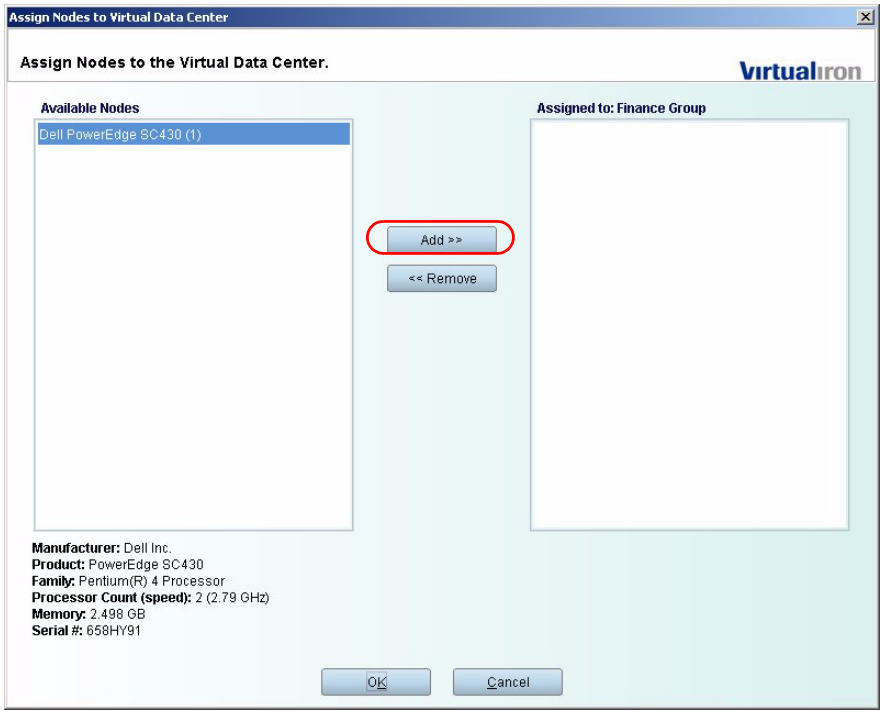
**Step 1.** To add nodes to the VDC, select its name in the navigation tree and click the **Assign Nodes** icon.

**Figure 76. Assign Nodes Icon**


**Step 2.** The **Assign Nodes** dialog opens with information about all nodes that have been discovered by the Virtual Iron® management server that are not assigned to another VDC. (See Creating Virtual Data Centers.)

To move the node to the VDC you have created, select the node and click **Add >>**. Then click **OK**.

**Figure 77. Assigning Nodes to a VDC**



The node moves from the Available Nodes to the Assigned Nodes pane. You can assign as many nodes as are available to a VDC. Keep in mind, however, that the ownership of a node by its parent VDC is absolute. A node can used only by the VSs hosted in one VDC at a time; its physical resources cannot be shared by the VSs in any other VDC.

**Step 3.** After you assign a node to a VDC, information about the node appears in the **Summary** tab as shown in Figure 78. The node is green to show that it is **Free** for use within the VDC. Table 2 explains node states and their associated colors.

**Figure 78. Node Summary Tab**

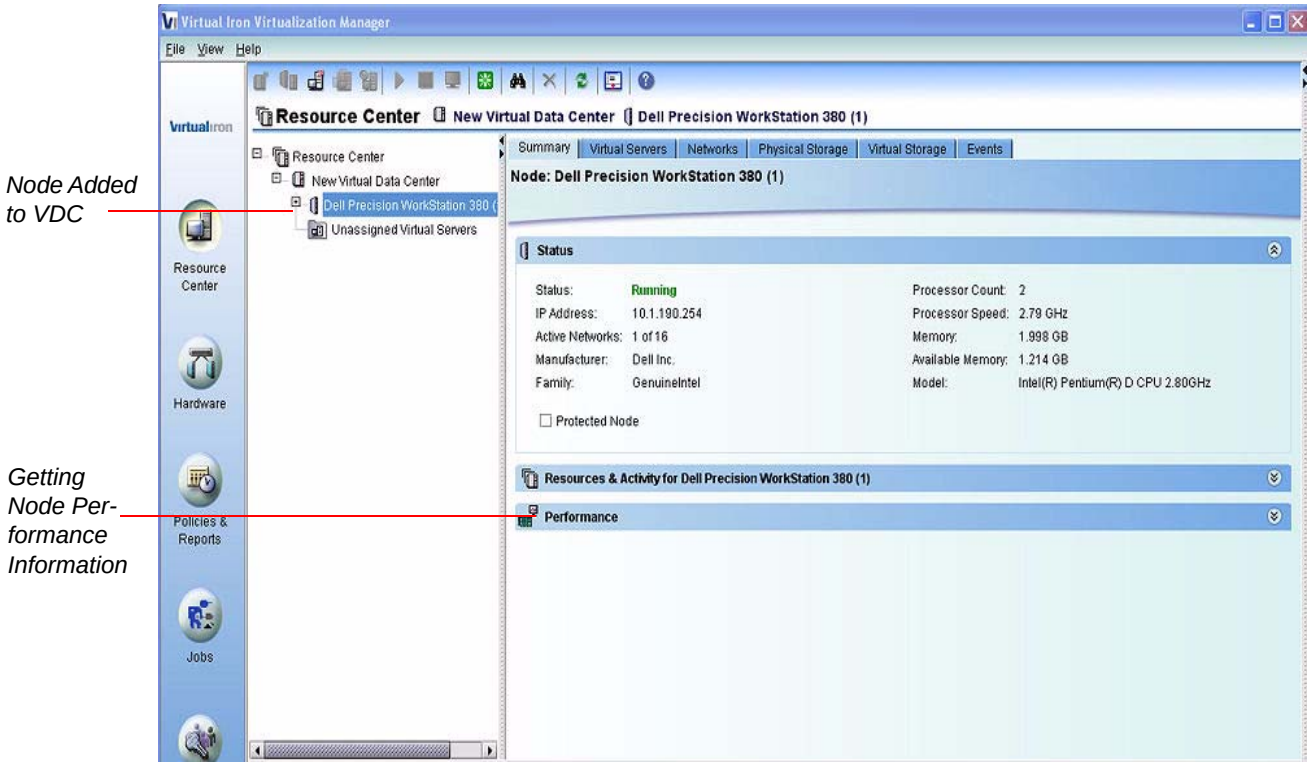


Table 2. Node States and Colors

| | State | Meaning |
|---|---|---|
| Green | Free | Available for use within the VDC. |
| Slate | In Use | The node is hosting at least one VS. |
| Yellow | Warning | Warning messages have been received. |
| Red | Error | The node is in error. |

Click the **Protected Node** check box if you do not want VSs to be moved to it from other nodes during LiveMigrate™.See LiveCapacity™ for information on LiveMigrate™.

Click the **Display** check boxes to see node resources and activity or performance data.

# VDCs and Unassigned Virtual Servers

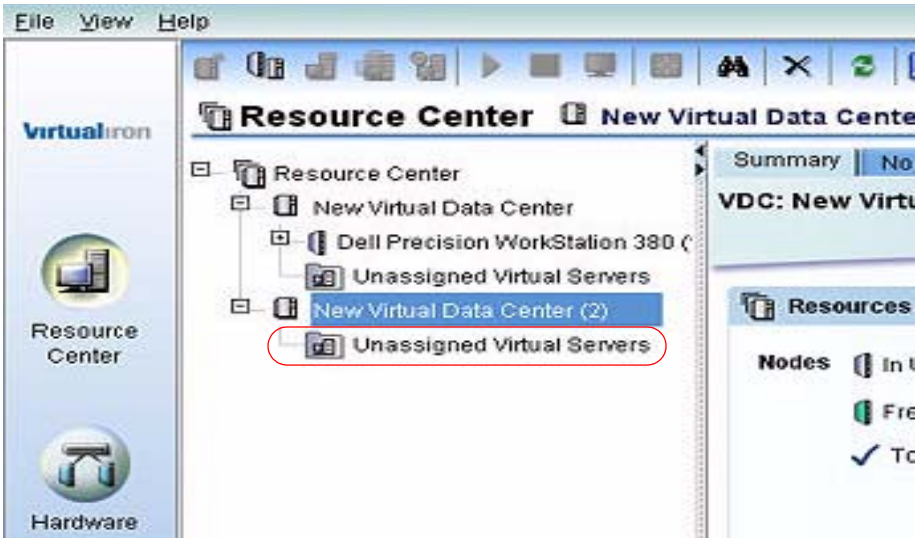
When you create a virtual data center, an Unassigned Virtual Servers folder is automatically created in the navigation tree. Use this folder to:

- Create and configure VSs for later deployment in the VDC
- Store virtual servers that are stopped, so that they do not use the memory associated with any node in the VDC
- Store virtual server clones.

See. Figure 79.

**Figure 79. Unassigned Virtual Servers Folder in Navigation Tree**

.




## About Unassigned Virtual Servers

Unassigned virtual servers are fully or partially configured VSs that are housed in a VDC, but do not consume any of that VDC's resources. Memory and processor parameters, network, and SAN access can be specified, but an inactive VS cannot be run until it is assigned to a node. At that time, its defined parameters are mapped to the node's resources.

Unassigned VSs are located in a separate folder at the bottom of each VDC. Once created, unassigned VSs can be dragged and dropped on a node within its parent VDC.

## Configuring Unassigned Virtual Servers

To configure an unassigned virtual server:

**Step 1.** Left-click on the **Unassigned Virtual Servers** folder in the navigation tree to select it. Then do one of the following:

- Right-click the selected icon and select **New Virtual Server**.
- Click the **Create New Virtual Server** icon in the action toolbar.

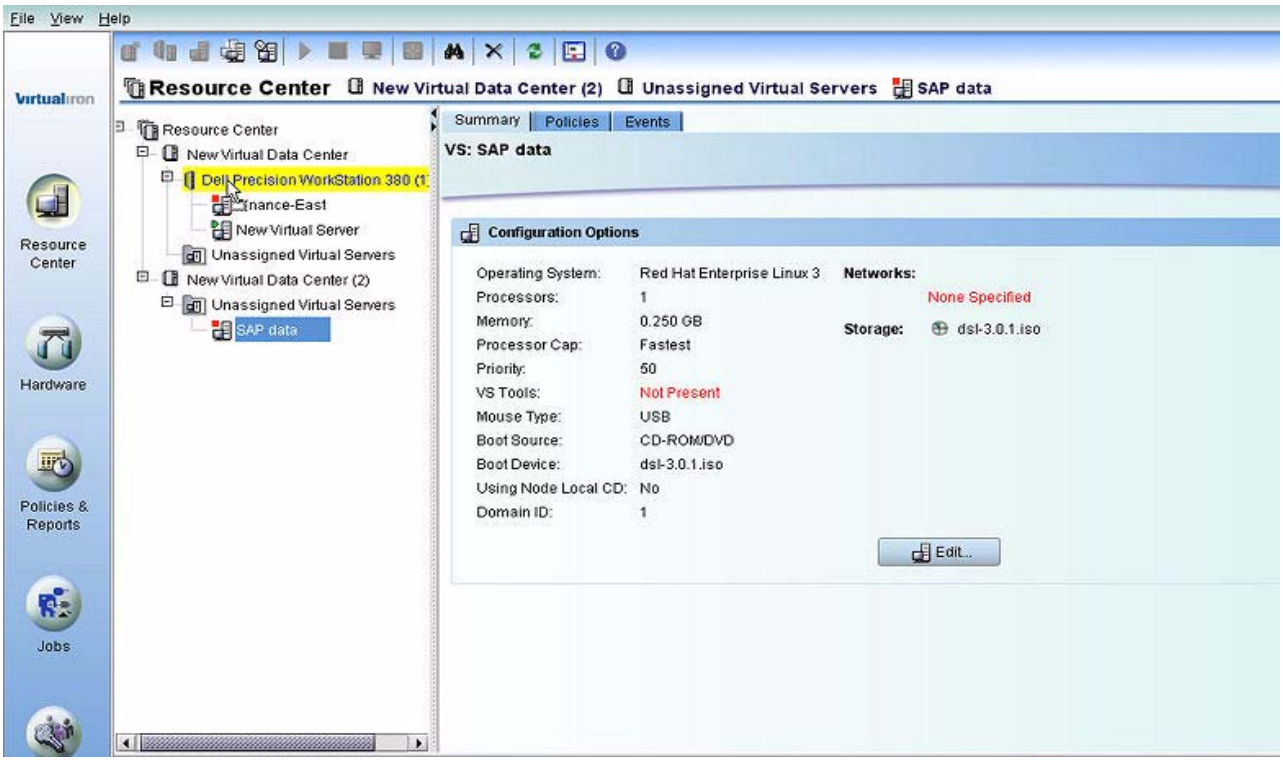
**Step 2.** Configure the virtual server: The New Virtual Server Wizard appears. Follow the steps outlined in Creating a Virtual Server.

## Deploying an Unassigned Virtual Server

After creating an unassigned VS, you can click and drag the VS to a node and start it. Figure 80 shows the unassigned virtual server *SAP data* being dragged to a node. Before the move is allowed, Virtualization Manager checks:

- Memory and processing resources in the target node
- Access to OS (on network or SAN) from the target node

**Figure 80. Moving an Unassigned VS to a Node**




The VS begins using the memory and processors configured for it as soon as it is moved to a node. If the target node does not have enough processors or memory, the UI disallows the operation.

## Moving a VS to Unassigned

Use the **Unassigned Virtual Servers** folder to park virtual servers that are not currently in use. To run the VS, move it back to its original parent node and restart it. Or, reconfigure the VS, and then move it to a different node.

The storage capability provided by Unassigned folders is extremely useful. When a VS exists on a node, it is allocated and consumes a certain amount of that node's available memory, whether or not the VS is running. Moving a stopped VS to the Unassigned Virtual Servers area prevents the VS from using any node memory. All information associated with the VS is maintained.

To use the VS, simply move it from the unassigned area to a node with sufficient processing and memory resources, and start it.

# VIRTUAL SERVERS

Make sure you have completed the following before you create a VS:

- Prepared nodes to be managed. See Managed Node Configuration.
- Cabled all nodes properly. See Site Preparation.
- Installed the Virtual Iron® software. See Installing Virtual Iron®.
- Established a connection to the Virtual Iron® management server.
- Defined connections between system nodes and physical networks. See Mapping Physical Ports to Logical Networks.
- Created a Virtual Data Center (VDC). See Creating Virtual Data Centers.
- Assigned a node to the VDC. See Assigning Nodes to Virtual Data Centers.

Once you complete these tasks, you have created the basis for virtualizing the resources of one or more nodes. All that remains is to create virtual servers.

**Note:** If you are configuring a Windows Guest Operating System for your virtual server, and you wish to use more than 4 GB, you will need to add a "/PAE" switch to the boot.ini file.

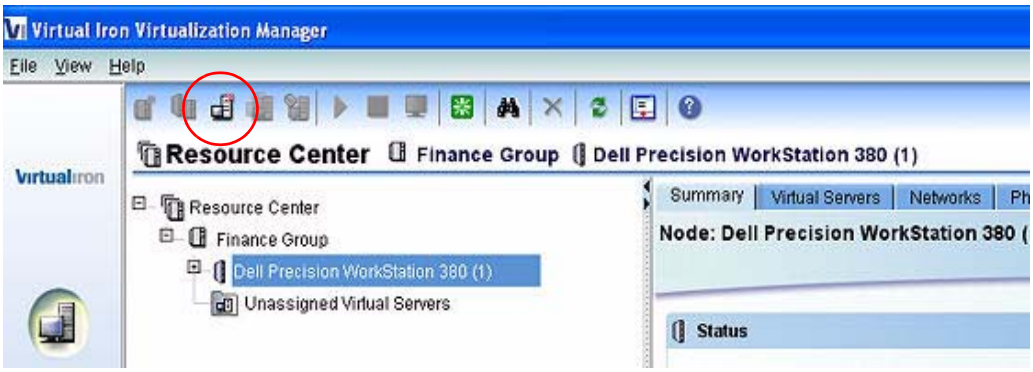
## Creating a Virtual Server

This procedure describes how to create, configure and deploy a new virtual server on a managed node.

**Note:** Do not use virtual server boot disks larger than 137 GB without VS Tools. See Installing VSTools on Virtual Servers.

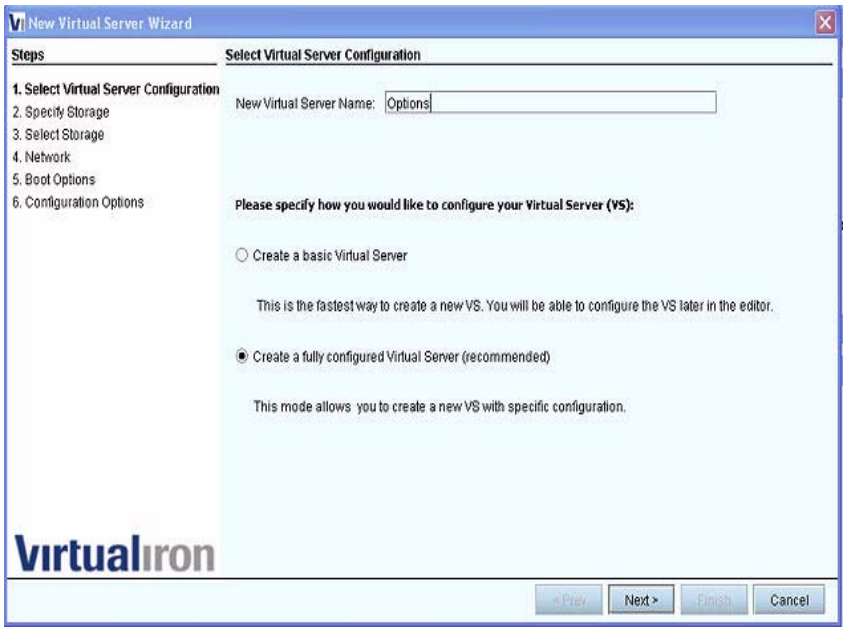
**Step 1.** Select the node you added earlier. Click the **Create Virtual Server** icon on the application tool bar.

**Figure 81. Create Virtual Server Icon**



**Step 2.** The new virtual server appears under **Unassigned Virtual Servers**, and the **New Virtual Server Wizard** appears. See Figure 82.

**Figure 82. New Virtual Server Wizard**




**Step 3.** Name the virtual server. In this example, the virtual server has been named Options.

The example shows the default setting, **Create a fully configured Virtual Server**.

NOTE: Choose **Create a Basic Virtual Server** to configure the virtual server later. Click its icon in the navigation pane. In the **New Virtual Server** window, click **Edit**.

**Step 4.** Click **Next**.

**Step 5.** Select or create storage for the virtual server. See Figure 83. For unconfigured systems, the default setting is **Create New Disks**.

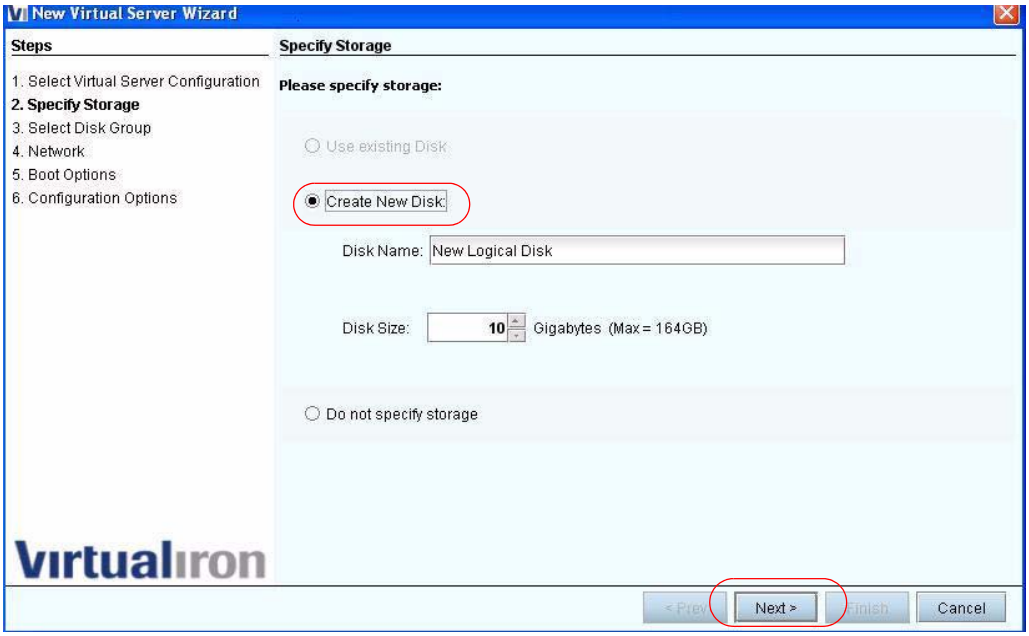
- If you have previously created logical disks, Use Existing Disk is the default. The next screen that appears displays the list of logical disks.
- If you select **Do not specify storage**, you can go back later to configure storage. Meanwhile, the virtual server just runs in memory. It will boot, but you can not run applications.

**Step 6.** Type a name for the new logical disk.

**Step 7.** Select a disk size from the pulldown menu. Default is 10 Gigabytes.

**Step 8.** Click **Next**.

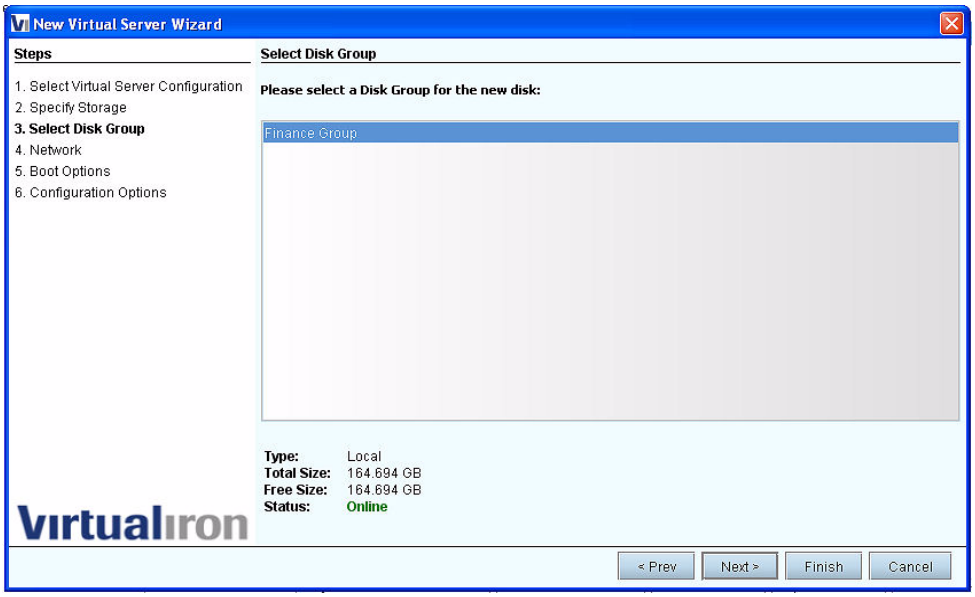
**Figure 83. New Virtual Server Wizard: Specify Storage**




**Step 9.** Select the disk group in which the newly created logical disk will be placed. See Figure 84.

**Step 10.** Click **Next**.

**Figure 84. New Virtual Server Wizard: Select Disk Group**



Configure network adaptors. Each network adapter consists of a virtual network identification card (VNIC), associated with an external subnet. You can add more than one VNIC to each VS, each allowing the VS to connect to and communicate with multiple networks. See Figure 85.

**Note:** You need to install VS Tools on an OS so the VS booting that OS can use more than one VNIC. See Installing VSTools on Virtual Servers.

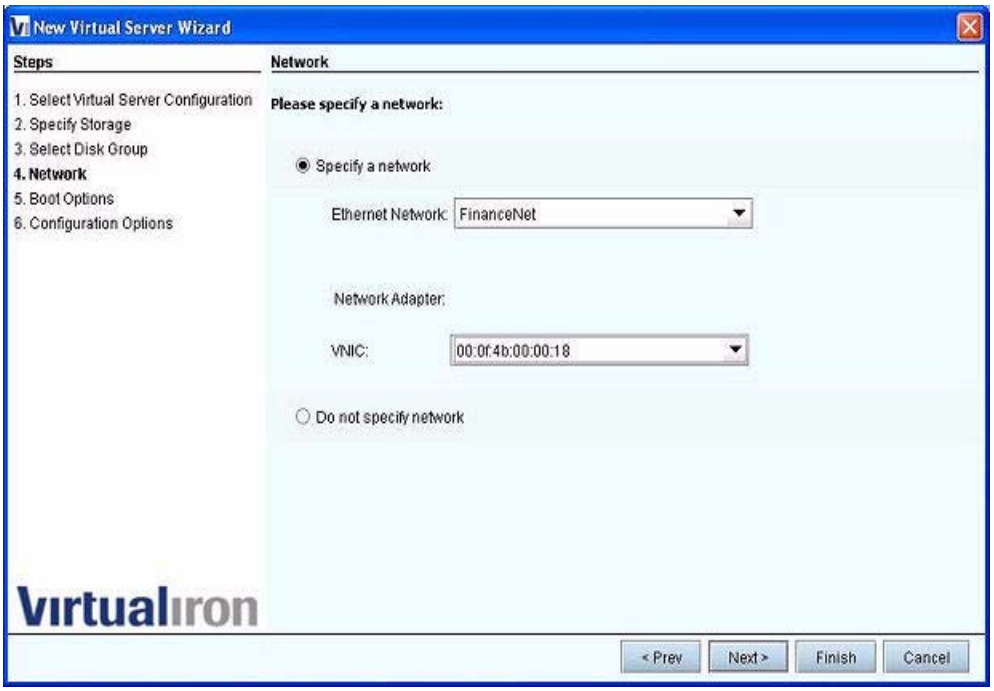
**Step 11.** Select an Ethernet network from the pulldown menu.

If you have not set up a network yet, select **Do not specify network**. You can set up the network later by clicking on the virtual server in the navigation pane and editing the virtual server.

**Step 12.** Select a VNIC from the Network Adapter pulldown menu to choose a specific VNIC from the drop-down list.

**Step 13.** Click **Next**.

**Figure 85. New Virtual Server Wizard: Network**

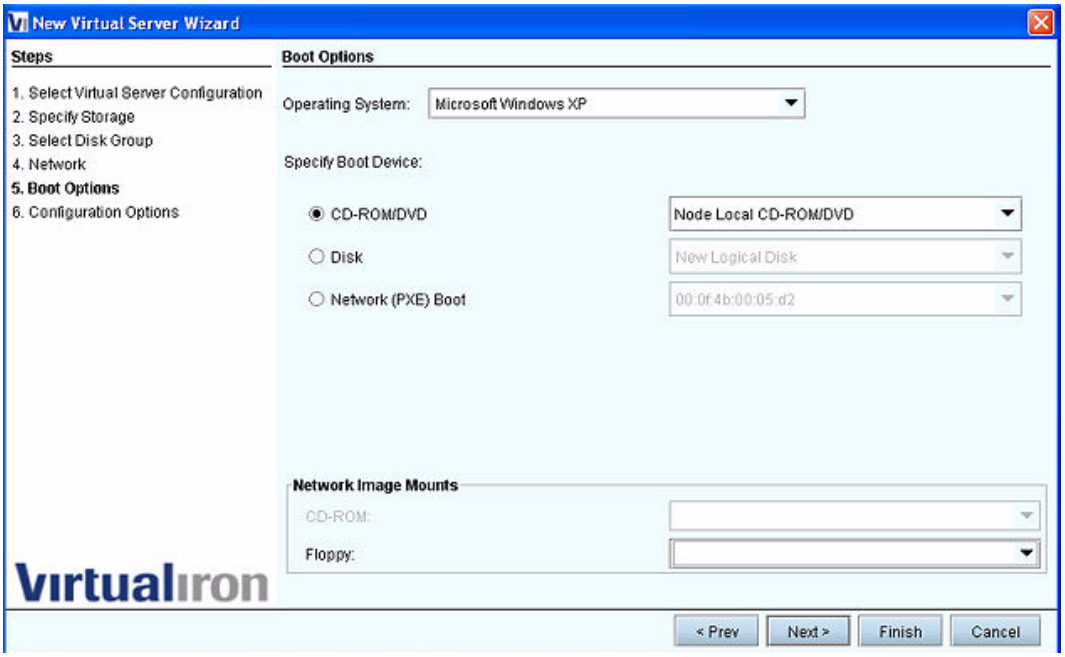



**Step 14.** Virtual Iron® enables VSs to boot over a SAN, via NFS (PXE), from a CDROM, or from a Network Boot Device. In the boot options window, select an operating system and then choose a boot method for the VS:

Note the following rules for physical CD-ROM/DVD boot options:

- Only virtual servers on the node on which the physical CD-ROM is located can use the physical CD-ROM.
- Only one virtual server at a time can use the physical CD-ROM.
- You can not associate more than one physical CD-ROM or ISO image with each virtual server.
- You can not have physical CD-ROMs *and* ISO images, or two ISO images, associated with a virtual server.
    - If you choose **CD/DVD**, select a specific drive if booting from a hard disk. This selection tells the virtual server to boot from the CD ROM device on the node where the VS is located. For example, if you are installing a Windows Operating System onto a logical disk, as in Figure 86, select Microsoft Windows XP for the operating system. You will need a Microsoft Windows XP CD and license key later, when you install Windows onto a logical disk that you specify.

**Figure 86. New Virtual Server Boot Options:**



- If you choose **CD/DVD** and specify to boot from an .iso file listed in the pulldown menu, the virtual server will boot from the .iso file on the node where the virtual server is located. See Figure 87. You can associate any of those applications to any virtual server. On Linux, ISO images are located in

  /opt/virtualiron/nbd

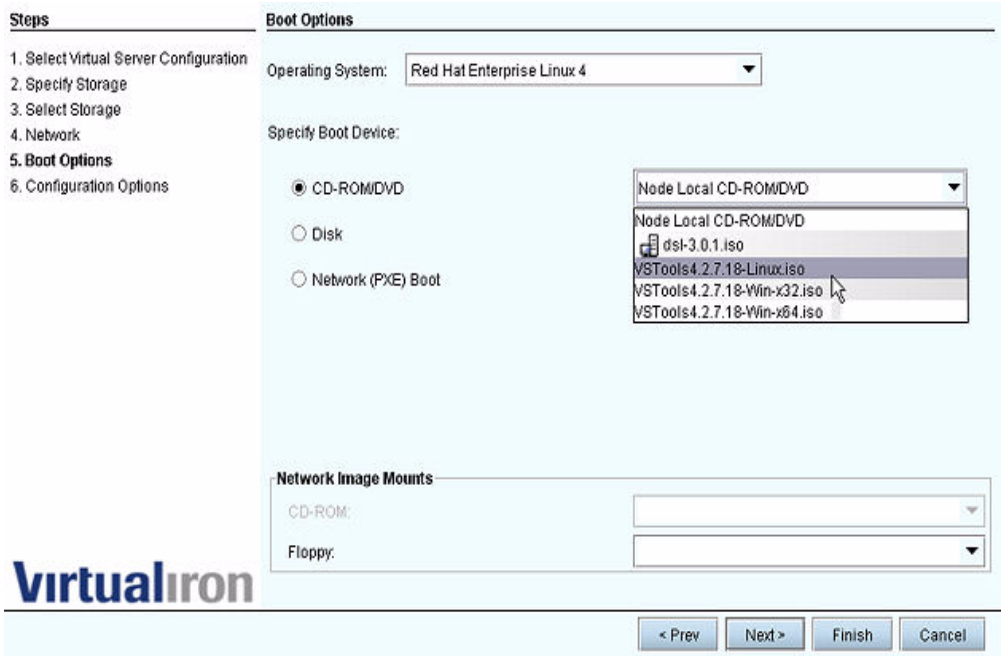
  On Windows™, they are located in

  C:\Program files\VirtualIron\nbd.

  See Figure 87.

  - If you also want a floppy associated with this virtual server, in **Network Image Mounts**, specify the **Floppy** from the pulldown menu.

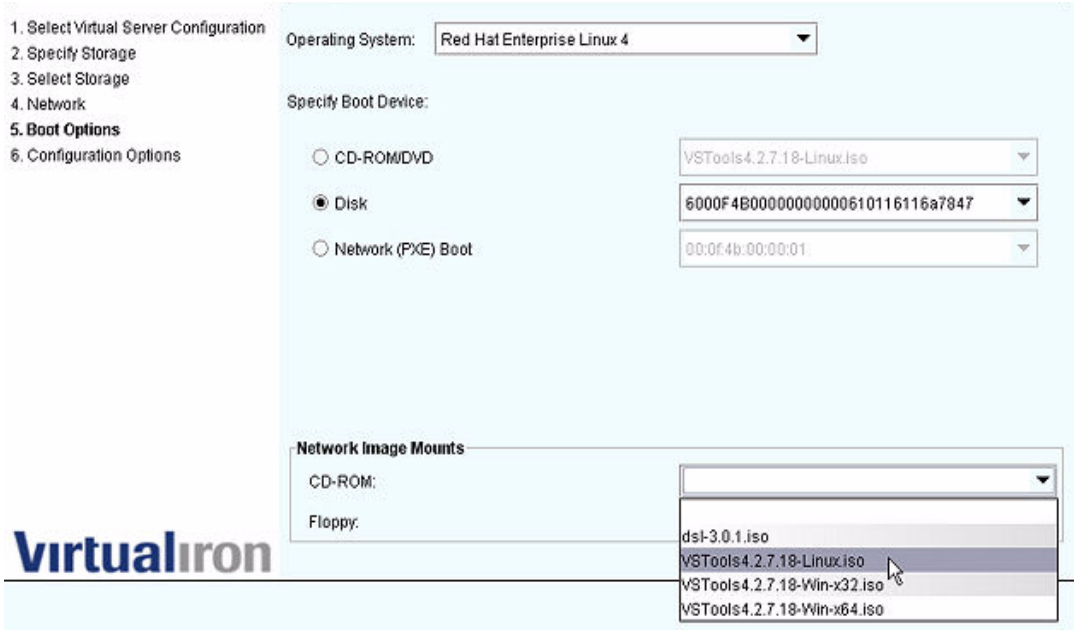
**Figure 87. New Virtual Server Wizard: .iso Boot Option**




- Choose **Disk** to boot from the logical disk or SAN assigned as the boot device for the VS.

  - If you also want a CD-ROM or floppy associated with this virtual server, in **Network Image Mounts**, specify the .iso file from the pulldown menu. See Figure 88. You can have one CD total and one floppy total.

**Figure 88. New Virtual Server Wizard: Network Image Mounts**




- Choose **Network PXE Boot** to PXE boot the VS from a public network. If you boot off a PXE, you can have one CD total and one floppy total.

You will not be able to configure a LUN unless you have configured SAN access and designated a boot disk, as described in Discovery and Management of Physical Disks.

---

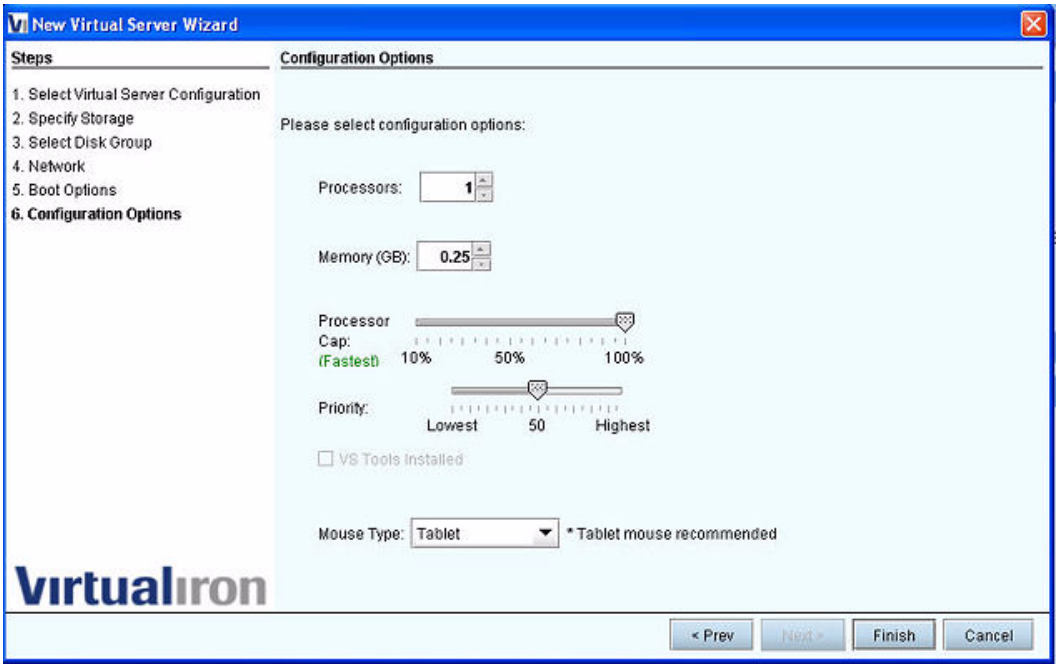
**Note:** See Installing VSTools on Virtual Servers to install VS Tools on an OS. A specific set of VS Tools are shipped for each guest OS supported by Virtual Iron. For enhanced performance and statistics gathering, Virtual Iron® strongly recommends that you use VS Tools.

---

**Step 15.** Click **Next**.

**Step 16.** Configure the number of processors and the amount of node memory allocated to the virtual server, and schedule the priority of this virtual server in relation to others running on the same managed node. See Figure 89. Each of the options is described below.

**Figure 89. New Virtual Server Wizard: Configuration Options**




- **Processors**—Configure the number of processors you want the VS to use. Note that multiple VSs can share the CPUs available on a managed node. If two VSs are running on the same node, you can assign two processors to each of them. Virtual Iron® time-shares available processors among the VSs in a manner that is transparent to all of them. Default for Processors = 1.
- **Memory**—Specify the amount of memory to be allocated to this VS. Unlike processors, memory is not shared among VSs, and cannot be oversubscribed. For example, if Virtual Servers A, B, and C are created on a managed node with 3 GB of memory, and A and B are each allocated 1 GB of memory, C can only be allocated up to 1 GB of memory. If the memory allocations of either A or B (or both) are reduced, C's allocation can be increased commensurately. To determine how much memory is available on a node, consult the node's Virtual Server tab. The default for memory = 256MB (.25 GB).
- **Processor Cap**—The cap optionally fixes the maximum amount of CPU that can be consumed, even if the host has idle CPU cycles. Use the cap to keep low priority virtual servers from consuming too many cycles on a node.

---

**Note:** The virtualization services component running on a managed node consumes a small amount of memory. For this reason, the memory available to virtual servers running on a node is below the total memory available on that node.

---

- **Priority**—If more than one VS is running on the same managed node, use the **Priority** setting to give highest priority to one VS, and less (or equal) priority to others. Priority levels determine which VS is allowed to run first, in the event two are contending for the same physical processors. Set the Priority for a VS from lowest (1) to highest (100). Default for Priority = 50.

---

**Note:** To improve performance, If you are mixing iSCSI-based virtual servers with SAN or local disk virtual servers, set the priority of the CPU on the iSCSI virtual server higher than the SAN or local disk virtual server's priority.

---

- **VS Tools Installed**—Check **VS Tools Installed** if you have installed the VS Tools package on the OS, and you wish to use VS Tools. A specific set of VS Tools is shipped for each guest OS supported by Virtual Iron®. Before enabling VS Tools for a guest OS, read Installing VSTools on Virtual Servers and follow the installation instructions for Windows® or Linux.
- **Mouse type**—Depending on the operating system you specified earlier, **Tablet**, **PS2** or **USB** is set as the default.

# CLONING VIRTUAL SERVERS

Cloning creates a copy of a virtual server. The cloned VS has the same processing, memory, and other characteristics of the original VS, and has access to the same logical disks assigned to the original. However, cloned VSs are not exact replicas of their originals; the cloning operation assigns a new VNIC to the clone (rather than the VNIC used by its parent).

Virtualization Manager does not allow you to move a cloned VS to a VDC unless the VDC has access to the networks or storage configured for that VS.

The VS clone is automatically placed in the **Unassigned** folder of the VDC containing the original VS. To start the VS, move it from Unassigned to a VDC with sufficient memory to accommodate its needs.

Before cloning a virtual server:

- Stop the virtual server. Running virtual servers cannot be cloned.
- Assign a guest OS to the virtual server.
- Make sure the virtual server is not assigned to a local disk or raw disk.

## Preparing a Windows VS for Cloning

Use the Windows utility *sysprep* to prepare a Windows virtual server for cloning. Computers running Windows operating systems have a Security ID (SID) that uniquely identifies the computer or domain, and user. When you clone a Windows virtual server, it is important to ensure that duplicate SIDs are not created.

Sysprep personalizes the cloned computer with characteristics you provide. At the same time, it modifies the local computer SID to make it unique to each computer.

### CLONING WINDOWS VIRTUAL SERVERS

**Step 1.** Create, install, and configure the Windows virtual server as desired.

- If the virtual server you are cloning has storage disks, the clone option displays a dialog box with options for cloning the disks.
- If the virtual server does not have storage, you will not see the dialog box.

**Step 2.** Apply all relevant Windows service packs and updates.

**Step 3.** Install VS Tools. See Installing VS Tools on Windows® Virtual Servers Using a Browser.

**Step 4.** Install desired applications and apply settings as needed.

**Step 5.** Copy the contents of

\support\tools\deploy.cab

from the Windows product CD to a new \sysprep folder in the virtual server.

**Step 6.** Create an answer file with setupmgr.exe.

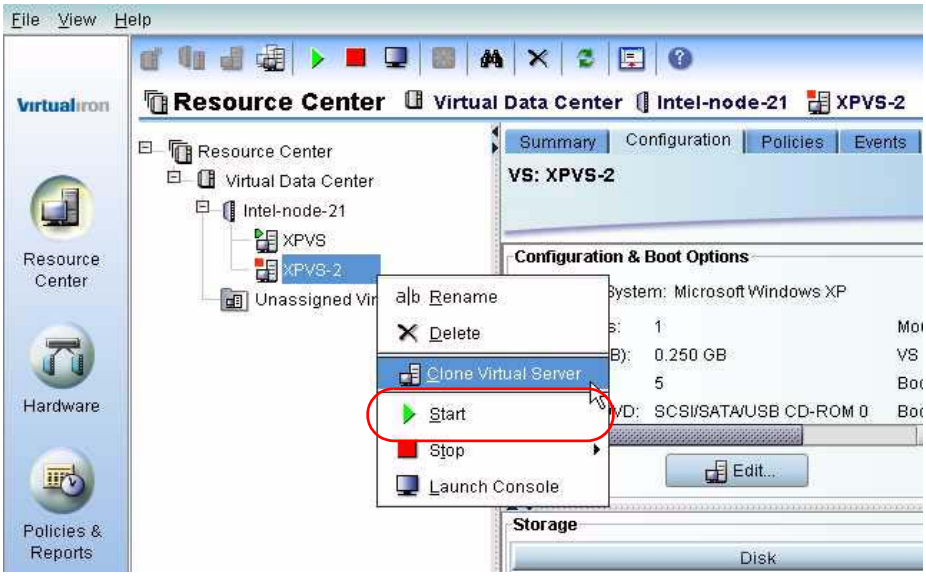
**Step 7.** Run sysprep. This will shut down the virtual server when it completes.

**Step 8.** Clone the newly created template into new virtual servers as required.

## Cloning a Virtual Server

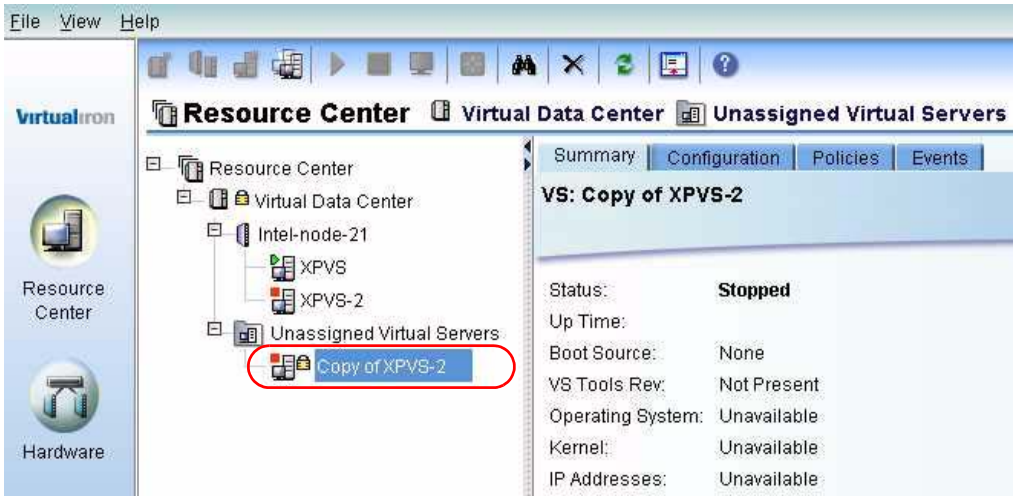
**Step 1.** Select the VS you want to clone, and choose **Clone Virtual Server** from the popup menu as shown in Figure 90.

**Figure 90. Cloning a Virtual Server**



**Step 2.** The cloned VS appears in the Unassigned folder of the VDC, as shown in Figure 91. By default, the cloned VS is called **Copy of VS name**.

**Figure 91. Cloned VS in Unassigned Folder**



# VIRTUAL SERVER SNAPSHOTS

The virtual server Snapshot feature is useful for patch management and backups. Once you have set up a virtual server, assigned storage to it, and are running the virtual server, there are cases when you may want to preserve its current state.

In the case of patch management, for example, you might want to apply a code patch to a virtual server. If you are unsure whether the patch will be successful or could negatively affect your applications, you can select the virtual server and create a snapshot of it. You now have a new virtual server, configured exactly the same as the original, with a snapshot copy of the storage that the original virtual server was using.

If you have high confidence in the patch, you can apply it to your virtual server; if you have low confidence, you can apply it to your snapshot virtual server. In either case, if the patch fails, you can delete the affected virtual server and have a copy that is ready to go in its place.

With backups, you might have a policy specifying that your virtual servers and their data are backed up at regular intervals. Since you cannot clone or export a virtual server when it is running, you can instead use the Snapshot feature. Once you Snapshot the data, you can use Export to pull the data out to a disk for restoring later. See also Snapshots And Disk Space Usage.

## OPERATIONAL CONSIDERATIONS

Once you have created a virtual server snapshot, observe these operational considerations.

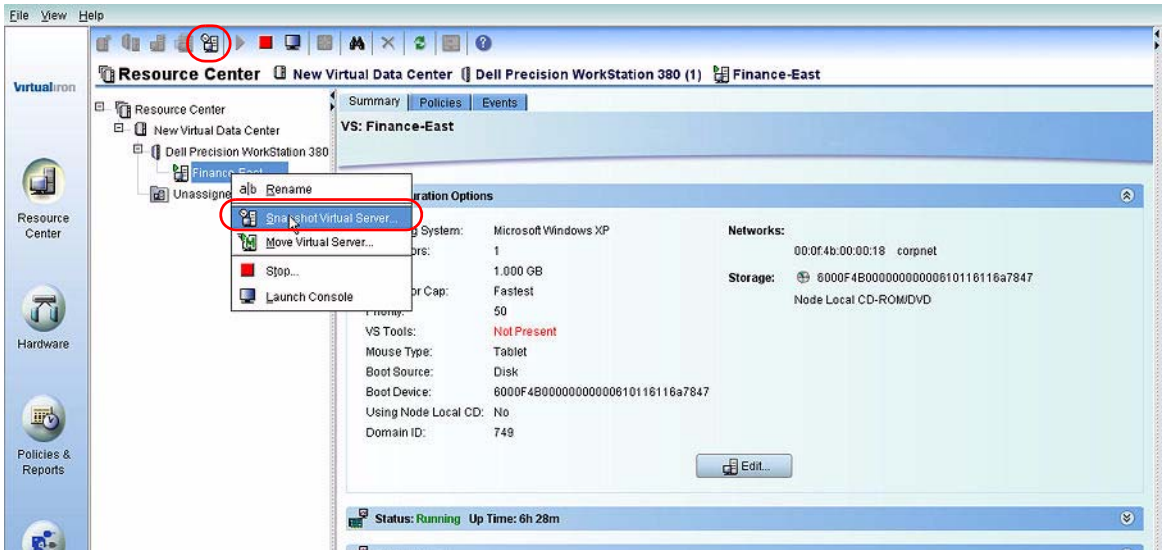
A snapshot virtual server:

- Can be stopped, started, renamed, cloned, and deleted.
- When you take a snapshot of a server with multiple disks, you get a snapshot of all the disks.
- Can *not* be moved off the node where the parent virtual server resides—can not use LiveMigrate.

## Creating a Snapshot of a Virtual Server

**Step 1.** Select a virtual server in the Resource Center and either click the Snapshot icon in the toolbar or right click and select Create Snapshot from the menu. See Figure 92.

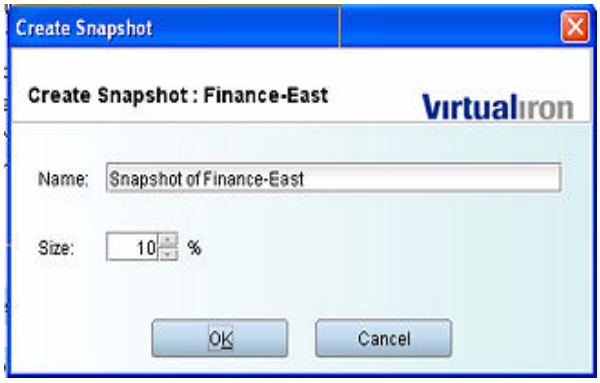
**Figure 92. Snapshot Icon and Menu Selection**




**Step 2.** In the Create Snapshot window, enter a percentage value for **Size**. This is the initial percentage of space to be allocated for snapshot storage. The default is 10%. When half of this allocated free space on the snapshot logical disk is consumed as a result of subsequent writes to the disk, the space utilization is dynamically increased by enough space to keep the storage used at 30%. The system issues warning events and the snapshot disk icon changes to yellow.

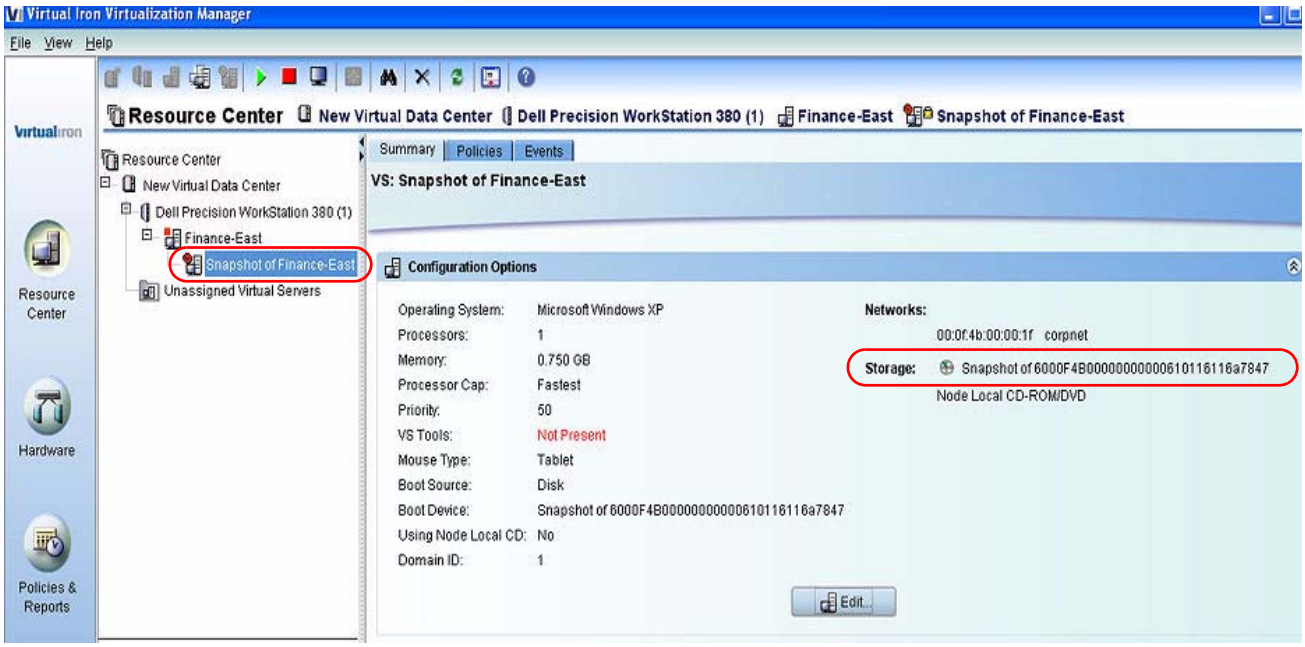
See LVM Snapshot Utilization in the Policies and Reports chapter.

**Step 3.** Click **OK**.



The snapshot virtual server appears in the navigation tree and the Configuration Options section of the Summary window. See Figure 93.

**Figure 93. Virtual Server Snapshot in Navigation Tree and Summary Screen**



# INSTALLING A GUEST OS

You can install an operating system and applications to a virtual server's disks the same way you would on a physical server. Use a physical CDROM (and the installation media provided by your operating system provider) or a network ISO image. If you prefer using ISO images, you can copy them to the NBD directory on the management server and boot using that method.For storage, use either a raw SAN LUN or a logical disk.

Installing an OS from a CDROM involves:

- Creating a virtual server, and moving it to a managed node that:
  - Contains a CDROM drive or has access to an ISO image of the installation.
  - Is connected to the disk on which you intend to install the OS
- Starting the virtual server
- Installing the OS on a specific disk, using your OS's installation program

Use the following steps for any supported operating system.

**Step 1.** Within Virtualization Manager, create a virtual server.

**Step 2.** Drag and drop this virtual server to a managed node with a CDROM drive. Choose **CDROM Disk** as the boot option for the virtual server. Do not choose Use VSTools.

If you are using an ISO image, you can use a node with or without a physical CD-ROM drive.

**Step 3.** Create a logical group and logical disk on the managed node. Then assign the logical disk to the virtual server.

- See Configuring Logical Disks for instructions on creating a disk group and logical disk.
- See Virtual Servers for instructions for assigning a logical disk to a virtual server.

**Step 4.** Disregard this step if you are using a network ISO image.

Insert OS installation Disk 1 in the managed node in which you intend to run the VS. Note that this node must be connected to the disk to which you intend to install the OS.

**Step 5.** Start the virtual server. This begins a standard installation from the CD.

**Step 6.** Open a virtual server console as explained in Launching a Virtual Server Console. The OS installer takes you through available options. If installing Red Hat, or SUSE without networking, continue to the next section.

### If Installing SUSE Linux Using a Network Installation...

When prompted for installation components, do the following:

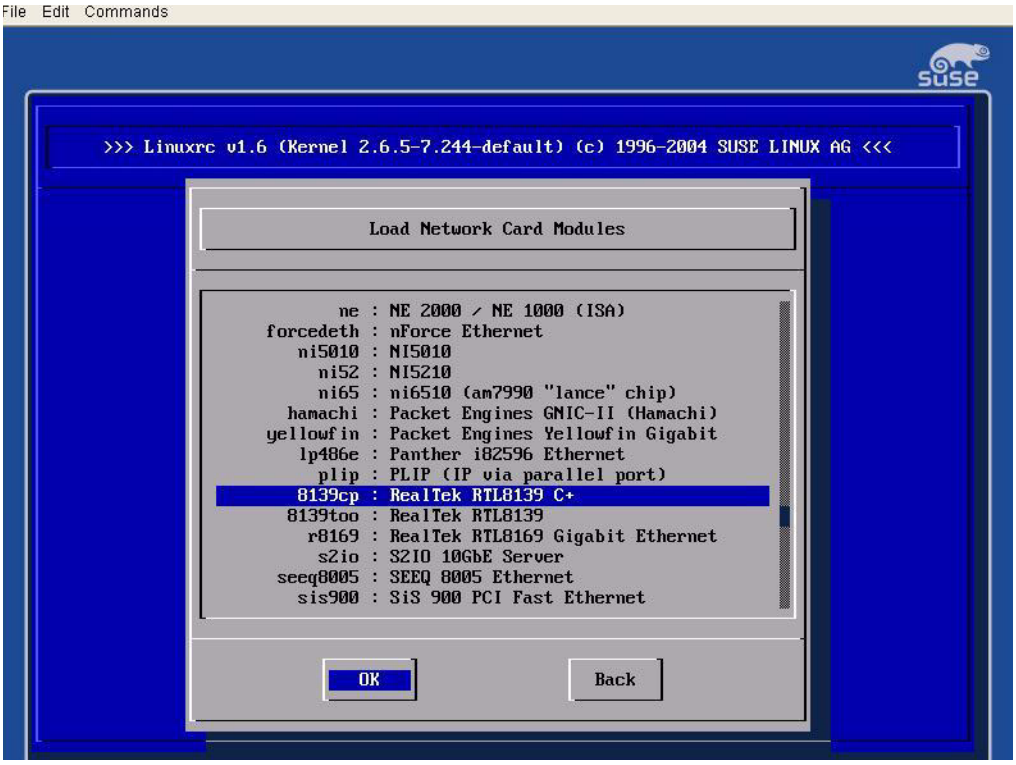
**Step 1.** Choose **Kernel Modules (Hardware Drivers)**

**Step 2.** Choose **Load Network Card Modules**

**Step 3.** Select this driver: **rt18139_cp**

This emulated network driver is included in the Virtual Iron Services layer. Figure 94 shows selection of this driver in the context of a SUSE installation.

**Figure 94. Choose Hardware Driver, SUSE Linux Installation**




**Step 4.** Continue the installation according to the instructions in your installation program.

**Step 5.** When the installation program completes, it instructs you to reboot. *Before you reboot*, use Virtualization Manager to change the virtual server boot option to **Disk Device**, as shown in Figure 88. Do **not** enable **VSTools Installed**.

**Step 6.** Reboot the OS as prompted by the installer. The VS boots from the disk you specified.

# INSTALLING VSTOOLS ON VIRTUAL SERVERS

Virtual Iron® provides VSTools for use by guest operating systems. VSTools provide increased performance and a set of enhanced capabilities:

- Accelerated network and storage block drivers
- The collection of virtual server statistics
- Control of virtual servers (shutdown/restart)
- LiveMigration™ of virtual servers

To make use of these capabilities, install VS Tools on the disk from which the guest OS is booted.

## Installing VS Tools on Linux Virtual Servers Using a Browser

Virtual Iron supports the base kernel as shipped and the latest security kernel. While the use of VS Tools is optional, Virtual Iron® strongly recommends that you install the VS Tools package on the OS disk.

To copy and install VS Tools for a Linux virtual server, do the following:

**Step 1.** Determine the kernel you are using by entering the uname -a command.

**Step 2.** Go to the VSTools directory:

/opt/VirtualIron/VirtualizationManager/system/vstools/rpms

**Step 3.** Locate the appropriate rpm kit in the list.

- It is important to select only the 32- or 64-bit rpm associated with the OS.
- Note that the RPM kit files are release-dependent, as shown in the following example, where x.x.x-yy represents the release:

virtualiron-2.6.5-7.244-bigsmp-x.x.x-yy.i386.rpm

**Step 4.** Copy the appropriate rpm kit from the management server to the virtual server.You can do this from the virtual server console. In this example, the rpm is being copied from the management server (10.1.3.6) to the virtual server (vs037).

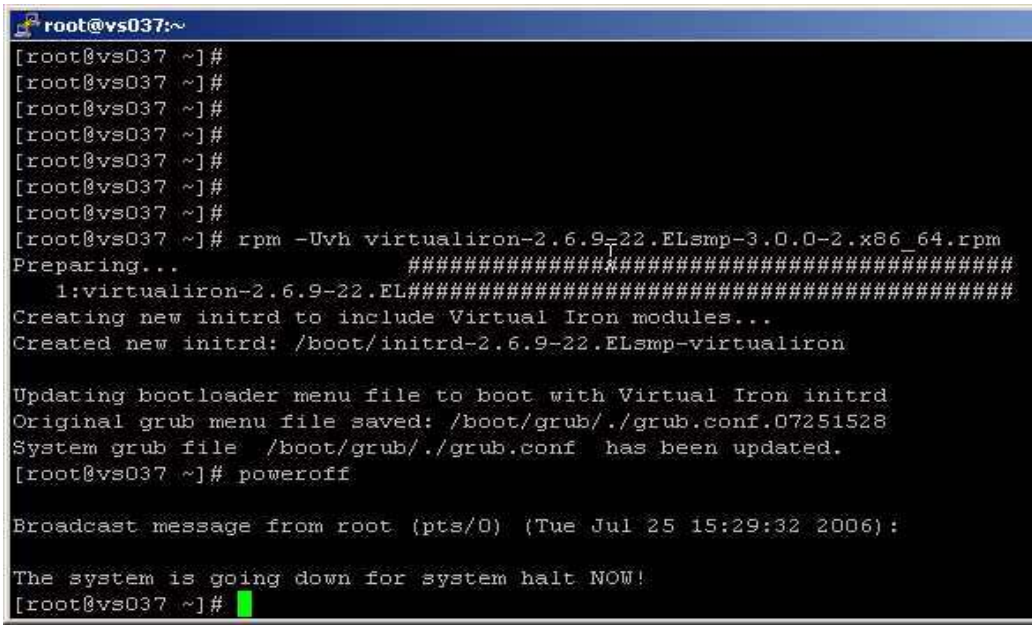
[root@vs037 ~]# scp 10.1.3.6:/opt/VirtualIron/VirtualizationManager/system/vstools/rpms/virtualiron-2.6.9-22.ELsmp-x.x.x-yy.x86_64.rpm.

**Step 5.** Install the VSTools package on the virtual server, using an rpm command as follows:

# rpm -Uvh <rpm kit>

A sample of the installation of the rpm for Red Hat Linux (64 bit) is shown in Figure 95.

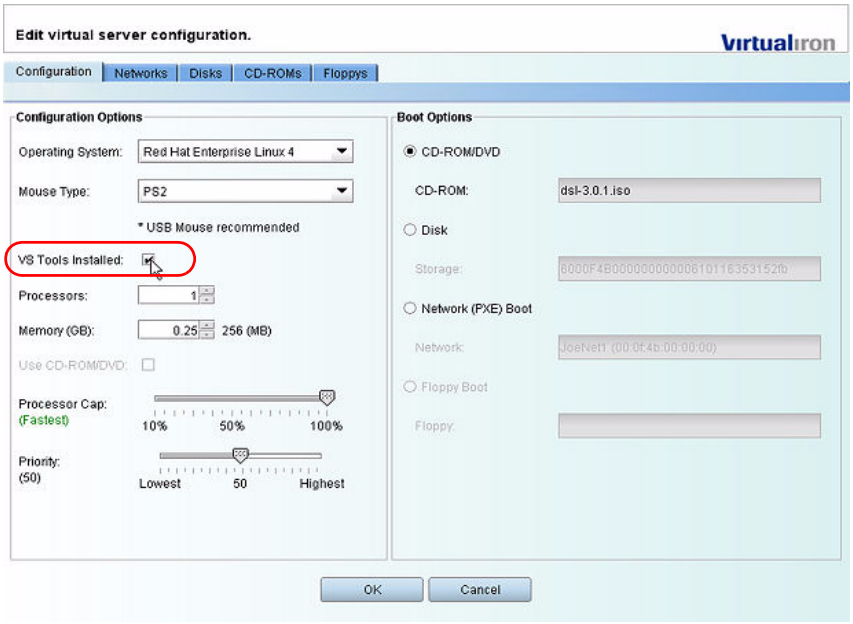
**Figure 95. Sample Installation of RPM Kit**




**Step 6.** After installing the rpm, power off the virtual server from the console as shown in Figure 95.

**Step 7.** Open the Virtual Server boot options window in Virtualization Manager. Check **VS Tools Installed** for the virtual server as shown in Figure 96. Click **OK**.

**Figure 96. Enable VSTools for a Virtual Server**



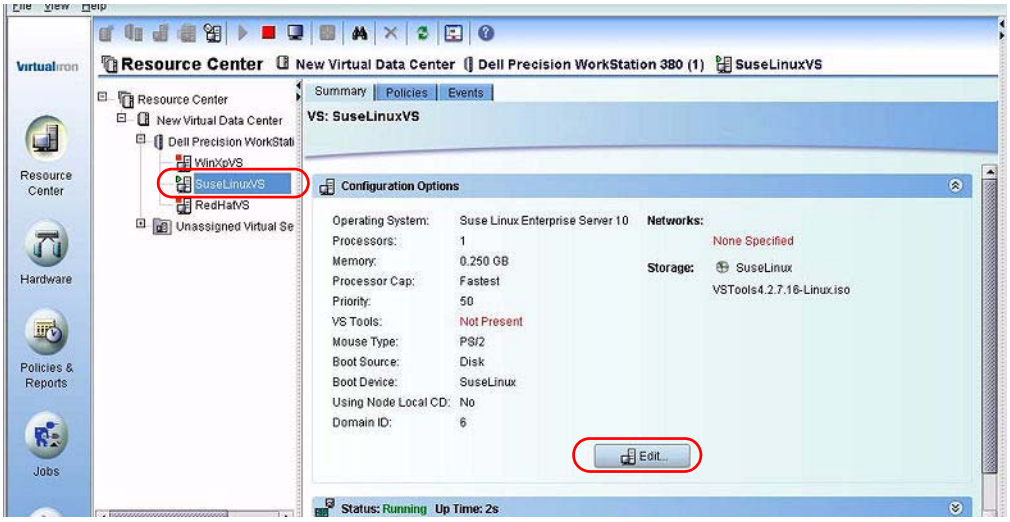

**Step 8.** Start the virtual server as described in Installing a Guest OS. Open a virtual server console and observe the boot process. When the virtual server starts, it will boot the VS Tools package you installed, as shown in Figure 99.

## Installing VS Tools on Linux Virtual Servers Using ISO Images

**Step 1.** In the **Resource Center**, select the virtual server.

**Step 2.** In the Summary screen, click the **Edit** button as shown in Figure 97.

**Figure 97. Selected Virtual Server Summary Screen**

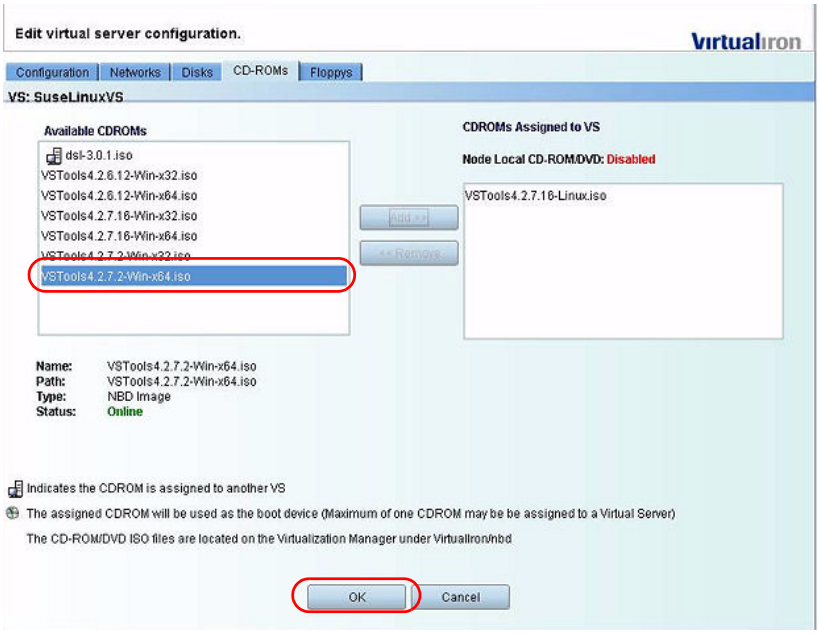


**Step 3.** In the Edit Virtual Server Configuration screen, click the **CD-ROMs** tab.

**Step 4.** Select the VSTools .iso file from the **Available CDROMs** list, and click **Add**.

**Step 5.** Click **OK** to add the .iso file. See Figure 98.

**Figure 98. Select VSTools .iso File**




**Step 6.** Click the **Start** icon and wait for the virtual server to start.

**Step 7.** Click the **Console** icon in the Virtualization Manager action toolbar and login to the console.

**Step 8.** If the CD-ROM is not automatically mounted, enter the following:

```
mount /dev/hdd /cdrom
```

**Step 9.** Locate the appropriate rpm kit in the list.

- It is important to select only the 32- or 64-bit rpm associated with the OS.
- Note that the RPM kit files are release-dependent, as shown in the following example, where x.x.x-yy represents the release:

```
virtualiron-2.6.5-7.244-bigsmp-x.x.x-yy.i386.rpm
```

**Step 10.** Install the VSTools package on the virtual server, using an rpm command as follows:

```
# rpm -Uvh <rpm kit>
```

A sample of the installation of the rpm for Red Hat Linux (64 bit) is shown in Figure 95.

**Step 11.** After installing the rpm, power off the virtual server from the console as shown in Figure 95.

**Step 12.** Open the Virtual Server boot options window in Virtualization Manager. Check **VS Tools Installed** for the virtual server as shown in Figure 96. Click **OK**.

**Step 13.** Start the virtual server as described in Installing a Guest OS. Open a virtual server console and observe the boot process. When the virtual server starts, it will boot the VS Tools package you installed, as shown in Figure 99.

**Figure 99. Virtual Server Startup, with VS Tools Installed**


## VERIFYING THAT VS TOOLS ARE INSTALLED

To see whether VS Tools is installed on a Linux virtual server, issue this command:

```
# rpm -qa | grep virtualiron
```

## UNINSTALLING VS TOOLS

You can uninstall the VS Tools package by issuing this command at the operating system prompt:

```
# rpm -e <rpm kit>
```

---

**Note:** If you uninstall VS Tools, make sure you un-check VSTools for VSs that boot the associated OS. See Figure 96.

---

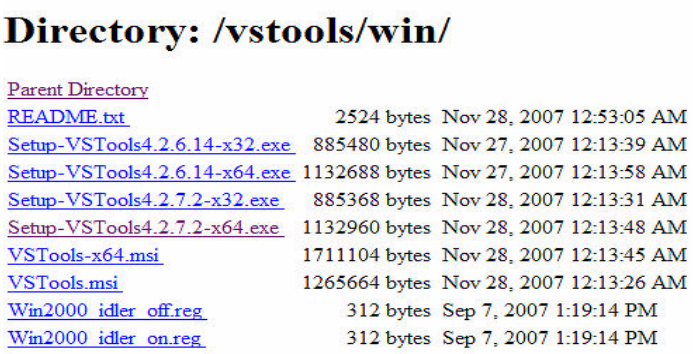
## Installing VS Tools on Windows® Virtual Servers Using a Browser

Virtual Iron® provides a set of VS Tools designed for use with Windows® virtual servers. Follow these steps to install the tools after you have created a VS running Windows® with VS Tools enabled (checked in the Virtual Server Configuration window). For automatic installation of Windows XP or Windows 2003, see VS Tools Silent Install: Windows XP and Windows 2003.

**Step 1.** Boot the Windows® VS, and Log in as **Admin**.

**Step 2.** Open a browser within the virtual server. Enter the IP address of the Virtual Iron Administration Manager and browse to the /vstools/win directory, as shown in Figure 100.

**Figure 100. VSTools Directory, Windows**




**NOTE:** Before performing the next step, be aware of the following: Do *not* install .msi files by double-clicking within a browser. This results in downloading the package into the folder for temporary internet files and installing from that location. The source install folder can not be a temporary folder.

For more information see:

http://msdn2.microsoft.com/en-us/library/aa368328.aspx

**Step 3.** Open the 32- or 64-bit VSTools-4.x.x-xx.msi file for your system, and download it *to your desktop or some other location on a local drive on the virtual server*. Double-click this file.

Or, do one of the following:

- To install from the internet,

  msiexec /i

  http://repo/repository/trees/main/LATEST/staging_win/VSTools-x64.msi

- Or, double click:

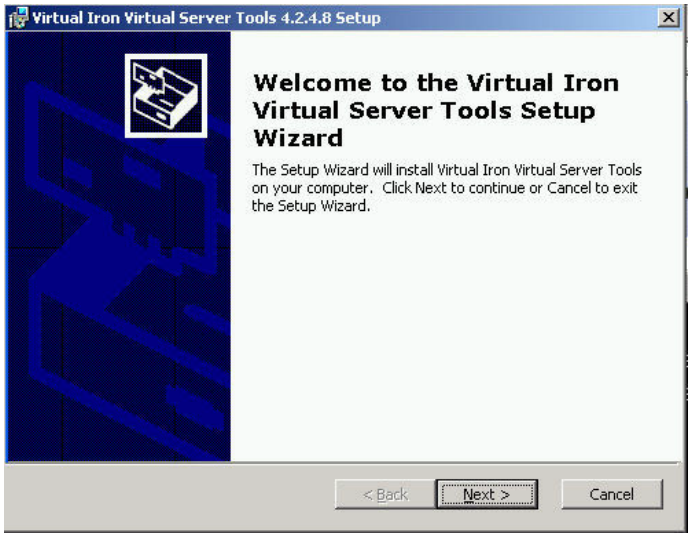
  VSTools4.x.x.x-64.exe

**Step 4.** Launch the installer and follow the prompts in the Virtual Server Tools Setup Wizard.

**Figure 101. Virtual Iron Setup Wizard**


**Step 5.** The following wizard prompts you to install the drivers.

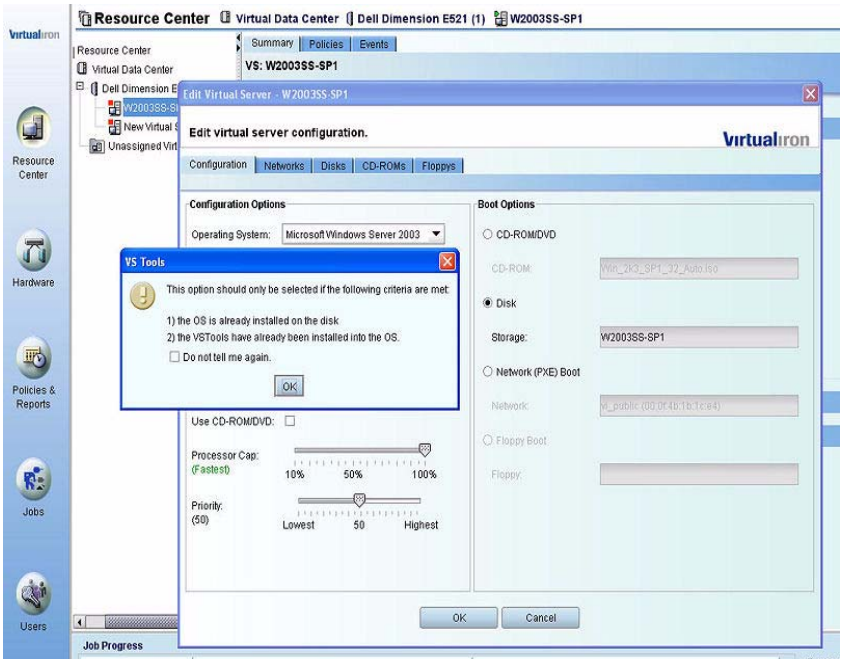
**Figure 102. Virtual Iron Accelerated Drivers Wizard**




**Step 6.** When the installer prompts you to shut down your virtual server, click **Yes**.

**Step 7.** After the virtual server stops, open the VS Configuration window, and check **VS Tools Installed**. Click **OK**. Refer to Figure 103.

**Figure 103. VS Tools Installed Checkbox**




**Step 8.** **Start** the VS. During boot, Windows® discovers the Virtual Iron® Ethernet driver. In the Found New Hardware Wizard, do the following:

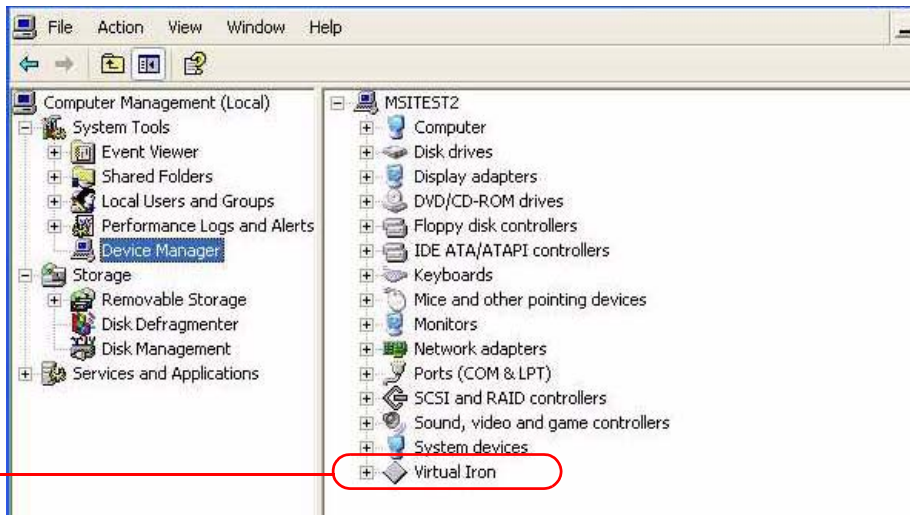
**A.** Select **No Not this time** when prompted to look for a driver update. Click **Next**.

**B.** Check **Install Software Automatically**. Click **Next**.

**C.** Windows begins installing the network driver.

This completes installation of the Virtual Iron® drivers. These appear under Device Manager as shown in Figure 104.

**Figure 104. Virtual Iron® Windows Drivers, Device Manager**




*Virtual Iron® accelerated drivers for Windows®*

## VS Tools Silent Install: Windows XP and Windows 2003

The following procedure automatically installs VS Tools for Windows XP and Windows 2003. Use .msi only for automated installation; use .exe for standard installation. The .exe install also removes prior versions of VSTools, whereas .msi does not.

**Step 1.** In Windows **Start** menu, select **Run**.

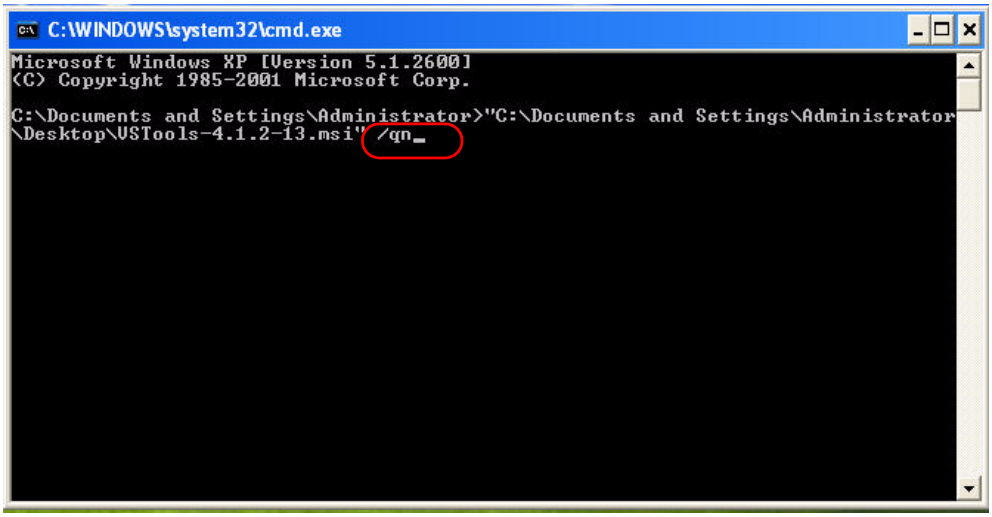
**Step 2.** In the **Run** window, type **cmd**. Press **Enter**.

**Step 3.** In the command console, click the **VSTools.msi** icon and drag it into the console window.

**Step 4.** The command string is automatically entered. Press the space bar.

**Step 5.** In the console window, type **/qn**, as shown in Figure 105**.** Press **Enter**.

**Figure 105. Windows Console, VS Tools Silent Install**




**Step 6.** The VSTools installation starts downloading. Open the VS Configuration window, and check **VS Tools Installed**. Click **OK**. Refer to Figure 103.

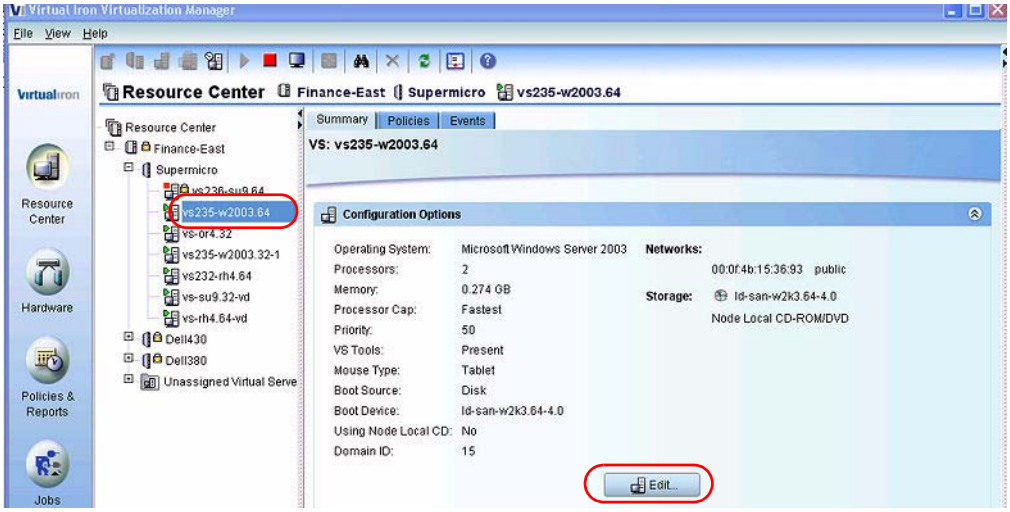
You can choose to disassociate the CD-ROM if you wish.

## Installing VS Tools on Windows Virtual Servers Using ISO Images

**Step 1.** In the **Resource Center**, select the virtual server.

**Step 2.** In the Summary screen, click the **Edit** button. See Figure 106.

**Figure 106. Selected Virtual Server Summary Screen: Windows**

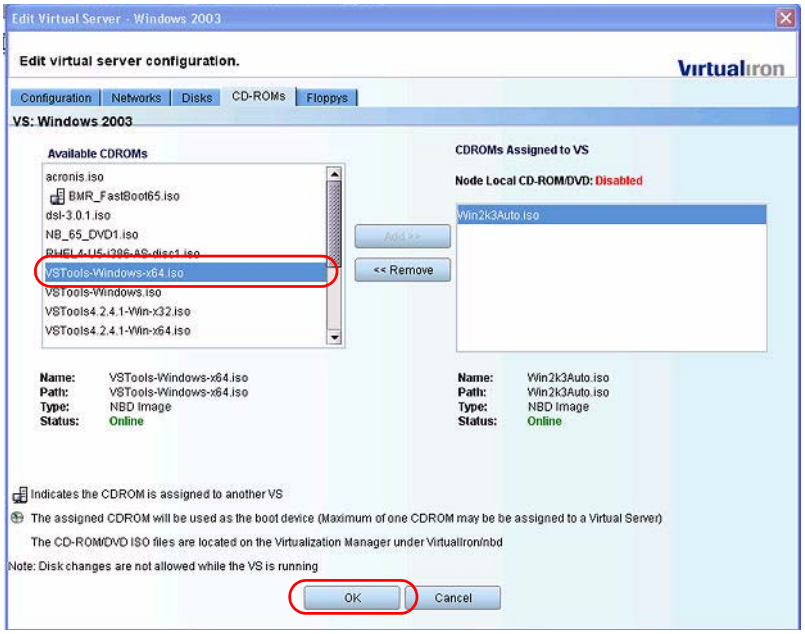



**Step 3.** In the Edit Virtual Server Configuration screen, click the **CD-ROMs** tab.

**Step 4.** Select the 32-bit or 64-bit VSTools .iso file from the **Available CDROMs** list, and click **Add**.

**Step 5.** Click **OK** to add the .iso file. See Figure 107.

**Figure 107. Select VSTools .iso File**




**Step 6.** Click the **Start** icon in the Virtualization Manager application toolbar and wait for the virtual server to start.

**Step 7.** Click the **Console** icon in the action toolbar and login to the console.

**Step 8.** .On your Desktop, open My Computer and double-click on the CD-ROM drive. The installation starts automatically.

**Step 9.** Follow the prompts in the Virtual Server Tools Setup Wizard.

# SPECIAL CONSIDERATIONS FOR WINDOWS 2000 OS

When a Windows 2000 system is idle, it will appear to be consuming no CPU resources. Task Manager will show that the CPU is idle. However, Windows 2000 is actually executing instructions in its idle loop. These cycles will not be available for use by other virtual servers on the same node. In order to get Windows 2000 to act like the other more recent Windows operating systems and actually relinquish the CPUs when idle, do the following:

**Step 1.** Make sure VS Tools are loaded and running in the Windows 2000 virtual server.

**Step 2.** Open a browser within the Windows 2000 virtual server, and navigate to the Virtualization Manager's IP address. You will see the Virtual Iron Virtualization Manager home page.

**Step 3.** Click the **VS Tools Installers** link.

**Step 4.** Click the **win /link**.

**Step 5.** Click the **Win2000_idler_on.reg** link and download that file to the virtual server. Do the same for **Win2000_idler_off.reg**.

**Step 6.** Double click **Win2000_idler_on.reg** to read the idler information into the Windows Registry.

**Step 7.** On the Windows 2000 desktop. Right click the **My Computer** icon and select **Manage**.

**Step 8.** Navigate to **Services** and **Applications > Services**.

**Step 9.** Find the Virtual Iron Service and right-click **Restart**.

A side-effect of the idler is that it will appear that the **ViStats.exe** process is consuming all idle cycles in the virtual server. In fact, it only appears this way; it is actually releasing control to the underlying virtualization services so that idle cycles can be used by other virtual servers.

Turn the idler off by double-clicking the **Win2000_idler_off.reg** file and then restarting the Virtual Iron Service. Virtual Iron recommends that the idler is turned on.

# STARTING AND STOPPING VIRTUAL SERVERS

Virtual servers that are running are marked with a green triangle in the navigation tree. Virtual servers in a Stopped state are marked with a red box in the navigation tree.

## Starting a Virtual Server

To start a virtual server:

**Step 1.** A stopped virtual server is marked with a red square in the navigation tree. Click the virtual server to select it, and perform one of the following actions:

- Select the Start Virtual Server icon in the application toolbar. This icon is shown in Figure 108.

**Figure 108. Start Virtual Server Icon**

*Start and Stop virtual server icons*


- Right click on the VS and select **Start** from the pop-up menu.

**Step 2.** When you issue a Start command, the command appears as an operation in the Job Operations tab at the bottom of the management pane.

## Stopping a Virtual Server

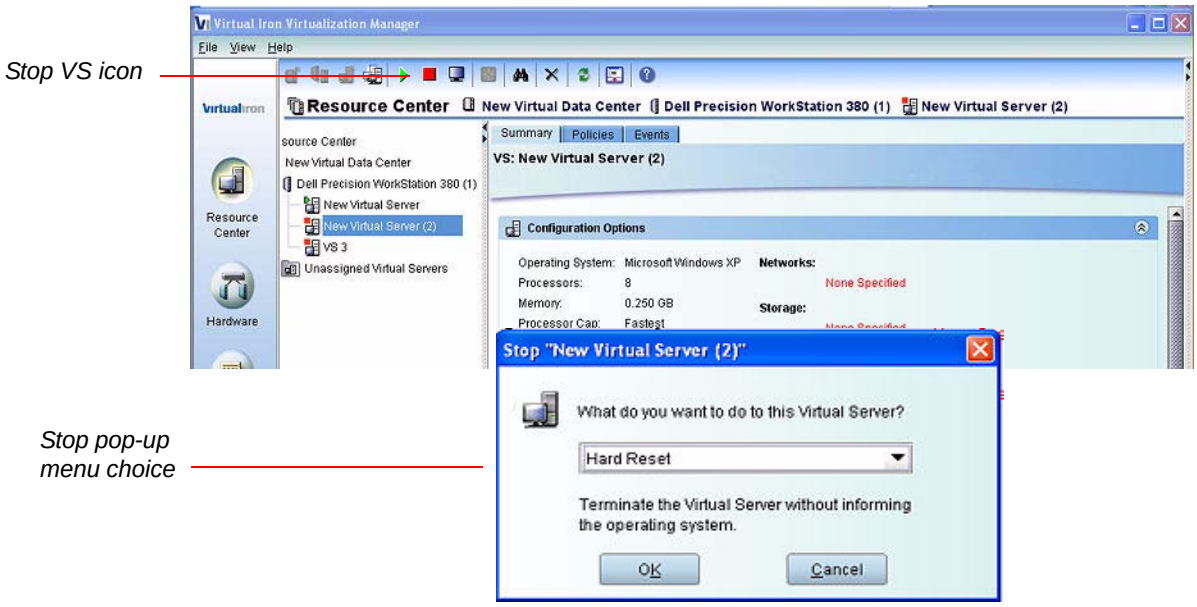
To stop a running virtual server:

**Step 1.** Select the virtual server in the navigation tree.

**Step 2.** Stop the server in by doing one of the following:

- Click the **Stop** icon in the application toolbar.
- Select the server and choose an option from the **Stop (New Virtual Server)** pop up menu as shown in Figure 109.

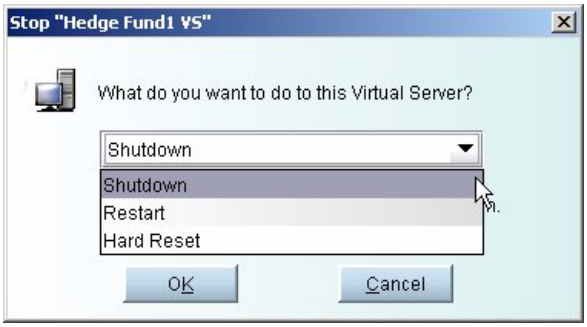
**Figure 109. Stopping a Virtual Server**




**Step 3.** If you do not have VSTools installed, **HardReset** is the only option, as shown in Figure 109. Click **OK**.

If VSTools are installed, choose from the options in the **Stop (New Virtual Server)** popup, shown in Figure 110, and described below:

**Figure 110. Virtual Server Stop Options**




- **Shutdown**—Performs an orderly OS shutdown. This requires VSTools installation, as explained in Installing VSTools on Virtual Servers.
- **Restart**—Performs an orderly OS shutdown followed by a virtual server restart.
- **Hard Reset**—Performs a forced stop. The virtual server is terminated without informing the OS. Perform a Hard Reset only when the VS does not respond to Shutdown or Restart commands. You may need to perform a hard reset if a VS does not have VS Tools installed.

Choose a shutdown option for the server and click **OK**.

# LAUNCHING A VIRTUAL SERVER CONSOLE

To open a console for a virtual server:

**Step 1.** Select the virtual server in the navigation tree.

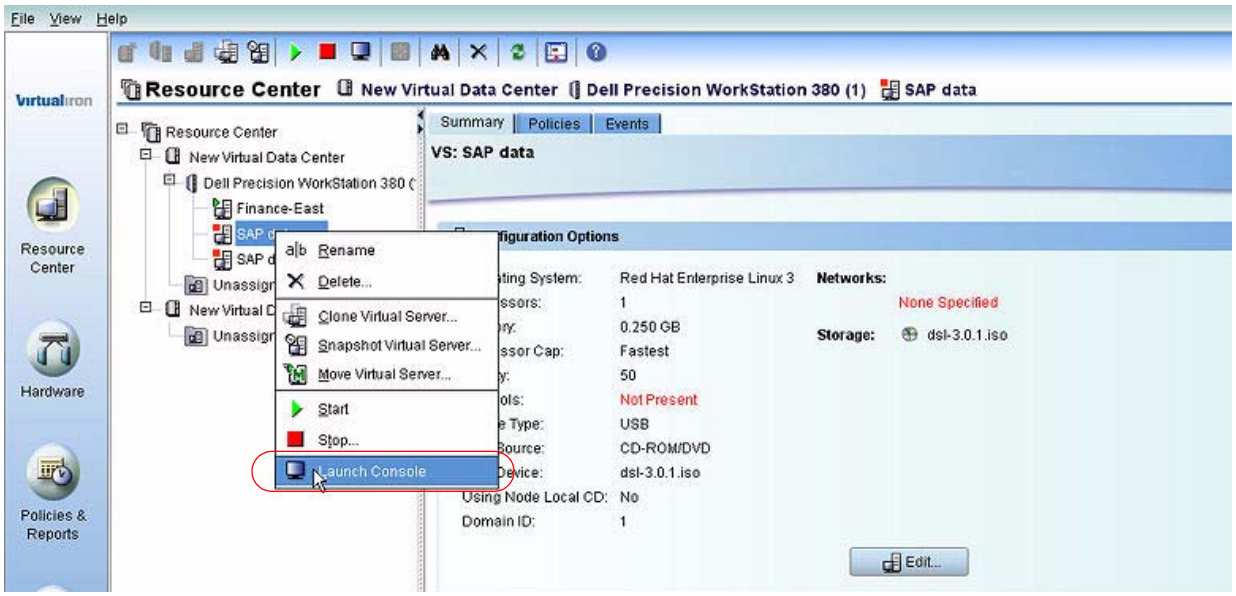
**Step 2.** Launch a console by doing one of the following:

- Click the console icon in the application toolbar. See Figure 111.

**Figure 111. Launch Virtual Server Console icon**


- Right-click on a running virtual server and choose **Launch console** from the menu options as shown in Figure 112.

**Figure 112. Launch virtual server option, pop-up menu**




**Step 3.** Press Enter several times in the open console window to get focus at the OS prompt. The console can be resized, run in the background, and dismissed (closed) as needed.

The virtual console shows the boot sequence for Red Hat Linux or the boot sequence for Window® XP Professional.

# CONFIGURING POLICY-BASED MANAGEMENT

Virtual Iron® provides advanced features that support high-availability for virtual servers—**LiveCapacity**, **LiveRecovery**, and **LiveMaintenance**. These features include:

- Automatically balancing processing loads across a set of physical machines
- The ability to move running virtual servers from host nodes to different machines to facilitate maintenance operations
- Automatically moving and restarting virtual servers on a new node if a hosting node fails.

These and other features provide policy-based automation of virtual and physical resources. This allows administrators to manage and deliver services more efficiently by reducing the complexity and costs involved with operating enterprise data centers. See Starting System Policies for detailed information and policy procedures.

## LiveCapacity™

LiveCapacity™ optimizes virtual server use across a shared pool of resources. It automatically moves running virtual servers to a new physical server in a VDC if any of the servers exceed a specified CPU threshold for a specified period of time.

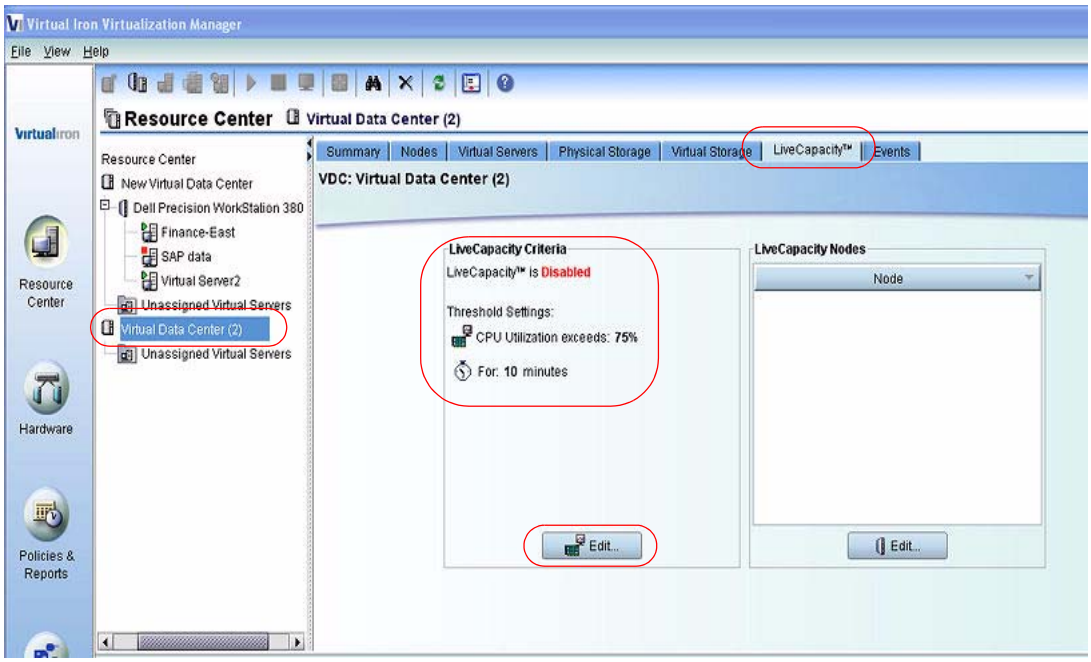
LiveCapacity™ continuously samples performance data from every node and every virtual server. The movement of virtual servers is policy-driven. When a threshold is reached, Virtual Iron® LiveMigrate™ technology relocates running GOSs and their applications from one physical server to another without down time. Virtualization Manager™ allows you to specify a LiveCapacity™ threshold for each Virtual Data Center, and to choose the set of nodes that will participate in the policy.

### CONFIGURING LIVECAPACITY

**Step 1.** In the **Resource Center**, select the virtual server in the navigation tree.

**Step 2.** Select the **LiveCapacity** tab. Note that LiveCapacity shows as **Disabled**, and that current threshold settings are listed. See Figure 113.

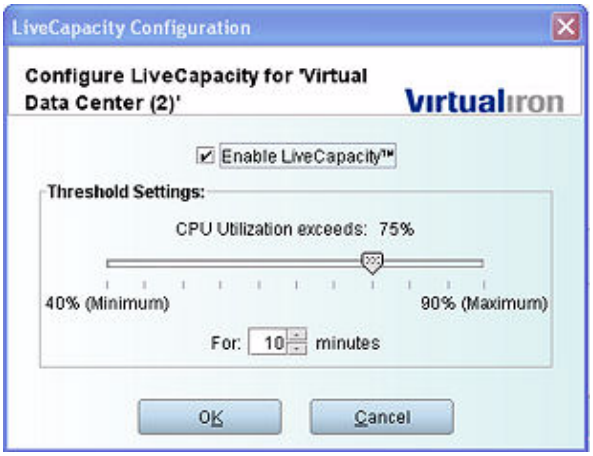
**Figure 113. LiveCapacity Criteria and Threshold Parameters**




**Step 3.** Click the **Edit** button in the LiveCapacity Criteria portion of the screen.

**Step 4.** In the LiveCapacity Configuration window, click the **Enable LiveCapacity** checkbox. Set a percentage for CPU utilization and a maximum time period for that threshold to exist. Click **OK**.

Note that Live Capacity is now Enabled in the LiveCapacity Criteria window.




**Step 5.** Click **Edit** in the **LiveCapacity Nodes** section of the window as shown in Figure 113, to Add or Remove available nodes to or from the pool of nodes that will participate in the policy. Click **OK**.

## LiveRecovery

**LiveRecovery™** provides high availability for virtual servers by automatically moving them to a new physical server if their managed node fails. In contrast to LiveCapacity, which is enabled at the VDC level, LiveRecovery™ is enabled for each virtual server on a case-by-case basis.

Once enabled, LiveRecovery checks the VSs as they start running to test whether they can respond to a ping to any of their IP addresses. If pings to any interface are successful, the VS is declared a candidate for LiveRecovery and the VS is shown as protected.

### LiveRecovery Requirements

For LiveRecovery to operate properly, certain conditions must be met for each virtual server (VS).

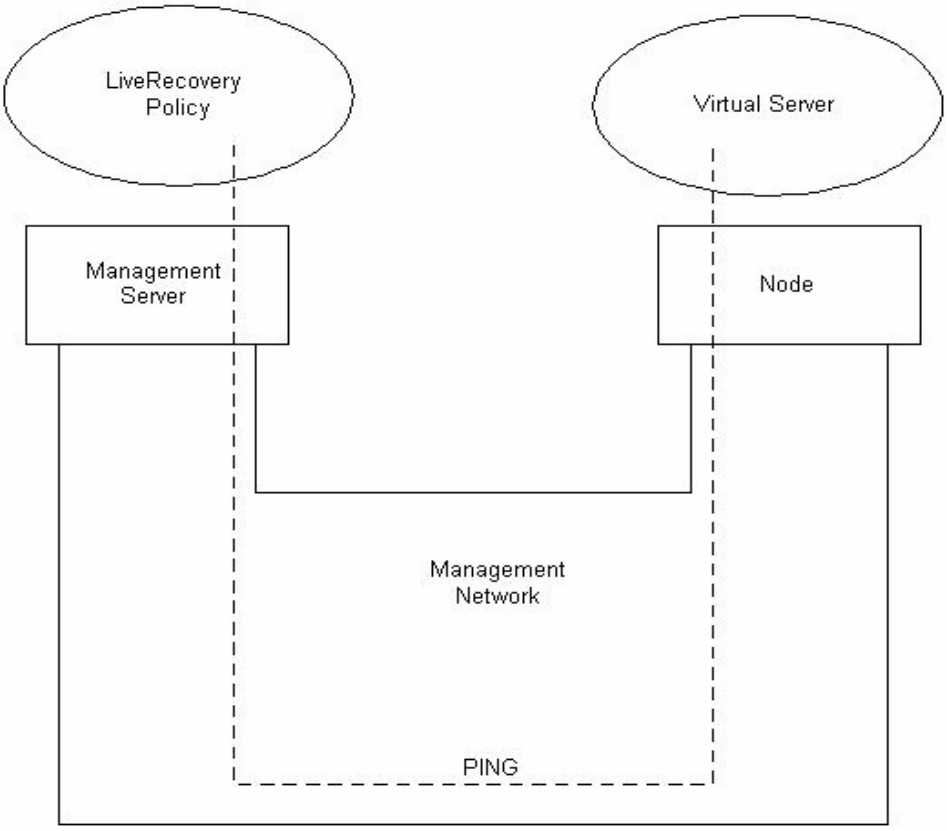
- Assure that the VS is *not* configured with a network (image) boot device.
- VSTools must be enabled on the virtual server to get the virtual server's IP address.
- Check that the VS is reachable by the management server via at least one of its Ethernet networks, and that ICMP is enabled in the VS. ICMP is required to allow the VS to respond to a network ping.
- Assure that at least one node that meets the following requirements is available in the VDC:
  - Enough free memory to accommodate the moved VS.
  - A running destination node.
  - The same as, or greater than, the number of CPUs in the VS.
  - Connectivity to all the disks assigned to the VS. This means that LiveRecovery will not work on a VS with any local storage assigned to it.
  - Connectivity to the networks configured on the VS. LiveRecovery checks all the networks assigned to the VS's VNICs, so a destination node must have all those networks configured on them.

### How LiveRecovery Works

The LiveRecovery policy uses the Management Network to detect that a node is disabled. However, if this were the only determinant, a pulled cable on the Management Network would initiate LiveRecovery, with the undesirable result of having two VSs writing to the same set of disks.

Therefore, the LiveRecovery policy checks whether the node is really down by pinging all the network interfaces on all the VSs on the suspected inoperable node. If any interfaces respond, the policy assumes the node is still operating and does not perform a LiveRecovery.

**Figure 114. LiveRecovery**



Click the Virtual Server **Policies** tab to see the state of LiveRecovery for the VS:

| | Meaning |
|---|---|
| Not Applicable | The virtual server is unassigned and/or VS Tools are not enabled. |
| Not Enabled | The LiveRecovery option is not selected for this virtual server. |
| Inactive | The LiveRecovery policy is not running. |
| | The LiveRecovery policy was deleted or is missing. |
| Initializing | LiveRecovery is attempting to contact (ping) the node on which the virtual server is running. |
| Not Protected | Contact attempt (ping) was unsuccessful; the VS will not be moved to a new node and restarted if the current node fails. |
| Protected | Contact attempt (ping) was successful; the VS will be moved to a new node and restarted if the current node fails and a suitable new node is available. |

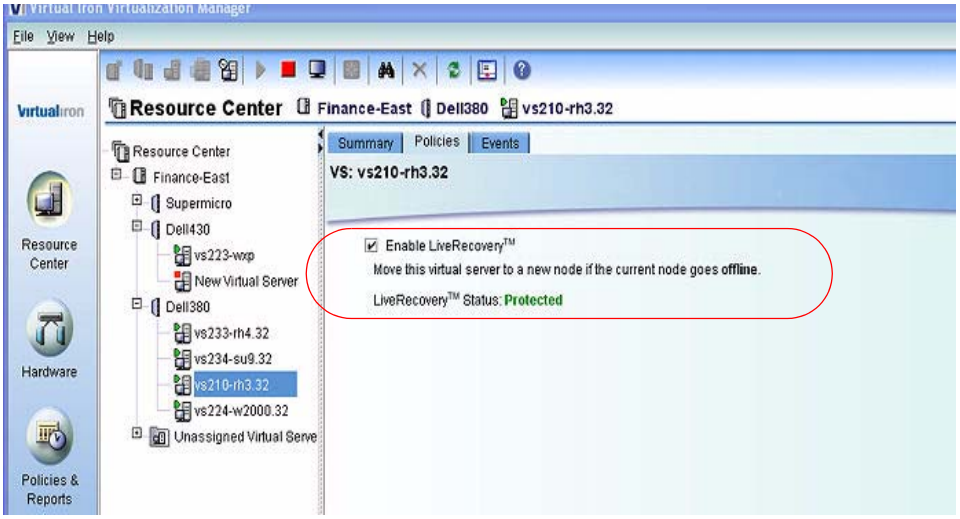
## CONFIGURING LIVERECOVERY

**Step 1.** Select the virtual server in the Resource Center view.

**Step 2.** Select the **Policies** tab.

**Step 3.** Check the **Enable LiveRecovery** tab. Note that the status changes from Unprotected to Protected. See Figure 115.

**Figure 115. Enabling LiveRecovery™ for a Virtual Server**



## LiveMaintenance™

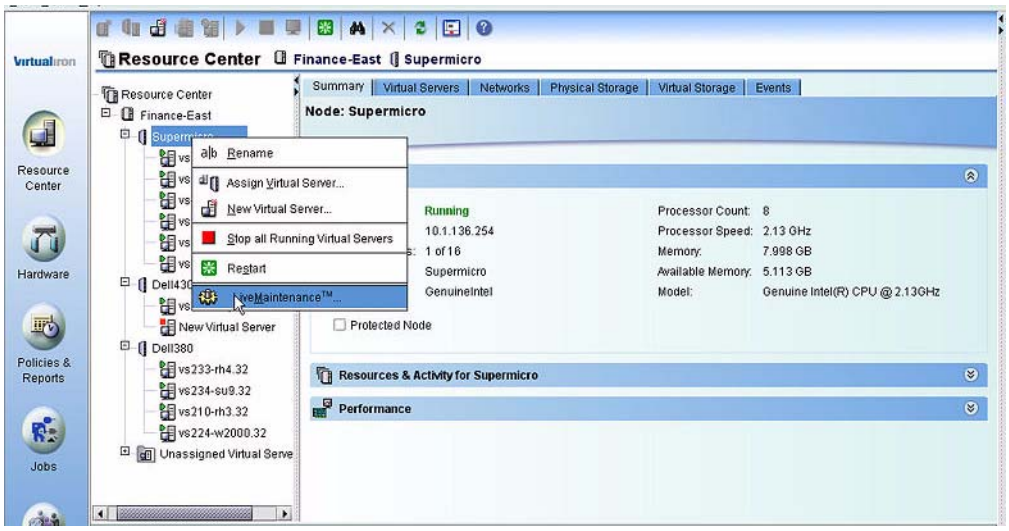
LiveMaintainence™ moves virtual servers to a new machine based on administrative intervention in the event a host server needs service. Server maintenance can be performed outside of scheduled maintenance windows without application downtime. With LiveMaintenance™, physical servers can be removed and reinstated at any time. The pool's capacity changes dynamically and the placement of virtual servers is automatically optimized. Operating system and application patch management activities can be tested with a snapshot of a "live" configuration before production deployment.

### CONFIGURING LIVEMAINTENANCE

**Step 1.** Select and right-click the virtual server in the Resource Center.

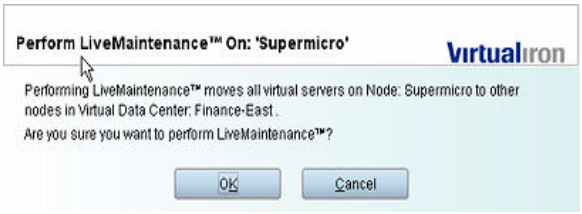
**Step 2.** Highlight LiveMaintenance. See Figure 116.

**Figure 116. LiveMaintenance™ Control**




*Moving virtual servers with LiveMaintenance*

**Step 3.** Click **OK** in the pop-up window.



# MOVING VIRTUAL SERVERS AND NODES

Virtual Iron® can adapt on-demand to changing business requirements. In this framework, virtual servers and the managed nodes that host them can be moved to accommodate administrative requirements.

Objects that can be moved are described in Table 3:

Table 3. Object Movement in the Virtual Iron® Framework

| | **Movement From, To...** |
|---|---|
| Node | • VDC to VDC<br>• VDC to Resource Center |
| Virtual Server | • Node to node<br>• Node to VDC<br>• Node to Unassigned |

## The Role of the Resource Center

**Resource Center** is the top-level object in the navigation tree. This object contains all VDCs, nodes, and VSs under management by Virtual Iron. Within the Resource Center, you can create separate node groups called Virtual Data Centers (VDCs). Each VDC is an administrative entity that can contain one or more managed nodes and the VSs hosted by these nodes.

## Moving Nodes to a VDC

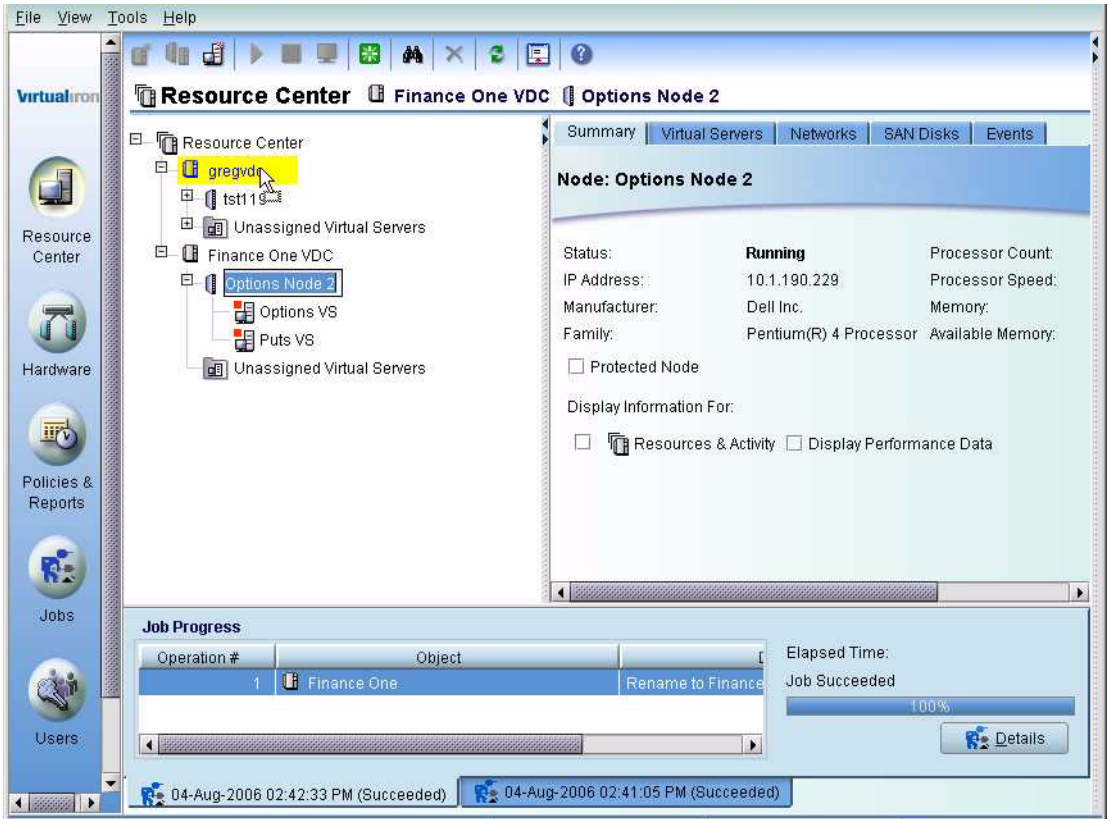
Virtualization Manager supports drag-and-drop control for managed nodes. Use drag-and-drop to move a node from one VDC to another, or to or from the Resource Center. An example is shown in Figure 117. To move a node:

**Step 1.** Select the node you want to move by depressing a mouse key.

**Step 2.** Drag the node to its new location, and release the mouse key.

Figure 117 shows managed node Options Node 2 (located in Finance One VDC) being dropped on *gregvdc*.

**Figure 117. Dragging a Node to a New VDC**



## Moving a Node to Resource Center

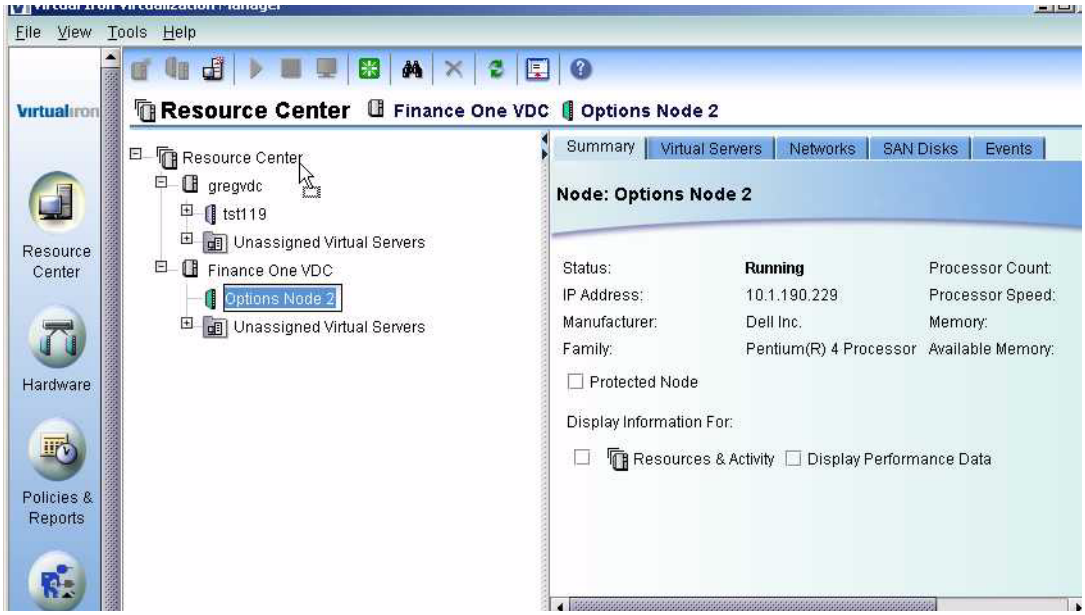
Managed nodes can only be used to host virtual servers when they belong to a VDC. Moving a node to a VDC places the node under ownership of that VDC. Moving a node from a VDC to Resource Center frees the node, making it available for reassignment to another VDC.

Since virtual servers consume node memory (even when offline), nodes that host virtual servers cannot be moved out of their current VDC. Any attempt to move a node that still hosts virtual servers produces the message shown in Figure 118.

**Figure 118. Message: cannot Move Node with Virtual Servers**


Figure 119 shows a node being moved from a VDC and dropped on **Resource Center**.

**Figure 119. Node moved to Resource Center**



## LiveMigrate: Conditions for Virtual Server Movement

In multi-node environments, Virtual Iron® allows you to move a running or offline virtual server from one physical server to another with LiveMigrate™. You may do so without affecting applications. Simply drag and drop the virtual server from its existing location to another node or virtual data center.

### LIVEMIGRATE™ REQUIREMENTS

Before you can move a virtual server from one managed node to another node or to a new VDC, Virtualization Manager evaluates the following:

- Does the managed node have enough memory to accommodate the virtual server? There must be at least the same amount of memory in the target node as in the original node.
- Are the processors of the same processor family? Only Intel-to-Intel or AMD-to-AMD migration is allowed.
- Are there the same or a greater number of CPUs?
- Is there access to a common physical disk pool?
- Does the node have access to the same network and/or SAN resources needed by the virtual server?

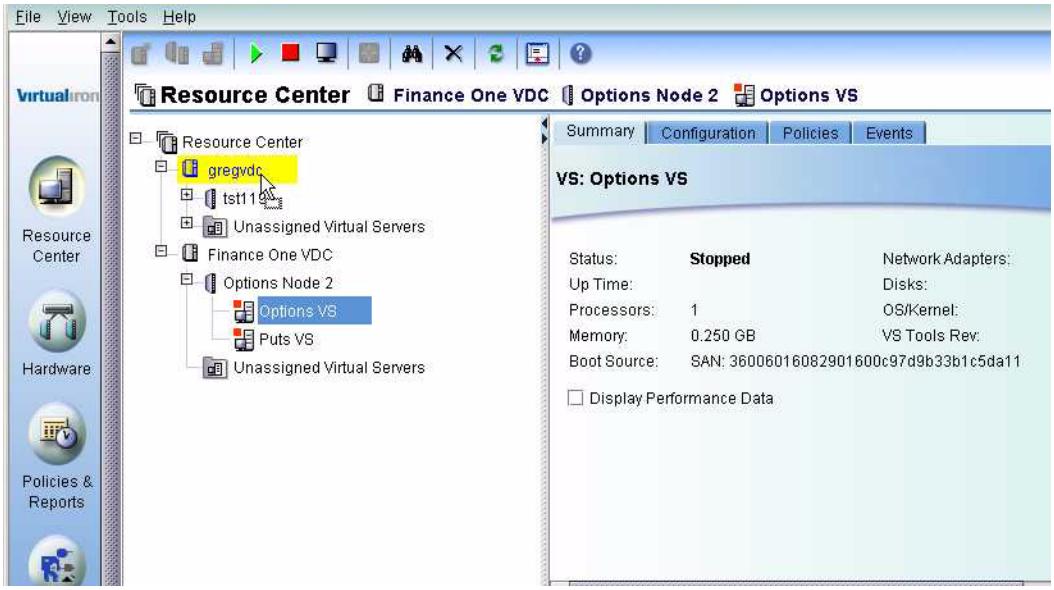
If the virtual server is running:

- The destination mode must be running also.
- VS Tools must be enabled
    - Accelerated drivers must be installed on the virtual server
    - The VS Tools checkbox must be checked.

### MOVING A VIRTUAL SERVER TO A NEW NODE OR VDC

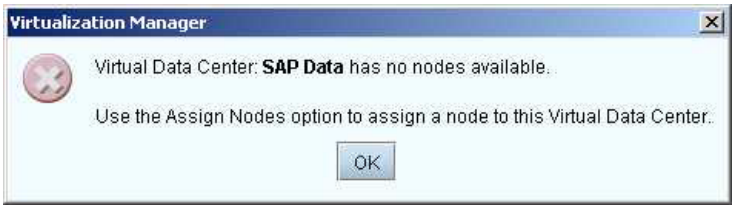
Before you can place a virtual server on a different managed node, Virtualization Manager checks the LiveMigrate requirements. If the virtual servers on the source node can function on the target managed node, Virtualization Manager allows the operation. If they are not met, movement of the virtual server is disallowed.Figure 120 shows *Options VS* being moved to *gregvdc*.

**Figure 120. Moving a VS to a New Node**



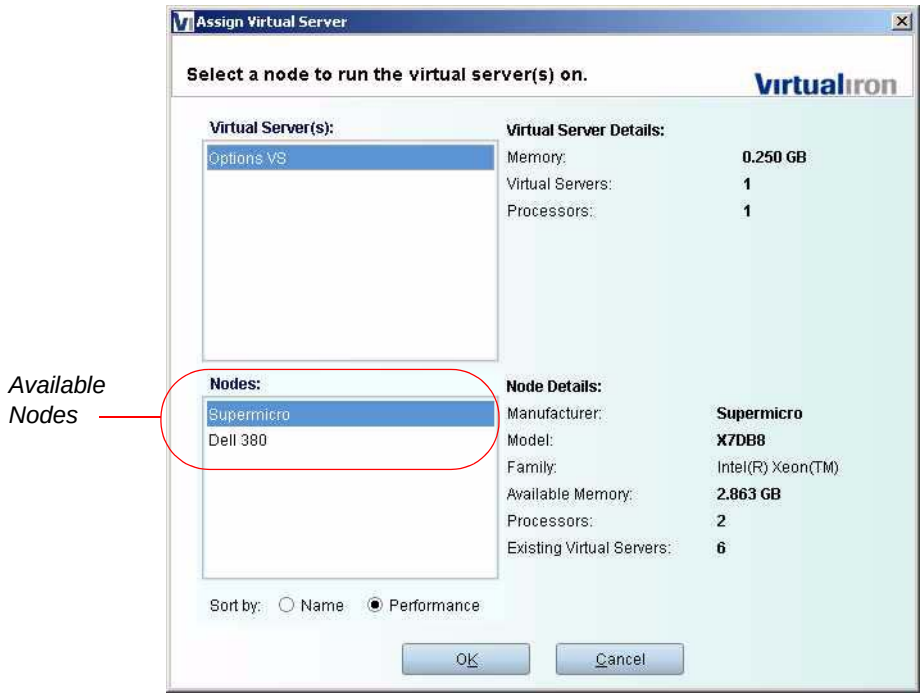

## NODE CHOICES AND RESTRICTIONS

Virtualization manager disallows movement of a VS to a VDC that has no nodes. If you attempt this operation, the following message appears:



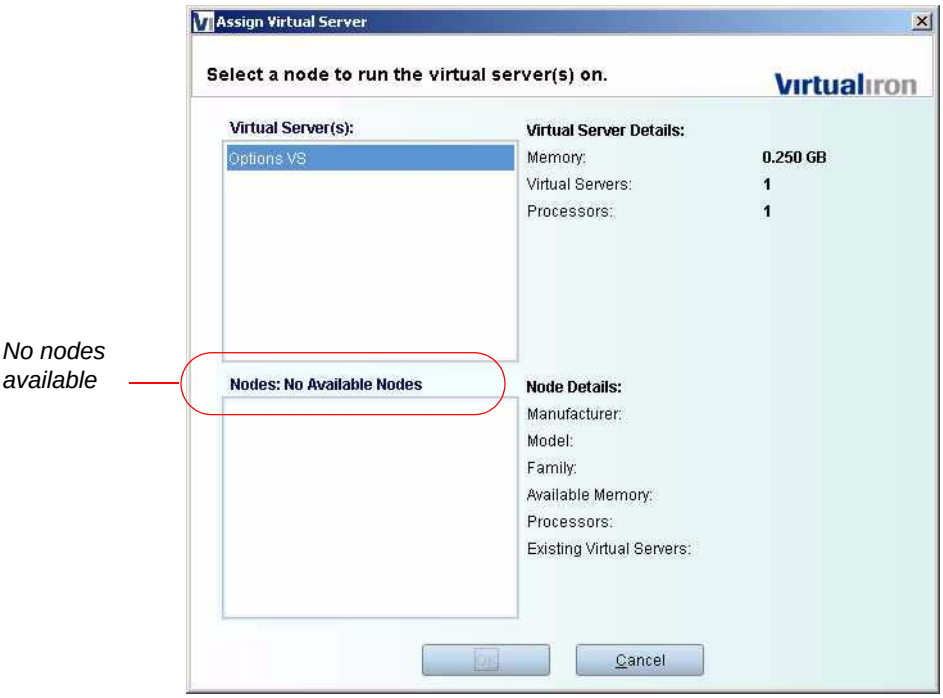

If a VDC contains more than one node that is eligible to host the VS you are moving, the dialog shown in Figure 121 appears. To complete the operation, select a node from the list of those available, and click **OK**.

**Figure 121. Choosing a Node to host a VS**




If you attempt to move a VS to a new VDC that does not have sufficient memory, processors, or access to the required SAN and Networks, the following dialog box appears.

**Figure 122. No Available Nodes for use by Virtual Servers**



# PROVISIONING VSS WITH GOLD MASTERS

It is useful to create a *gold master* for each GOS supported in your data center. This is a logical disk that serves as a container for an installed GOS. When you need to create a new VS running that GOS, simply clone the master logical disk and assign it to the LV. You can boot the VS without going through the OS installation process again. Simply create a new VS and assign the cloned master logical disk to it.

If you need to rapidly provision new VSs on an ongoing basis, it makes sense to maintain a set of gold masters. This saves time, since you perform an installation of each GOS only once. Thereafter, you can clone the GOS to make use of it as often as needed.

Since the cloning operation copies the entire content of a logical disk to a new location, you can copy applications as well as GOSs. For example, you can create a GOS with a specific Linux or Windows distribution and the set of applications required by a particular set of work requirements. As a result, you can automate the delivery of fully or partially configured systems to specific functional areas as needed.

**Note:** Before creating and using a gold master, you should familiarize yourself with license requirements that may apply to the use of OSs and applications.

## Creating a Gold Master Logical Disk

Follow these steps to create a gold master for any GOS supported by Virtual Iron®.

**Step 1.** Create a VS and configure it. Assign a logical disk to it. At this time, the logical disk is empty. Its purpose is to hold a bootable gold master. Rename the logical disk in a way that distinguishes it as such. For example, *Gold-Win2008-04-25*.

**Step 2.** Copy the OS iso files onto a publicly addressable web server. This makes the files available for boot later on.

**Step 3.** Copy the disk1.iso of the OS to the NBD directory of the Virtual Iron® management server.

**Step 4.** Configure the VS to boot from NBD as described in Creating a Virtual Server.

**Step 5.** Boot the VS from the ISO file.

**Step 6.** During the http installation process, you will be prompted for the location of the CD ISO. Point to the web server containing the additional ISOs.

**Step 7.** The installation proceeds, and installs the OS on the logical disk.

**Step 8.** Shut down the VS, clone the gold master to a new logical disk, and boot the VS from that logical disk, instead of the original master.

## Cloning and Booting from a Gold Master Logical Disk

From this point, use the logical disk as a gold master. When you need to install the same GOS to another VS proceed as follows:

**Step 1.** Clone the gold master to a new logical disk.

**Step 2.** Export the logical disk clone to an LV.

**Step 3.** Assign the LV to the VS.

**Step 4.** In the VS Configuration window, designate the logical disk clone as the boot disk.

**Step 5.** Boot the VS.

You can also install applications on the gold master, so that these can be cloned (along with their GOS) for use by new VSs.

See Cloning Disks for information on cloning logical disks.

8

# POLICIES AND REPORTS

This chapter shows how to use Virtualization Manager to configure policies and generate reports.

About Policies and Reports ..... 170
Report Types ..... 172
User Policies ..... 178
Starting System Policies ..... 182

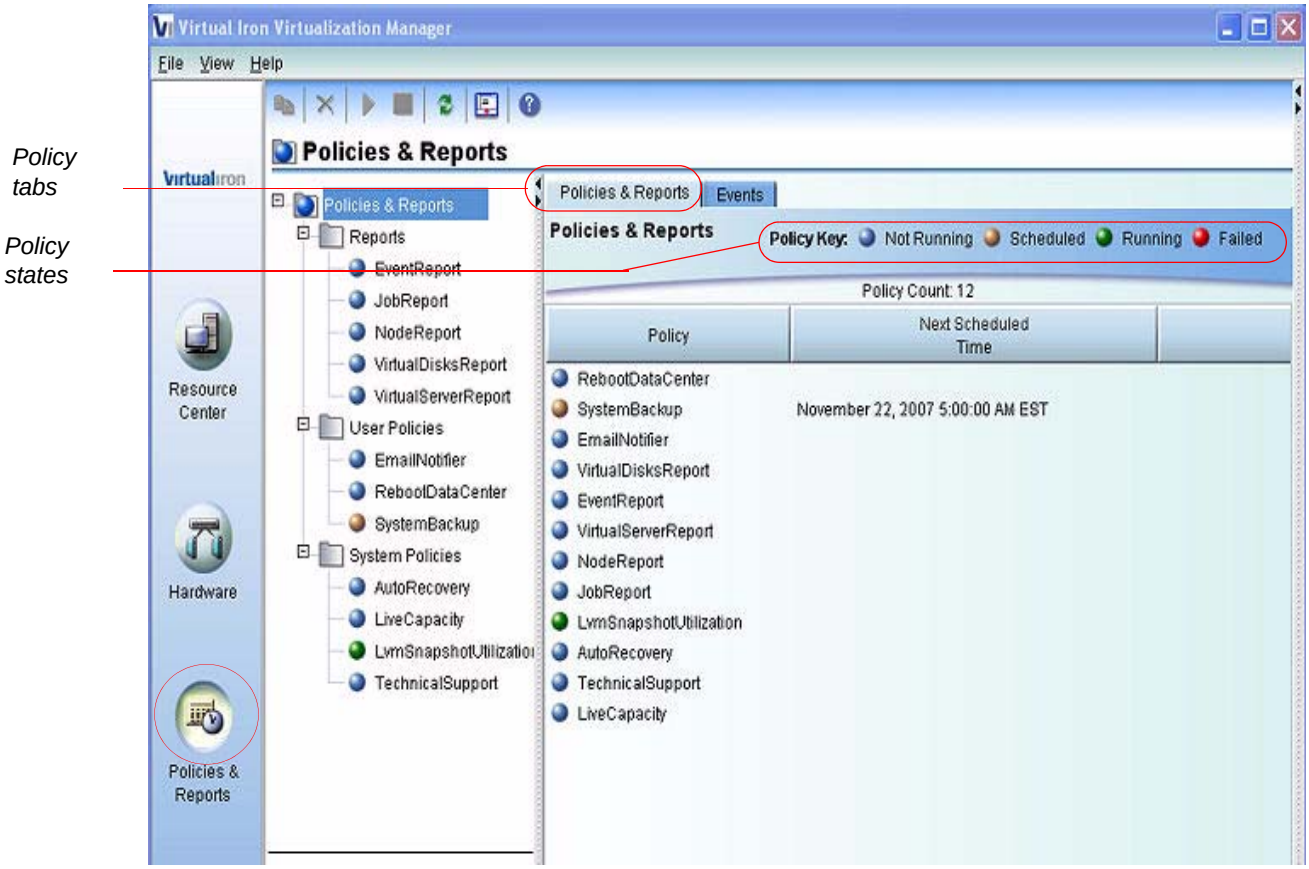
# ABOUT POLICIES AND REPORTS

Virtualization Manager™ supports a set of policies and reports that you configure in various templates. To access these policy and report templates or to view generated reports:

- Click **Policies & Reports** in the application toolbar, or
- In the **View** menu, select the **Policies & Reports** menu option.

This opens the summary view shown in Figure 123.

**Figure 123. Policies and Reports, Main View**

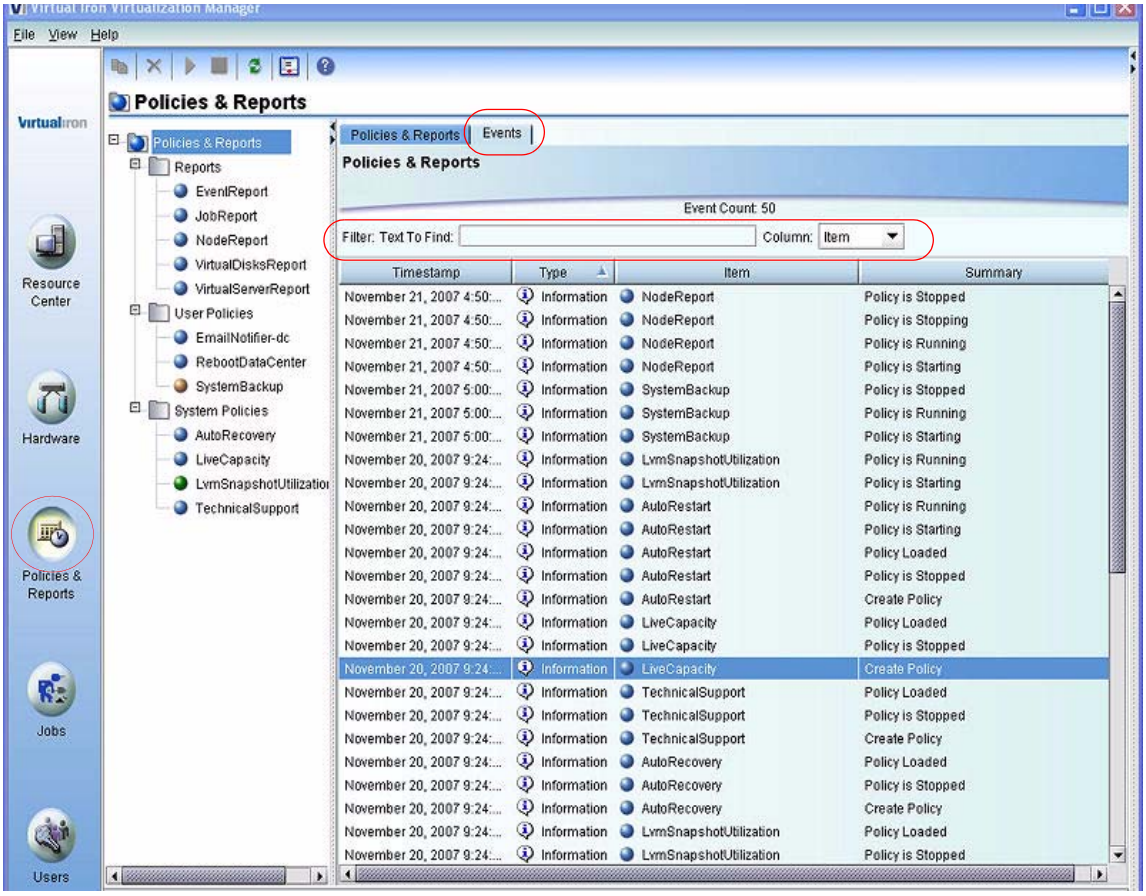



This screen displays all the policies and reports available to you in the navigation tree. The **Policies and Reports** tab lists all policies and their current states. These states are denoted by color coded icons:

- Not running: blue
- Scheduled: gold
- Running: green
- Failed: red

If a policy or report is scheduled to run at a specific time, the time is listed.

Click the **Events** tab to see all user- or system-related events associated with configured policies or reports. Click any of the column headings in the Policies & Reports or Events windows to sort the data in ascending or descending order by time, type, or description.




## Changing Policies and Reports Scheduling

To change the scheduled time or frequency of a policy, you must first stop the policy. To do so, click the red Stop icon in the action toolbar at the top of the window.

# REPORT TYPES

A report is the result of specifying criteria in a report template and displaying the output in either HTML or CSV format. As with other policies, reports can be scheduled, or run as needed. These pre-formatted report templates are provided:

Table 4. Virtualization Manager™ Reports

| | **Purpose** |
|---|---|
| EventReport | Specify time interval or date range, event severity, and optional description. |
| JobReport | Specify a time interval or date range. |
| NodeReport | Specify all criteria options, or select from a list that includes Running, Stopped, and Protected. In addition, you can run a report for nodes in all, a specific, or unassigned VDCs. |
| VirtualDisksReport | Specify all criteria options, or select from a list that includes Assigned, Unassigned, Mounted, Not Mounted, Local Disks, and SAN disks. You can run a report for virtual disks in all, a specific, or unassigned VDCs, and limit the output to Groups, Volumes or Virtual Disks. |
| VirtualServerReport | Specify all virtual servers, or select from a list that includes Running, Stopped, AutoRecovered, and Unassigned. You can run a report for virtual servers in all VDCs, or a specific VDC |

## Report Naming and Types

Reports are named with the name of the template you are using and the date and time. For example:

/opt/VirtualIron/DataCenterManager/system/reports/DataCenter Operations Report_01_28_2008_02_13pm.html

All reports can be exported in CSV or HTML format. These are stored in the reports directory, located at:

/opt/VirtualIron/DataCenterManager/system/reports

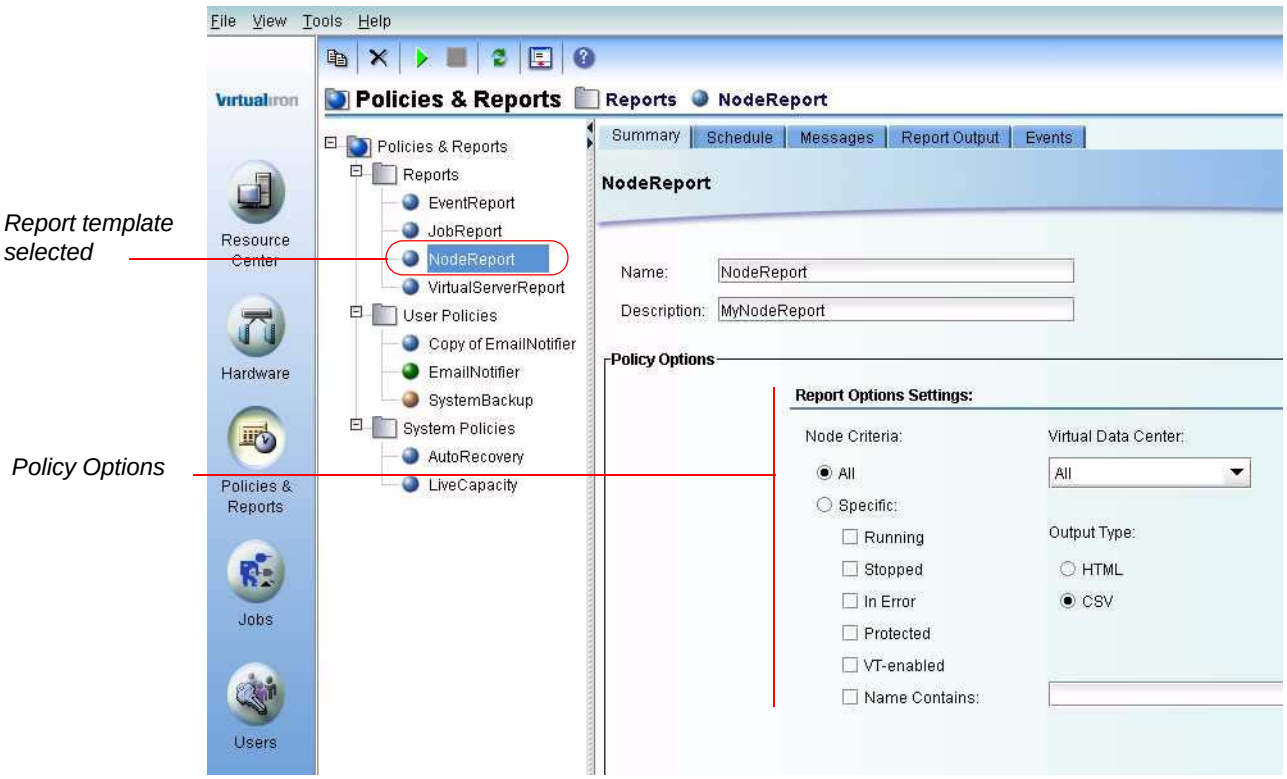
## Generating Reports

To generate a report, enter data into the policy template and run the report. For example, to create a Data Center Operations report:

**Step 1.** Click the **Policies and Reports** button.

**Step 2.** In the navigation pane, under **Reports**, select the type of report you want to generate. In the sample shown in Figure 124, **NodeReport** has been selected.

**Figure 124. Report Template**




**Step 3.** The Node Report informs you of node operations such as running or stopped nodes, or in error or protected nodes, in any or all Virtual Data Centers. Choose from the listed criteria by checking the boxes in the **Summary** screen.

Choose **HTML** or **CSV** (comma separated values) for the report output.

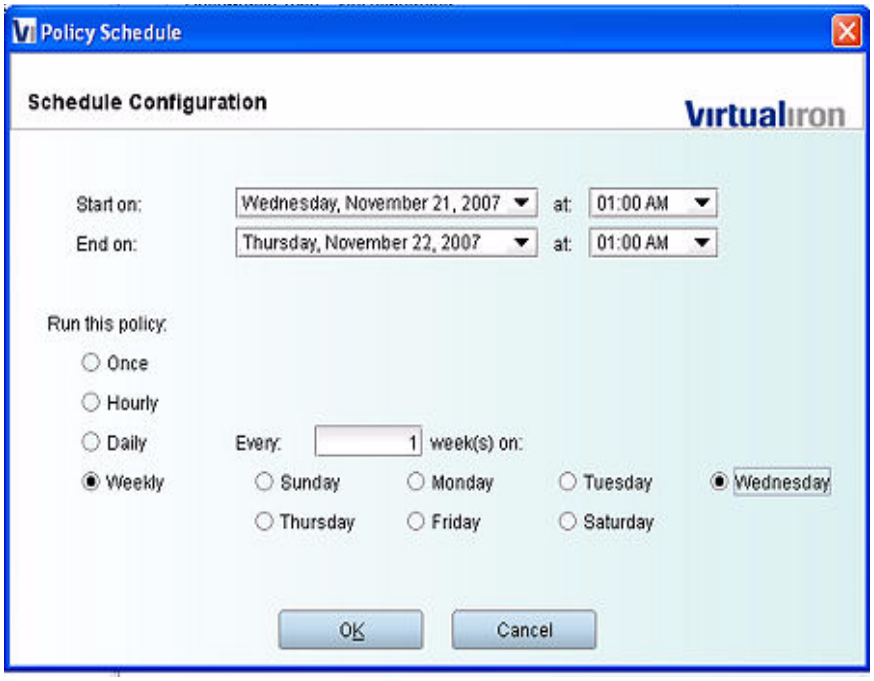
**Step 4.** Select the **Schedule** tab and click the **Edit** button.

**Step 5.** In the **Schedule Configuration** window, specify a run schedule for the report. You can choose to run a report once (immediately), daily, weekly, or monthly.

In the time dropdown menu, click to highlight the hour or minutes and use the up and down arrows to specify the time. See Figure 125.

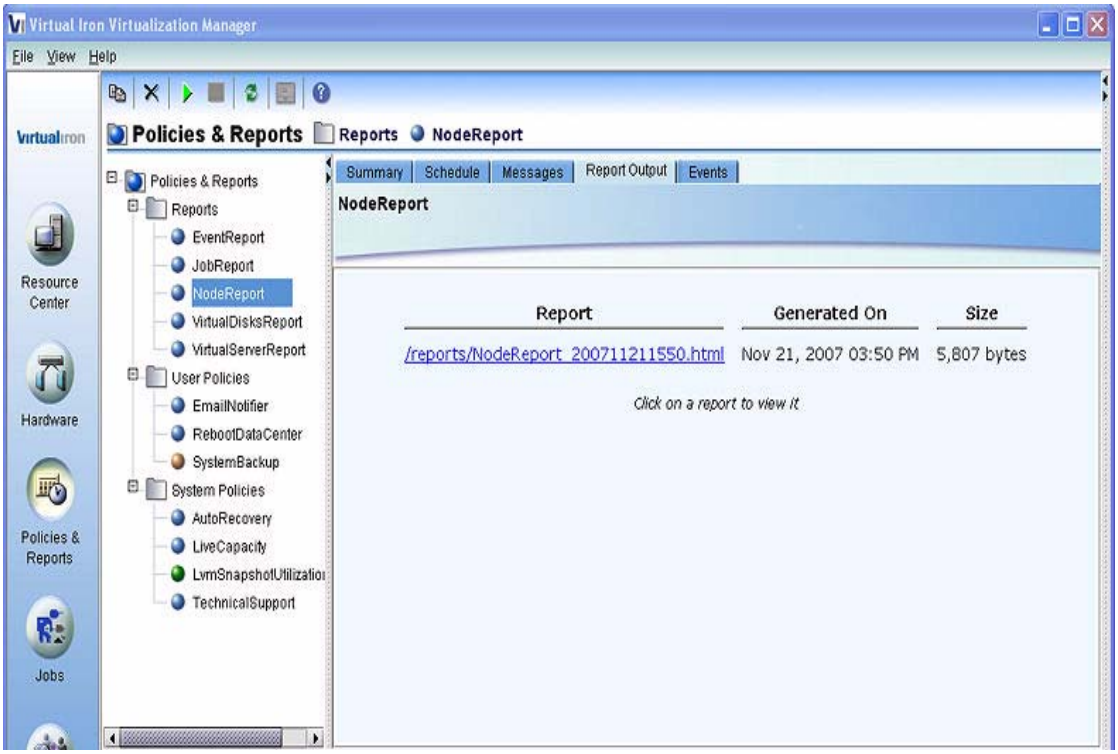
**Step 6.** Click **OK**.

**Figure 125. Scheduling a Report**




**Step 7.** To access reports, select the **Report Output** tab. Click a report to open it. A sample tab is shown in Figure 126.

**Figure 126. Report Output Tab**



## Report Examples

Following are sample reports generated with the pre-formatted support templates supplied with the Virtual Iron™ software.

### EVENT REPORT

This report provides details on the events specified in the Summary tab, and the time specified in the Schedule tab.

**Figure 127. Sample Event Report**

EventReport

*Click here to list all Reports*

Virtualiron

Name: **EventReport**
Generated On: Saturday July 08, 2006 at 4:13 AM PDT
Report Period: 2006-07-08 00:00 to 2006-07-08 04:13 PDT

| Time | Event | Source | Summary | Description |
|---|---|---|---|---|
| Sat Jul 08 04:12 AM PDT 2006 | Informational | EventReport | Policy is Starting | |
| Sat Jul 08 04:13 AM PDT 2006 | Informational | This Job | Job Running: 8 of 8 | |
| Sat Jul 08 04:13 AM PDT 2006 | Informational | EventReport | Policy is Running | |
| Sat Jul 08 | Informational | Virtual Iron | Archive Task | |

## JOB REPORT

**Figure 128. Job Report**

JobReport

Click here to list all Reports

VirtualIron

Name: **JobReport**
Generated On: Saturday July 08, 2006 at 4:20 AM PDT (Job Count: 5)
Report Period: 2006-07-08 00:00 to 2006-07-08 04:20 PDT

| Time | User | Status | Description |
|---|---|---|---|
| Sat Jul 08 04:12 AM PDT 2006 | admin | FIXME: Job Status | No description provided |

| Step | Operation | Foundry Resource |
|---|---|---|
| 1 | Create schedule for policy | EventReport |
| 2 | Schedule policy | EventReport |

| Time | Event | Source | Summary |
|---|---|---|---|
| Sat Jul 08 04:12 AM PDT 2006 | JobConstructingEvent | This Job | Job Construction: 0 of 0 |
| Sat Jul 08 04:12 AM PDT 2006 | JobRunningEvent | This Job | Job Running: 8 of 8 |
| Sat Jul 08 04:12 AM PDT 2006 | JobDoneEvent | This Job | Job Finished: 8 of 8 |

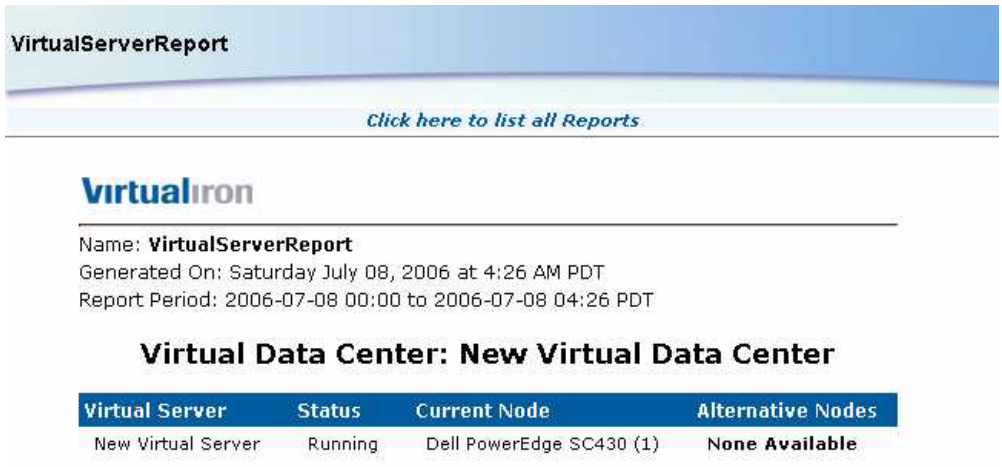
## NODE REPORT

**Figure 129. Node Report**


## VIRTUAL SERVER REPORT

Following is a sample Virtual Server report.

**Figure 130. Virtual Server Report**



# USER POLICIES

User policies are administratively configured to perform specified actions in response to certain conditions. Supported policies are shown in Table 5:

Table 5. Virtualization Manager™ User Policies

| | Purpose |
|---|---|
| EmailNotifier | Allows you to send email to one or more addresses in response to specified events. |
| RebootDataCenter | Use to specify which nodes to reboot in the selected Virtual Data Centers. Virtual servers that are running are stopped and restarted when their parent nodes return online. Virtual servers with VSTools installed are shut down; virtual servers without VSTools are that are starting up, are hard reset, if desired. However, it is preferable to shut down those virtual servers directly from within each guest. |
| SystemBackup | Allows you to specify where backups of the Virtualization Manager database are to be stored, and the number of copies to retain. |

## Configuring and Starting User Policies

A user policy instructs Virtualization Manager to perform certain actions in response to specified conditions, and schedules when those actions are to be taken. An email policy might be translated as:

*Send email to me and my colleague if any VS is in error.*

Another email policy might be:

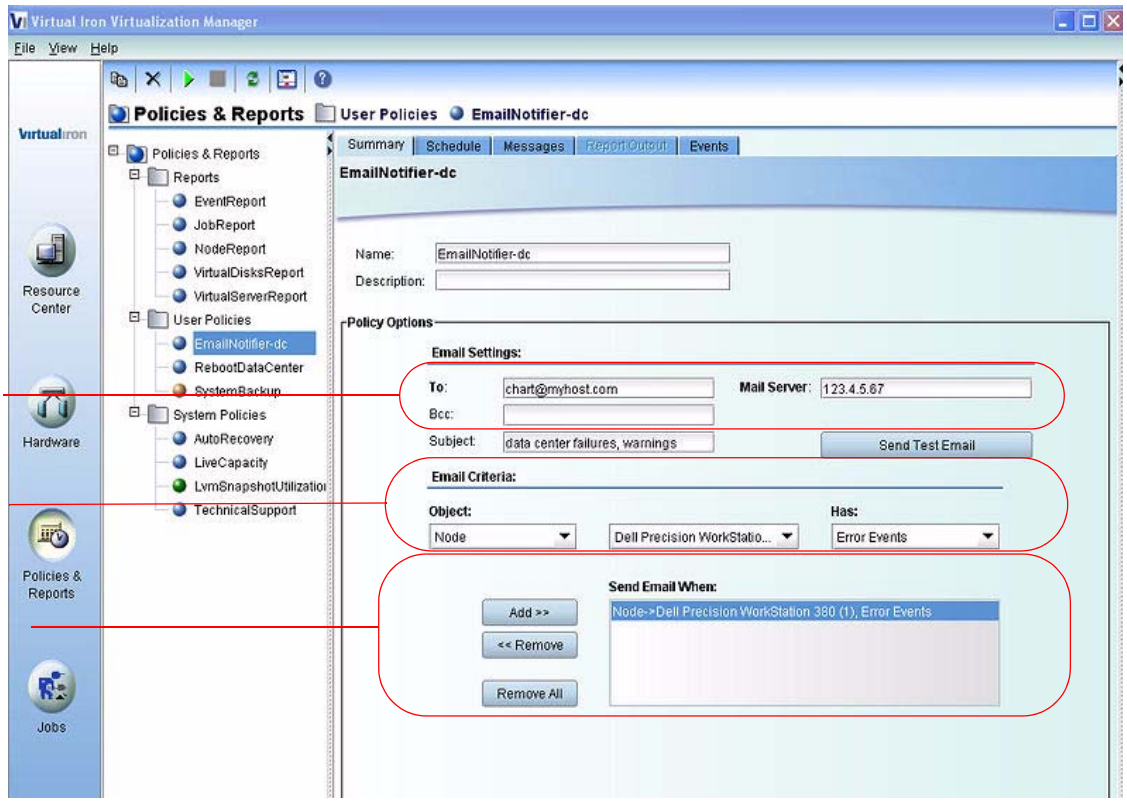
*Send email to both of us if any node is in error, or if a warning message is issued in relation to a specific VDC.*

For example, to configure an email policy:

**Step 1.** Click **Policies & Reports** button. In the navigation pane under **User Policies**, select **EmailNotifier**.

**Step 2.** In the **Summary** screen, provide information on policy actions, as shown in Figure 131.

**Figure 131. Options, Sample Email Policy**




Identify a recipient, *chart@myhost.com*, a mail host, and a subject for the email message (the latter is optional).

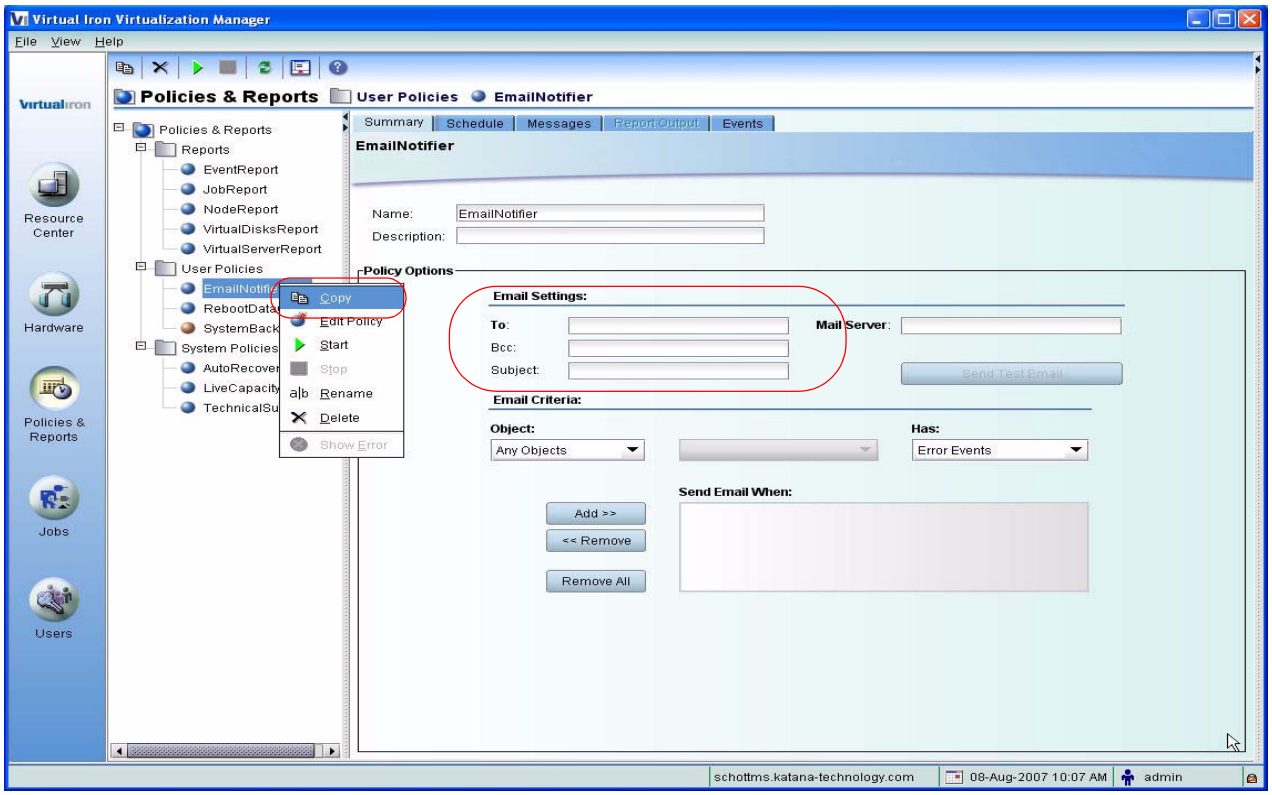
**Step 3.** The basis of the policy is the criteria that trigger the email message. These criteria determine when the message ("data center failures, warnings") will be sent. Specify these criteria by choosing physical and/or virtual objects, and the states associated with them. In this case, email will be sent when any of these criteria are met:

- Any virtual server is in error
- A specific virtual data center (New Virtual Data Center) has warning events
- A specific node has error events

Add these criteria by choosing an object type from the **Object** pull-down and selecting an associated action from the **Has** pull-down. Click **Add>>** to add the criteria to the list.

**Step 4.** Rename the template if you wish. Right-click **EmailNotifier** and select **Rename** from the pop up menu, or choose **Copy** to copy the template and rename it, as shown in Figure 132.

**Figure 132. Copying and Renaming an Email Template**



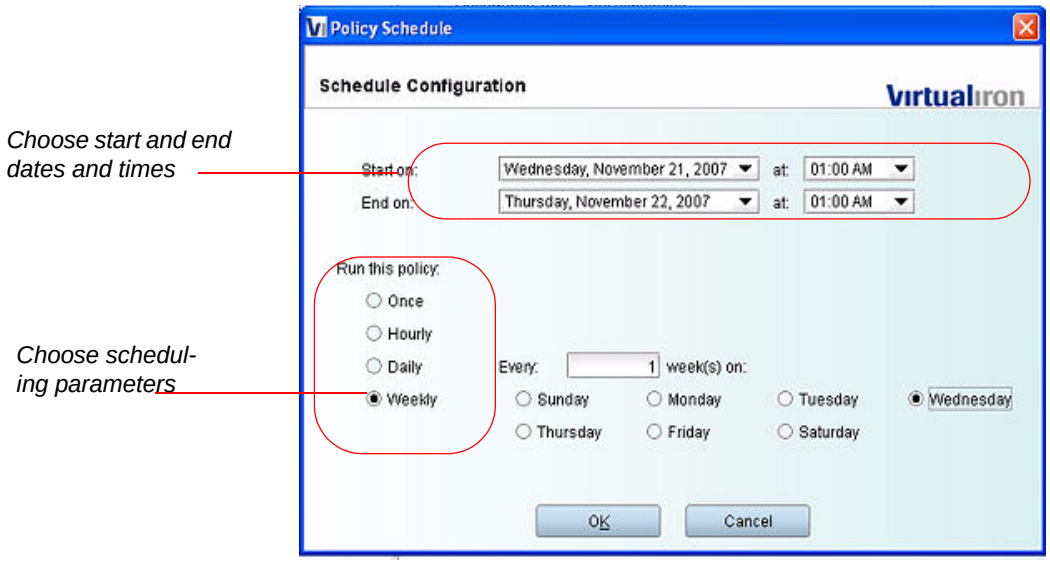

**Step 5.** Click the **Schedule** tab. Click the **Edit** button.

**Step 6.** In the **Schedule Configuration** window, use the dropdown menus to choose start and stop dates and (optionally) times. Click to highlight the hour or minutes and use the up and down arrows to specify the time.

**Step 7.** Specify a run schedule for the report. You can choose to run a report once (immediately), daily, weekly, or monthly. See Figure 125.

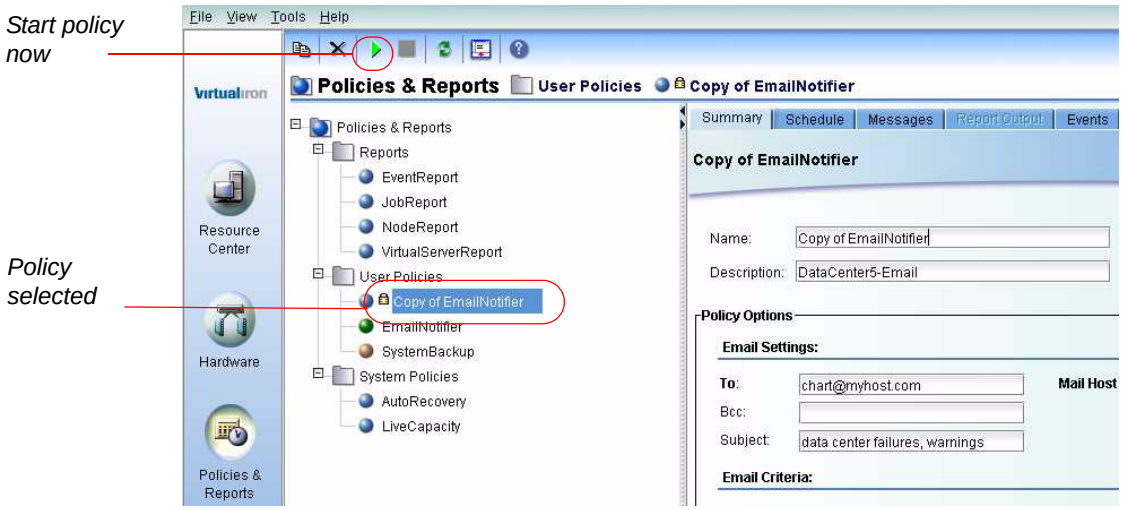
**Step 8.** Click **OK**. A sample scheduling tab is shown in Figure 133.

**Figure 133. Email Policy, Schedule Tab**




**Step 9.** To start the policy, select the policy in the navigation tree and click **Start** as shown in Figure 134.

**Figure 134. Starting a Policy or Report**



# STARTING SYSTEM POLICIES

System policies have system-wide application and run in the background according to specified parameters. Once started, they are always running. Virtual Iron® supports the system policies listed in Table 6.

Table 6. Virtualization Manager™ System Policies

| | **Purpose** |
|---|---|
| LiveRecovery™ | Moves virtual servers on nodes that go offline to a healthy node and then restarts it in the event its host fails.The policy is run automatically by the system when LiveRecovery is enabled for a virtual server. |
| LiveCapacity™ | Balances CPU utilization across selected nodes in a virtual data center by using LiveMigrate to perform virtual server migration without downtime. To balance CPU utilization across selected nodes in a virtual data center, enable LiveCapacity on the virtual data center's Live Capacity tab. |
| LvmSnapshot Utilization | Allows you to capture an OS image of virtual servers or logical disks so that you can recover data that could potentially be lost or damaged, such as in a test environment. |
| Technical Support | Access to Virtual Iron Technical Support. |

System Policies differ from User policies in two ways.

- They apply to all physical and virtual objects under management, rather than a subset of these objects.
- They run at all times, rather than on a scheduled basis.

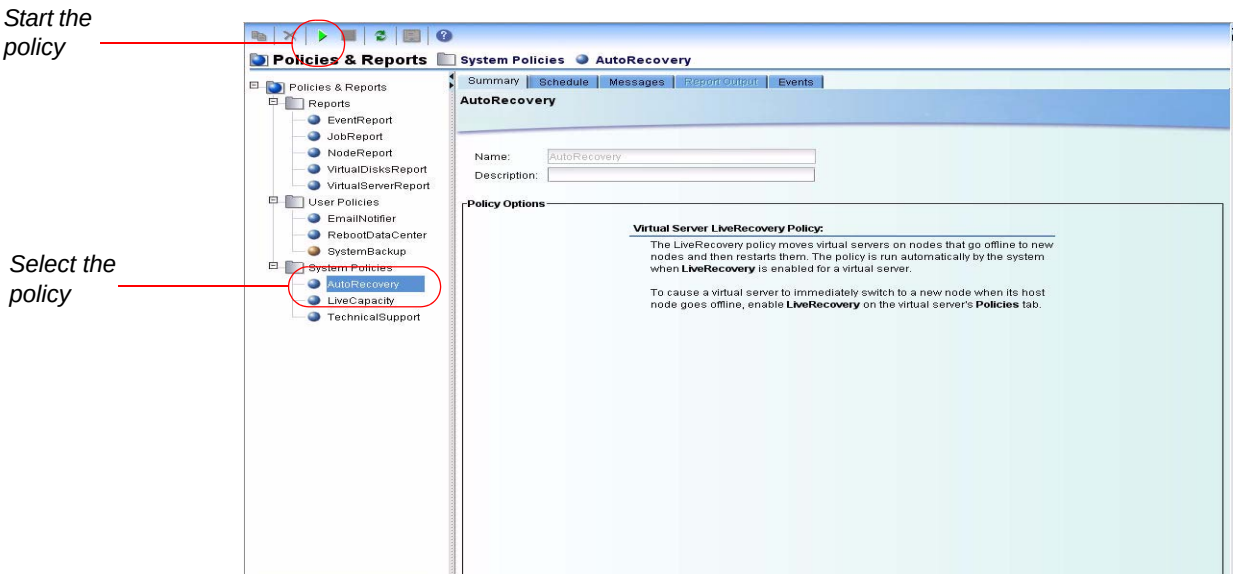
## LiveCapacity and LiveRecovery

**LiveCapacity™** is a system-wide policy that enables load-balancing of VSs within VDCs. **LiveRecovery™** is a system-wide policy that allows a VS to move and restart on a new node in the event its host node fails.

To enable either of these system policies, select **LiveCapacity** or **AutoRecovery** in the navigation tree, and click **Start**.

You may optionally choose start and stop dates and times from the pull down lists, and choose a schedule period. If you do not enter a parameter from **Run this policy** and click once, the policy runs immediately when you start it.

**Figure 135. Starting a Policy**




## LVM Snapshot Utilization

The Snapshot feature reflects a disk at a particular point in time. The initial size of the snapshot logical disk is therefore a small fraction of the size of the parent logical disk.

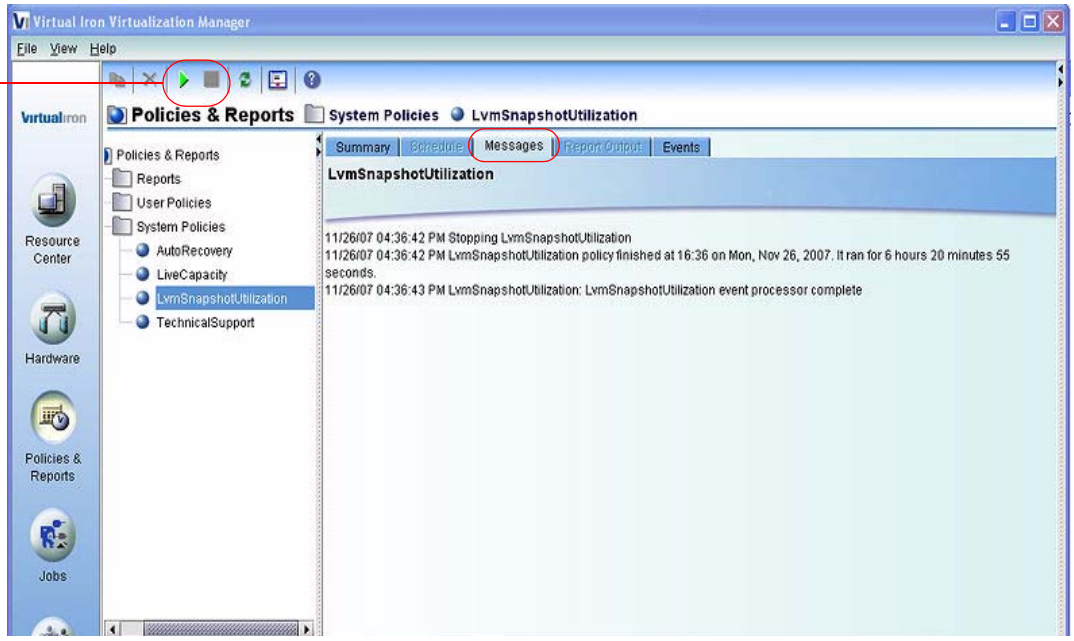
When you create a snapshot of a virtual server or logical disk, you set an initial percentage of space to be allocated for snapshot storage. The default is 10%. As the delta data increases as a result of writing to either the snapshot or parent logical disk, the free space on the snapshot logical disk is consumed.

The system policy monitors when it is necessary to increase the size of the snapshot storage. When 50% (the default) of the snapshot storage percentage is used, the space utilization is dynamically increased by enough space to keep the storage used at 30%. When this occurs, the system issues warning events and the snapshot disk icon changes to yellow.

The Snapshot policy is always on by default whenever a virtual server is created; there is no policy for setting a scheduled time. To stop the **LvmSnapshotUtilization** policy, select the policy in the navigation tree, and click the **Stop** icon in the action toolbar at the top of the window. To restart, click the **Start** icon. Figure 136 shows these events listed in the **Messages** window.

For procedural information on using LvmSnapshotUtilization, see Virtual Server Snapshots.

**Figure 136. Messages associated with LVMSnapshotUtilization**




## Technical Support

To access Virtual Iron Technical Support:

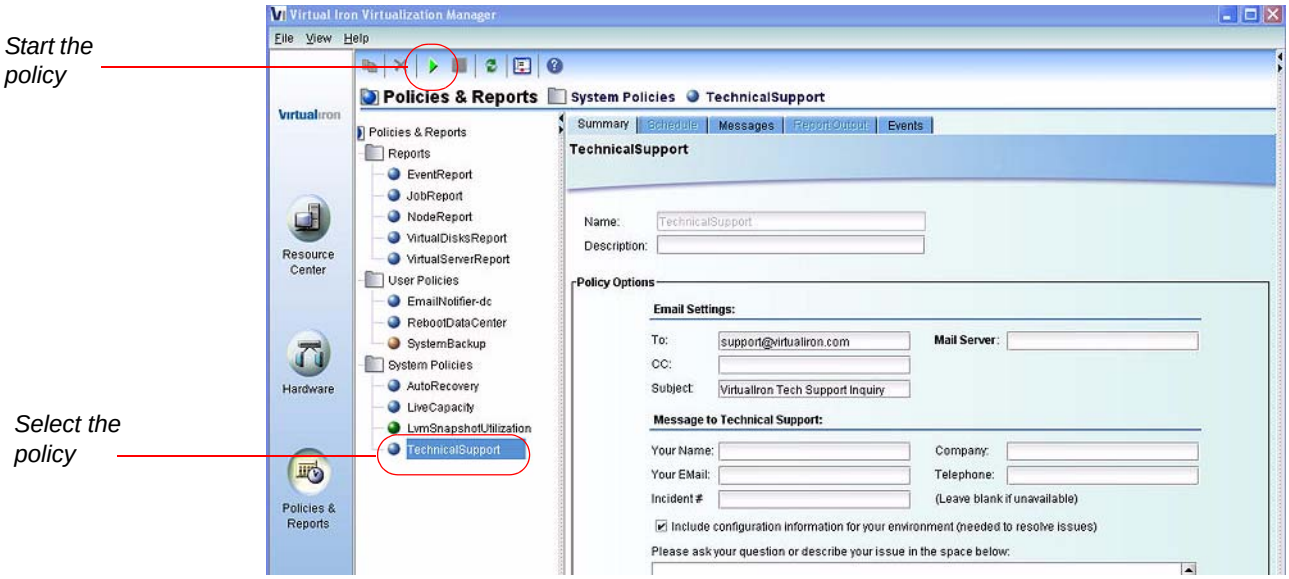
**Step 1.** Click the **Policies & Reports** button.

**Step 2.** In the navigation pane, click **TechnicalSupport**.

**Step 3.** Type in the required data.

**Step 4.** To send the data to Technical Support, click **Start**. See Figure 137.

**Figure 137. Accessing Virtual Iron Technical Support**



# 9

# PERFORMING ADMINISTRATIVE TASKS

This chapter shows how to perform a number of administrative tasks. It contains the following sections.


Configuring User Accounts ..... 188
Configuring LDAP ..... 191
Configuring Non-English Keyboards ..... 198
Performance Statistics ..... 201
Starting the Virtualization Manager ..... 207
Performing Backup and Restore Operations ..... 209
Changing the Virtualization Manager IP Address ..... 211
Configuring the Archive Manager ..... 212
Assuring Virtualization Manager High Availability ..... 213
Single Node to Multi-Node Conversion ..... 217
Uninstalling Virtualization Manager ..... 219
Reassigning Unassigned DGs ..... 220
Accessing Online Help ..... 221
Accessing Technical Support ..... 223

# CONFIGURING USER ACCOUNTS

Virtualization Manager supports user accounts and associated passwords. These accounts can be local, or can exist on an LDAP server. The following section describes how to configure local accounts. See Configuring LDAP for information on configuring LDAP authentication.

## Creating Local User Accounts

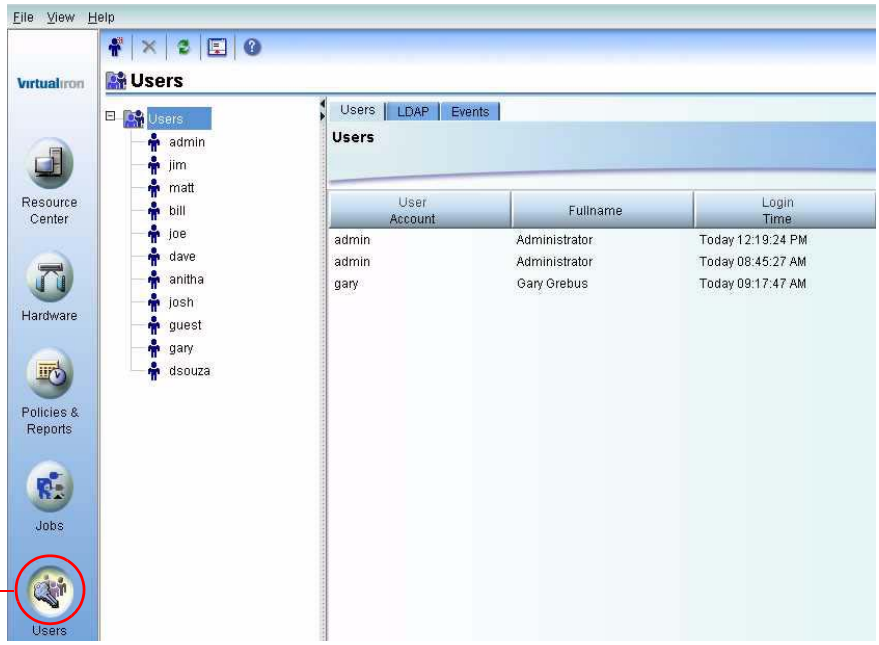
Only an Admin user can create or delete Local user accounts. A default Admin account, with username and password **Admin,** is created during installation of the software (see Installing Virtual Iron®). To create additional accounts:

**Step 1.** Log in to Virtualization Manager™ as **Admin**.

**Step 2.** Click the **Users** button in the Application toolbar on the left. The Users accounts view opens. See Figure 138.

**Step 3.** To create a new user account, click the **Users** icon in the Action toolbar, or right click **Users** in the navigation tree. See Figure 139.

**Figure 138. User Account View**




Users, Application Toolbar

**Figure 139. Creating a New User Account**


**Step 4.** The default name *New User Account* is assigned to the account. Enter the user's full name and then enter and confirm a password for the user. Click **OK**.

## Deleting User Accounts

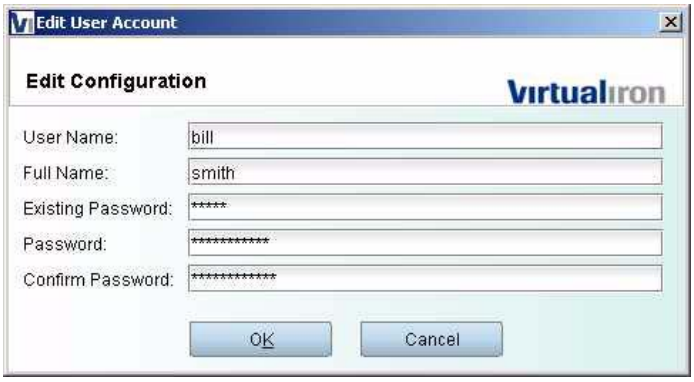
Only personnel with Admin privileges are allowed to delete user accounts. Select the User account in the navigation tree and select **Delete** or click the **Delete** icon in the toolbar. See Figure 140.

**Figure 140. Deleting User Accounts**

## Editing Account Information

To edit user account information, select an account in the navigation tree and select **Edit User Account**. The dialog box shown in Figure 141 appears. Make the changes, and click **OK**.

**Figure 141. Editing Account Information**



# CONFIGURING LDAP

In addition to local user accounts, Virtualization Manager supports LDAP authentication (Lightweight Directory Access Protocol) via a centralized database.

Virtual Iron® supports both Microsoft Active Directory (for Windows®) and Open LDAP for Linux distributions.

## About LDAP Authentication

LDAP is a protocol used to store and access information in a directory. LDAP has the advantage of being platform-independent and standards-based. Applications do not need to know what type of server is hosting the LDAP directory to communicate with it. The server can be any one of a number of commercial or open-source LDAP directory servers—even a DBMS server with an LDAP interface).

## LDAP Support and Administration

To use LDAP, you need to provide a set of LDAP criteria and enable the LDAP protocol on Virtualization Manager. Only personnel with **Admin** privileges are allowed to log in to the Virtualization Manager or make changes to the LDAP configuration.

**Note:** To use LDAP over SSL, you must import the LDAP SSL certificate into the java keystore of the Virtualization Manager.

When LDAP is enabled, the user accounts on the local server are disabled. However, local account information remains on the management server and can be used again if LDAP is disabled.

## LDAP Component Information

LDAP directories store data hierarchically, similar to DNS trees, or Unix directories. Though LDAP implementations may differ slightly, they preserve a common set of components that are used in specific ways. The components include the following:

| | | |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

## Configuring Virtual Iron To Authenticate with LDAP

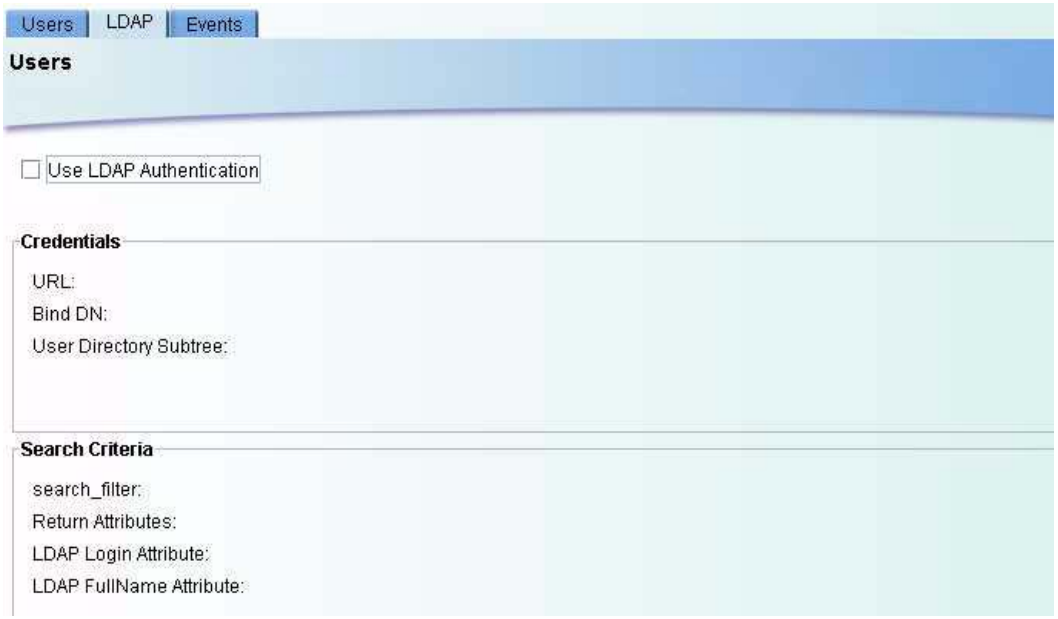
LDAP authentication requires enabling Virtualization Manager to access user information stored on an LDAP server and enabling the LDAP protocol.

You need to know which LDAP implementation is in use at your site. The implementation determines the proper syntax to use to pass LDAP credentials and search criteria to the LDAP server. For information on the LDAP components to pass and the proper syntax, contact your LDAP system administrator.

To configure LDAP authentication for the Virtualization Manager:

**Step 1.** Click **Users** on the application toolbar. Select the **LDAP** tab. The screen shown in Figure 142 appears.

**Figure 142. LDAP Authentication Tab**

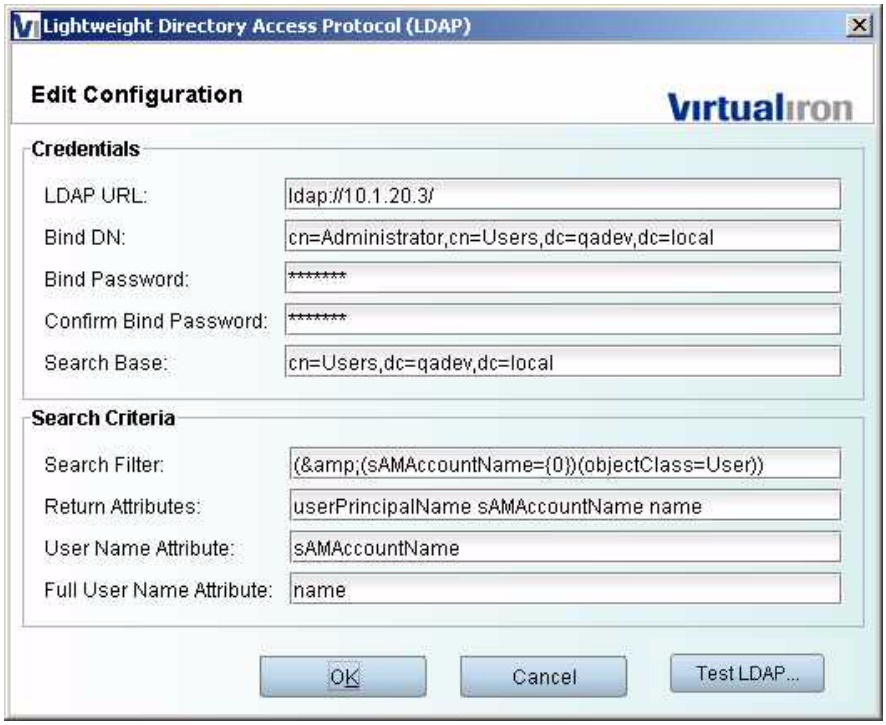



**Step 2.** The LDAP tab has two panes.

- **Credentials**—Records the URL of the LDAP server, the server's distinguished name (DN), and the LDAP search base within that DN. The search base defines the specific location in the LDAP directory from which your LDAP search will begin.
- **Search Criteria**—Provides the criteria used to match against the user data stored in the LDAP search base. Virtualization Manager applies the criteria you enter to filter the data. When it connects to the LDAP server, Virtualization Manager uses these criteria to identify a set of users. Use the **Assign Users...** dialog to add some or all of them to the list of those that can manage within the Virtual Iron® framework.

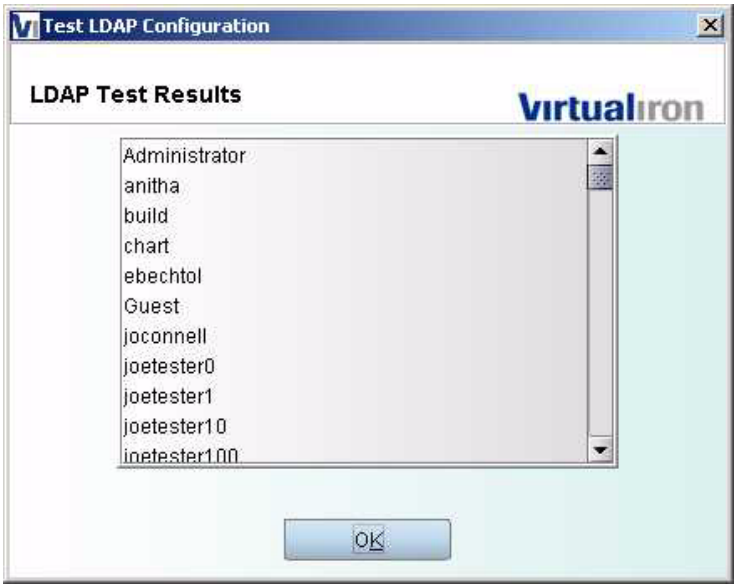
Before you enable LDAP, enter LDAP Credentials and Search criteria. To do this, click **Setup...** The dialog shown in Figure 143 is displayed. In this example, LDAP information has been added.

**Figure 143. Entering LDAP Credentials and Search Criteria**




**Step 3.** Enter LDAP credentials and search criteria. Click **Test Data...** to validate the data. Virtualization Manager connects with the LDAP server and uses the search criteria you provided to return a list of users. Figure 144 shows a sample of the test results window. Click **OK** to accept the configuration.

**Figure 144. Adding LDAP User Data to the Virtualization Manager Database**



Following are examples of valid parameters for the implementation of LDAP in Active Directory, and OpenLDAP.

**Sample LDAP Data, Active Directory**

**Credentials**

URL:ldap://10.1.20.3/

DN: cn=Adminstrator,cn=Users,dc=qadev,dc=local

DN Password: *password*

LDAP Search Base: cn=Users,dc=qadev,dc=local

**Search Criteria**

Search Filter: (& sAMAccountName={0}(objectClass=User))

LDAP User Name: userPrincipalName sAMAccountName name

LDAP Full User Name: sAMAccountName

**Sample LDAP Data, OpenLDAP**

**Credentials**

URL: ldap://123.45.67.23

DN: cn=admin,cn=Users,dc=qatest,dc=com

DN Password: *password*

LDAP Search Base: ou=users,dc=qadev,dc=local

**Search Criteria**

Search Filter: (& (cn={0})(objectClass=inetOrgPerson))

LDAP User Name: cn uid

LDAP Full User Name: cn

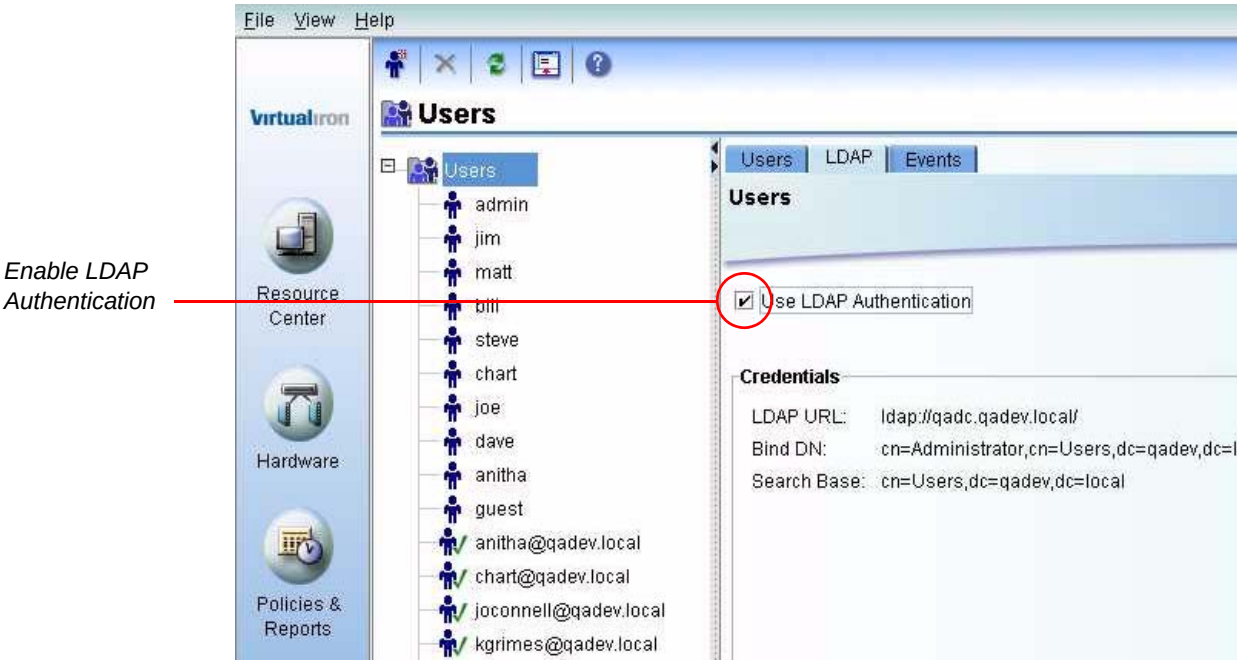
**Step 4.** After the LDAP credentials have been validated, you are ready to assign LDAP users. Click **Assign Users...** The dialog box that appears contains all of the users Virtualization Manager has found on the LDAP server. A sample is shown in Figure 145.

To assign one or more of these users to the list stored on the management server, use the **Add>>** and **<<Remove** keys to move users from the left to the right pane. Click **OK**.

**Figure 145. Adding LDAP User Data to the Virtualization Manager Database**

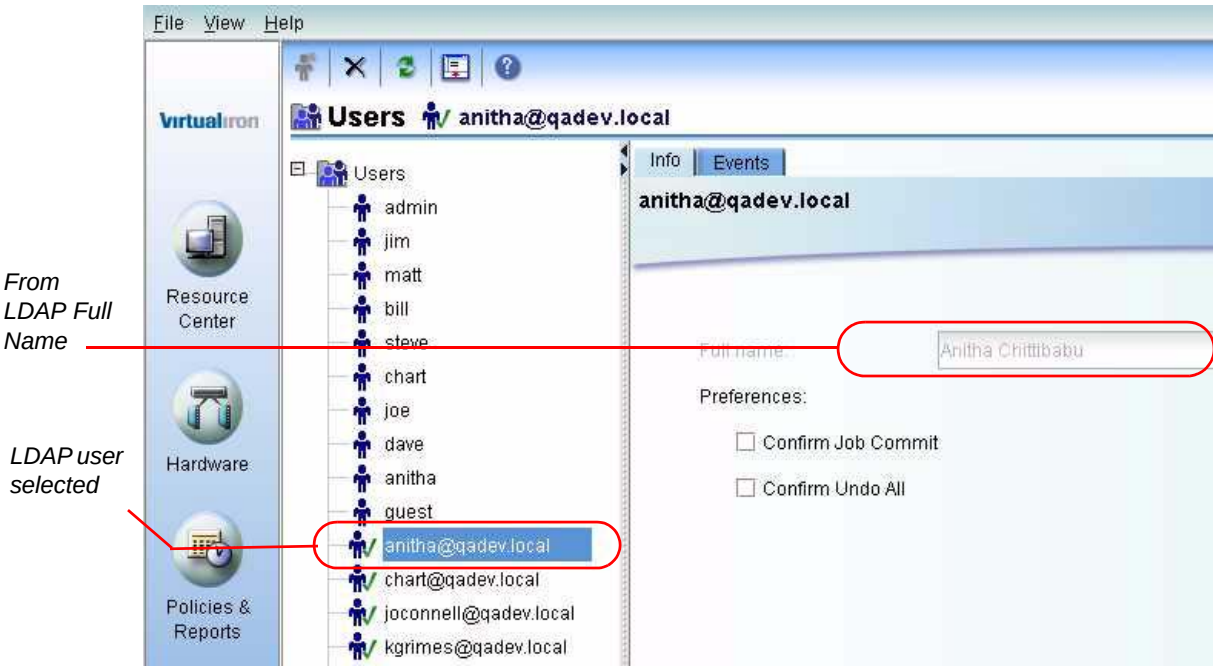

**Step 5.** Click **Enable LDAP** as shown in Figure 146.

**Figure 146. Enable LDAP**




**Step 6.** The LDAP users you have assigned appear on the management UI. A green check mark next to the User icons identifies users authenticated with LDAP, as shown in Figure 147. The user names that appear in the navigation tree is data retrieved via LDAP based on the User Name attribute. The Full Name information is retrieved via LDAP based on the Full User Name Attribute.

**Figure 147. LDAP Users Added to the Virtual Iron Database**




## Changing the LDAP Configuration

Only personnel with Admin privileges can make changes to the LDAP configuration.

You cannot edit LDAP search criteria while LDAP is enabled. To make changes to the criteria, uncheck the **Enable LDAP** check box. Then click **Setup...** and make whatever changes are required. Test the changes and check **Enable LDAP** to re-enable the protocol.

Note that while LDAP is disabled, local users can connect to the Virtualization Manager and manage resources.

# CONFIGURING NON-ENGLISH KEYBOARDS

You must use the US-English 101 keyboard in order to enter text for the Virtual Console. Non-English keyboards do not map their keys properly.

Users of Japanese, German, and other non-English 101 keyboard types, can use the following procedure to set the Virtual Console's keyboard.

## Workaround

Java 1.6 fixed a number of long standing key map/keyboard issues. Therefore, for Virtual Iron's virtual server console to work with non-English keyboards, it must be run in a Java 1.6 runtime environment.

Following are instructions for installing Java 1.6 on a client that has a non-English keyboard, and for configuring a guest OS and virtual server to use the corresponding key map.

### INSTALL JAVA 1.6

Download the latest Java 1.6 from http://www.java.com/en/download/manual.jsp and install it on the computer used to run the Virtualization Manager.

When you start the Virtualization Manager, check the first two lines of Java Console output to make sure that you're using the correct version. You should see something similar to the following:

Java Web Start 1.6.0

Using JRE version 1.6.0 Java HotSpot (TM) Client VM

### CONFIGURE KEYBOARD

Configure the guest OS to use the correct keyboard. If it isn't already configured:

- Start the virtual server (it will use the default en-us key map).
- Start a virtual server console.
- Configure the guest OS to use the correct keyboard. You must use the en-us key map to do this. For example, if you're using a German keyboard (QWERTZ not QWERTY—the Z and Y are swapped), and need to enter the letter Y, type the Z key (German keyboard, English key map).

The API has methods to set and get the name of the key map used by virtual server consoles. The default key map name is en-us. It can be overridden at the foundry, virtual data center, or virtual server level. The key map names correspond to the names of the QEMU key map used by Xen.

Each key map name consists of an ISO 639-1 language code:

(http://www.loc.gov/standards/iso639-2/php/English_list.php)

These are optionally followed by a dash and an ISO 3166-1 country code:

(http://www.iso.ch/iso/en/prods-services/iso3166ma/02iso-3166-code-lists/list-en1.html)

The following key map names are supported.

| | | | | | | |
|---|---|---|---|---|---|---|
| ar | da | de | de-ch | en-gb | en-us | es |
| et | fi | fo | fr | fr-be | fr-ca | fr-ch |
| hr | hu | is | it | ja | lt | lv |
| mk | nl | nl-be | no | pl | pt | pt-br |
| ru | sl | sv | th | tr | | |

Use *runner* to configure key maps. For example:

```
# ./runner.sh
Virtualization Manager API Runner: v3.0 Interactive Mode
>>> from com.virtualiron.vce.mgmt.api import *
>>> from com.virtualiron.vce.mgmt.api.physical import *
>>> from com.virtualiron.vce.mgmt.api.virtual import *
>>> cm = VirtualizationManager.getConfigurationManager()
>>> vs = cm.findObject(VirtualServer, 'VS123')
>>> vs.getKeymapName()
'en-us'
>>> # configure VS123 to use German keymap
>>> vs.setKeymapName('de')
>>> vs.getKeymapName()
'de'
>>> # configure VS123 to inherit keymap from its VDC
>>> vs.setKeymapName(None)
>>> vs.getKeymapName()
'en-us'
>>> vdc = vs.getAssociatedVirtualDataCenter()
>>> vdc.getKeymapName()
'en-us'
```

```
>>> vdc.setKeymapName('de')
>>> vdc.getKeymapName()
'de'
>>> # by default all virtual servers in this VDC will use 'de'
>>> vs.getKeymapName()
'de'
```

If a virtual server is running, restart it for the new key map to take effect.

Note that there are still a few key map issues, even if you use Java 1.6, as when for example, a virtual server console displays a text console (the one that looks like a vt100 terminal). This is alleviated once you start up a graphical desktop such as Gnome. Only dead keys continue to be a problem when a graphical desktop is used.

Using the virtual server console to interact with a graphical desktop on the guest OS, you can configure VNC or Remote Desktop. If you need to use dead keys to produce diacritical marks above letters, don't use the virtual server console. Instead, switch to a native VNC or Remote Desktop client.

# PERFORMANCE STATISTICS

Virtualization Manager provides performance and activity statistics on nodes and virtual servers.

Node statistics are available at all times; statistics on virtual servers are available only if VStools has been installed on the virtual server being monitored. See Installing VSTools on Virtual Servers for information.

Virtualization Manager collects and presents statistics for these areas:

- Activity for the Resource Center
- Last 5 Errors
- Node Performance
- Virtual Server Performance
- License Usage
- Active Policies
- User Connections

Each of these data categories are organized in a dashboard in the Resource Center's **Summary** screen.

## Accessing Performance Statistics

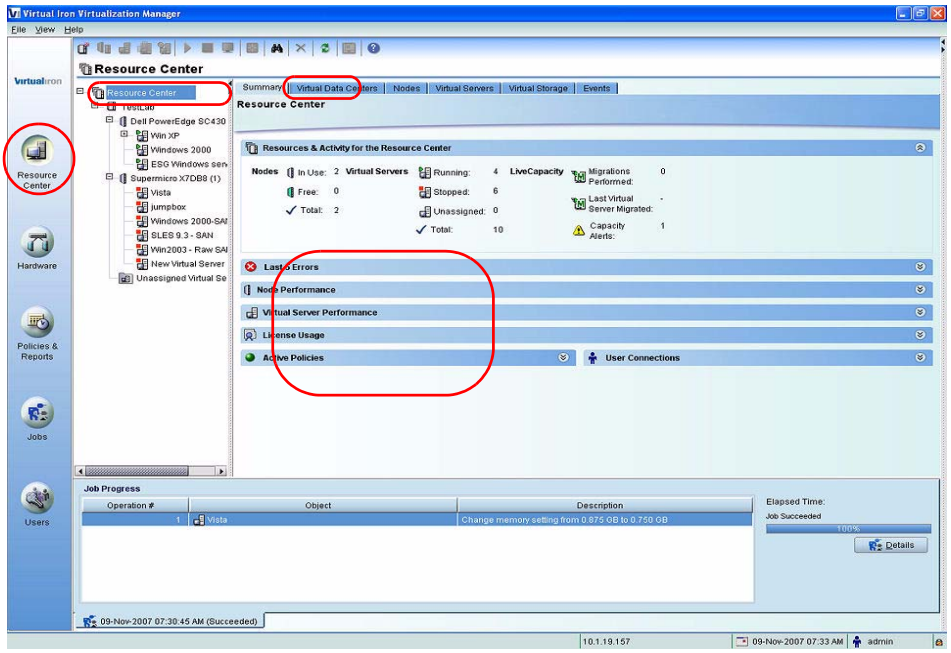
To view performance statistics in Virtualization Manager, do the following:

**Step 1.** Click the **Resource Center** button.

**Step 2.** Select **Resource Center** in the navigation tree. The Resource Center window opens with the **Summary** tab active.

**Step 3.** Click one or more of the performance statistics categories displayed in the dashboard. See Figure 148.

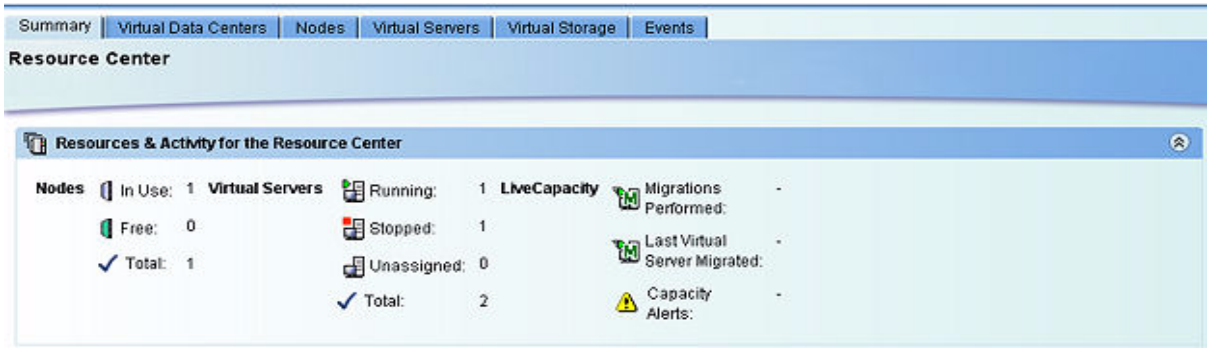
**Figure 148. Resource Center Activity Screen, showing dashboard options**




## ACTIVITY FOR THE RESOURCE CENTER

Figure 149 shows a close-up of the initial screen with Resource Center level data for Nodes, Virtual Servers, and LiveCapacity.

**Figure 149. Resource and Activity Data**



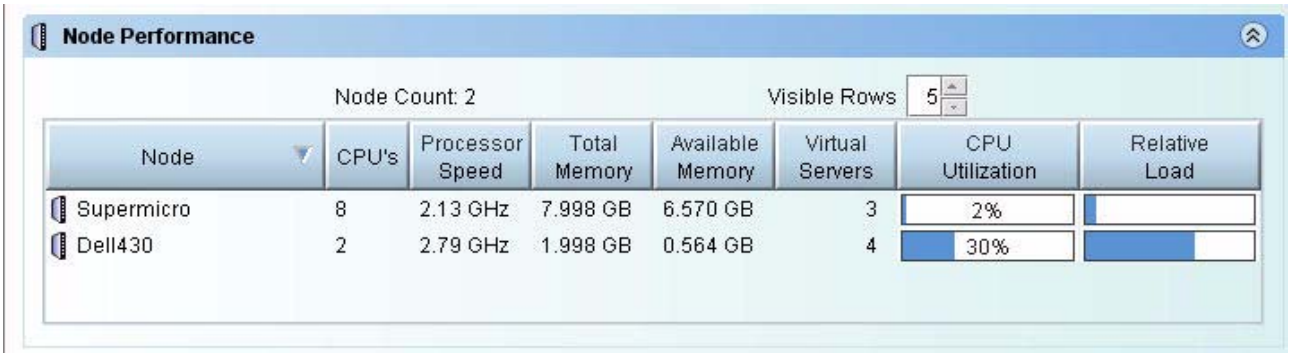

## LAST 5 ERRORS

To view the last five errors associated with the Resource Center, select Resource Center in the navigation tree. In the Summary screen, click the **Last 5 Errors** tab. Error data is displayed with a timestamp of the occurrence, the object, and a brief summary of the issue.

## NODE PERFORMANCE

You can view node performance by using the procedure described in Accessing Performance Statistics. See Figure 150.

**Figure 150. Node Performance Detail**

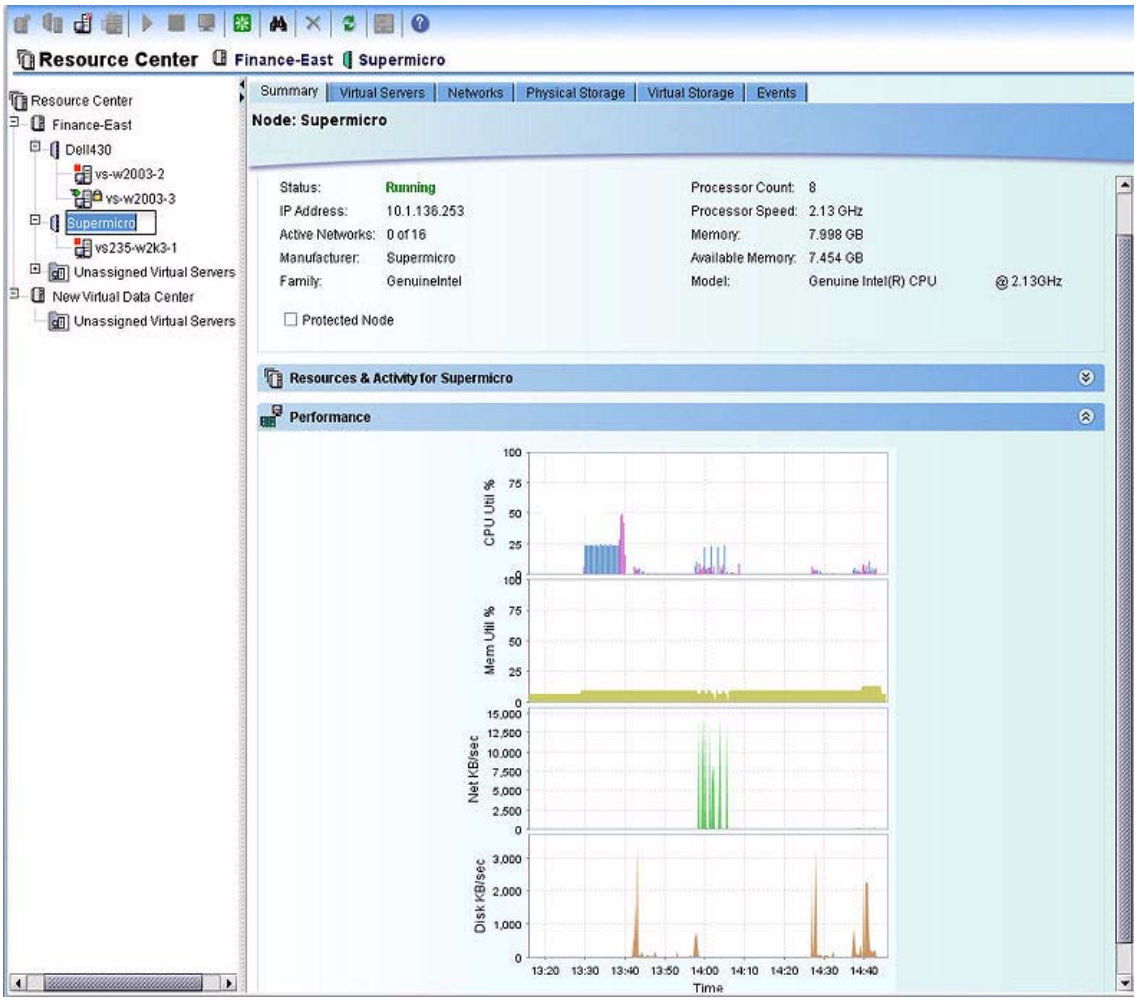



Note that you can set the number of rows of data displayed in the Node Performance pane. Click any of the column headings to switch the order of the displayed data from highest to lowest or vice versa. The **CPU Utilization** and **Relative Load** columns are a visual representation in terms of percentage of use.

Relative Load is calculated by computing a weighted average of the CPU, memory, network, and SAN load on each node, and then normalizing these node scores on a scale of 0 (the least busy node) to 100 (the mode busy node). Relative Load usually correlates to CPU utilization, but if two nodes have an equal CPU utilization, and one has much less free memory, that node will have a higher relative load value.

To see the performance of a *specific* node, click the node icon in the navigation tree, and then click **Performance** in the Summary screen. A graphical representation of the node's disk, network, memory, and CPU usage are displayed in 10-minute increments. See Figure 151.

**Figure 151. Node Statistics**

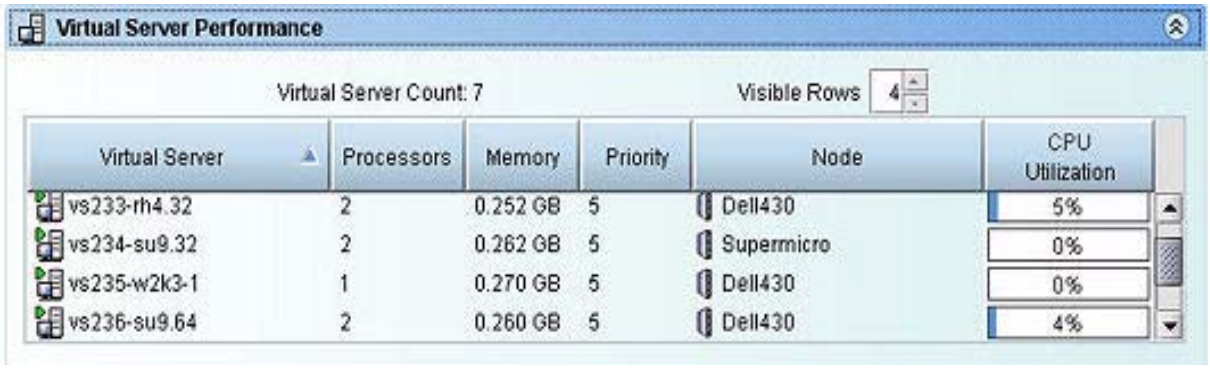



## VIRTUAL SERVER PERFORMANCE

Virtual Server statistics are available only if VSTools is enabled for the GOS booted by a virtual server. In addition to using the Summary screen to view all VS statistics, you can click a specific VS icon in the navigation tree to see its data.

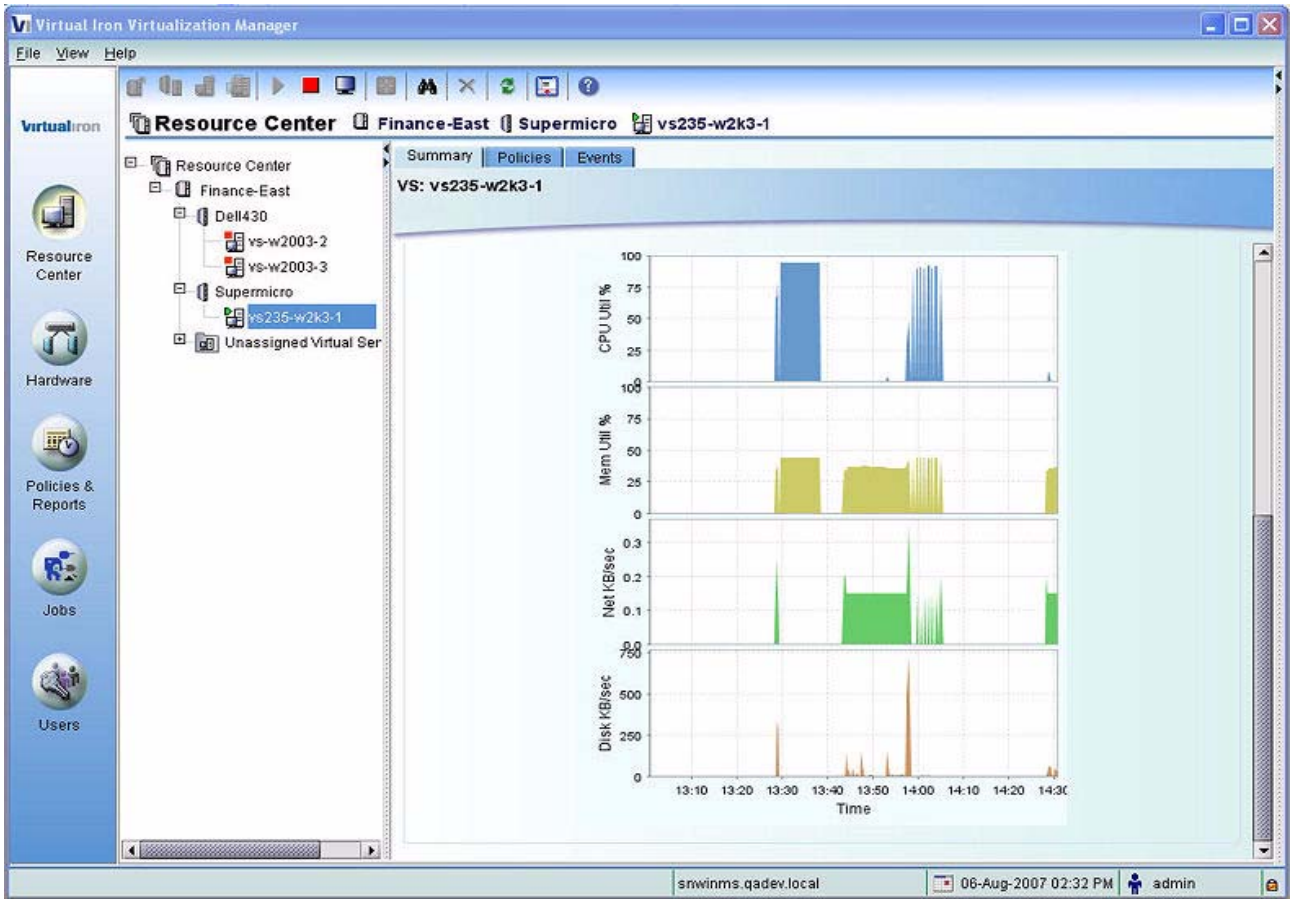
Note that you can set the number of rows of data displayed in the Virtual Server Performance pane. Click any of the column headings to switch the order of the displayed data from highest to lowest or vice versa. The **CPU Utilization** column is a visual representation in terms of percentage of use. See Figure 152

**Figure 152. Virtual Server Performance Detail**




To see the performance of a *specific* virtual server, click the virtual server icon in the navigation tree, and then click **Performance** in the Summary screen. A graphical representation of the virtual server's disk, network, memory, and CPU usage are displayed in 10-minute increments. See Figure 153.

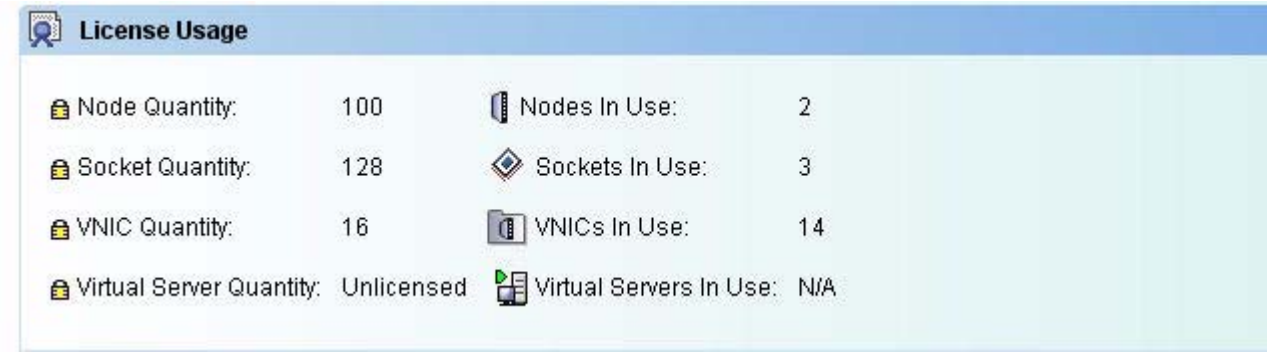
**Figure 153. Virtual Server Statistics**



## LICENSE USAGE

The License Usage pane shows how many resources are being used in relation to the total available for use. See Figure 154 for an example of the type of data displayed in the License Usage pane.

**Figure 154. License Usage Detail**




## ACTIVE POLICIES

Use the Active Policies pane to track which policies are scheduled and which are running. See Figure 155.

**Figure 155. Active Policies Detail**


## USER CONNECTIONS

The User Connections pane shows which users are connected and at what time they logged on.

# STARTING THE VIRTUALIZATION MANAGER

The instructions that follow explain how to start the Virtual Iron® Virtualization Manager on Linux or Windows®. These instructions do not apply to the Single Server Edition, which does not require a hosting OS.

## Starting the Virtualization Manager, Linux®

After installing Virtual Iron® start the Virtualization Manager. On the management node, type:

/etc/init.d/vivmgr

You are presented with **start** and **stop** options. Choose start.sh to start the server.

---

**Note:** You can also start the Virtualization Manager by rebooting the management node after installation.

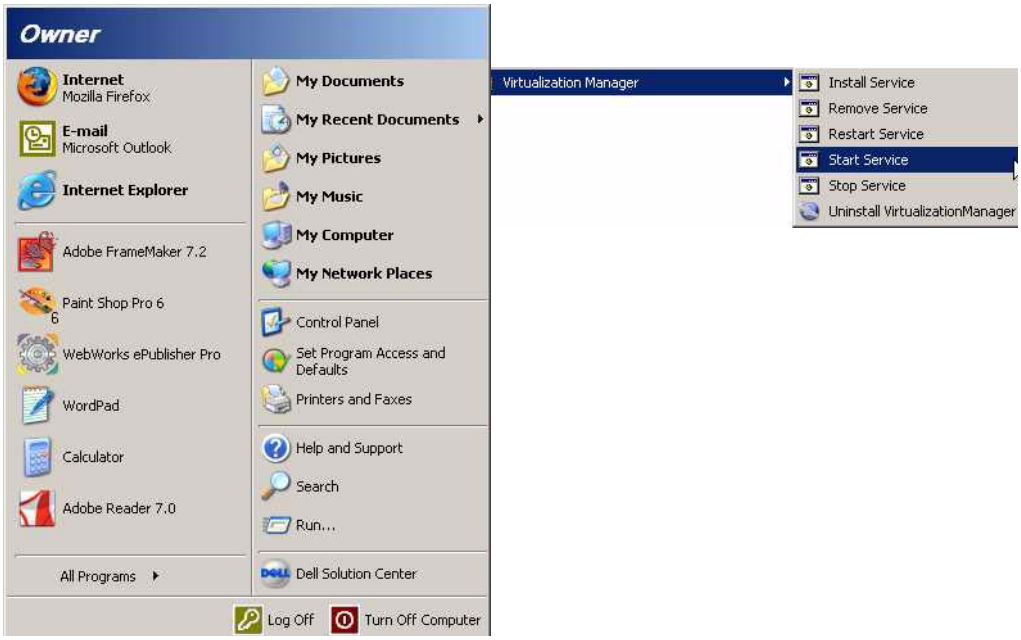
---

## Starting the Virtualization Manager, Windows®

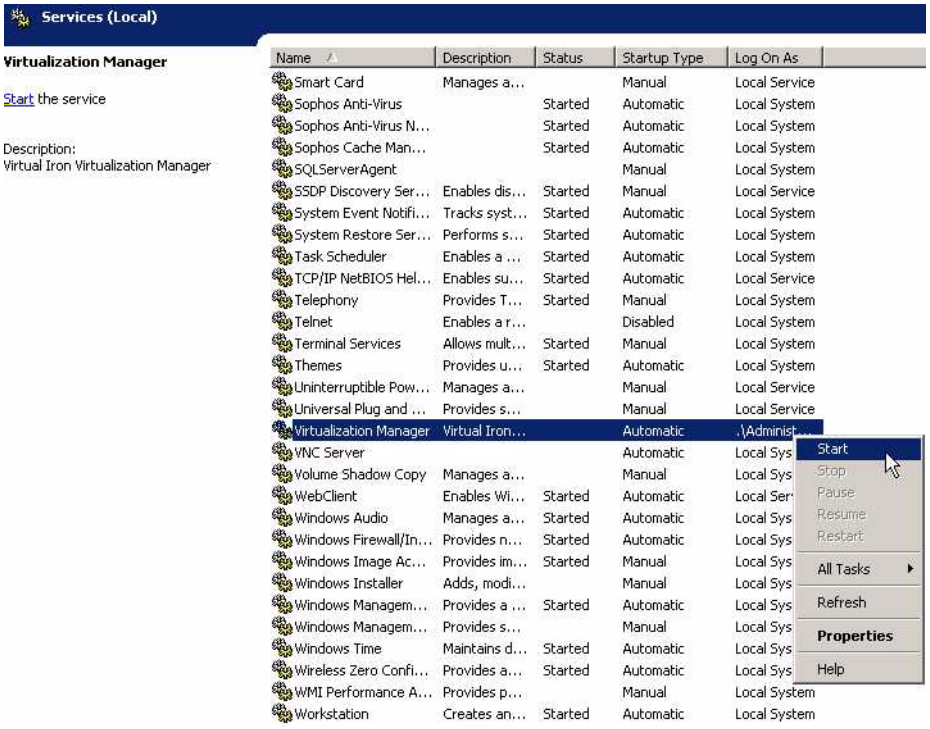
After completing an installation on Windows:

**Step 1.** Install and start the Virtualization Manager as a service. Choose **All Programs -> Virtualization Manager ->Install Service.** You are prompted for a password. Enter the password of the system Administrator or Owner (in the case of Windows® XP).

Choose **Programs -> Virtualization Manager ->Start Service**



**Step 2.** Navigate to **Control Panel ->Administrative Tools-> Services.** Virtualization Manager is listed as a service. Start the service as shown here.



# PERFORMING BACKUP AND RESTORE OPERATIONS

The Virtualization Manager database can be backed up on the system hosting the Virtualization Manager. Backed up data includes the state of all virtual objects.

## Backing up the Configuration Database

Perform backup operations by running a backup policy from the UI:

**Step 1.** Cancel all current jobs, close all virtual console sessions, and close all user sessions.

**Step 2.** Click **Policies and Reports** in the application toolbar. Then select **SystemBackup** as shown.

**Figure 156. Running a Backup Policy**


**Step 3.** To run a backup policy immediately, select SystemBackup and click **Start** as shown in Figure 156. To configure the system for scheduled back ups, see Policies and Reports.

## Restoring the Configuration Database

To restore a saved configuration desk, run the restore script. This script shuts down the Virtual Iron Virtualization Manager, untars and runs the backup file you specify, and restarts the Virtualization Manager. The script is in the installation directory on the Virtualization Manager host.

To run the script, change directory to the installation directory. Then use this command.

LINUX:

```
<root@ms-host># /opt/VirtualIron/restore.sh
backup/backup.<date>.tar
```

WINDOWS:

```
C:\Program Files\VirtualIron\restore.bat backup\backup. <date>.tar
```

# CHANGING THE VIRTUALIZATION MANAGER IP ADDRESS

It may sometimes become necessary to rearchitect the network or move the Virtualization Manager to a different subnet after installation.

Follow these steps to change the Virtualization Manager IP address:

**Step 1.** Stop the Virtualization Manager.

**Step 2.** Change the IP address of the dedicated network on the Virtualization Manager system via the host operating system.

**Step 3.** Copy the file:

VirtualizationManager\etc\dhcpd.conf_default

to

VirtualizationManager\etc\dhcpd.conf

**Step 4.** Copy the file:

VirtualizationManager\etc\dhcpd.leases_default

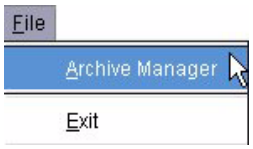
to

VirtualizationManager\etc\dhcpd.leases

**Step 5.** Start the Virtualization Manager and reboot all nodes.

# CONFIGURING THE ARCHIVE MANAGER

The archive manager is a background process that runs continuously. The archive manager moves all jobs and associated events that are older than a specified date to a secondary location in the Virtualization Manager database. This reduces the size of the working set of jobs and events stored in the Virtualization Manager's primary database.




To configure the archive manager, proceed as follows:

**Step 1.** Choose **Archive Manager** from the **File** pull down menu. This displays the window shown in Figure 157.

By default, the archive manager runs every day at 2 am. The operation keeps 500 most recent jobs and associated events, and 10,000 most recent non-job events. Such events would include hardware failures and environmental events. The operation deletes all jobs, events, and statistics older than 90 days.

**Figure 157. Archive Manager Defaults**


**Step 2.** You can edit the defaults, as shown in Figure 157. You can run the archive manager at any time, but it is best to run it when activity on the Virtualization Manager is light.

# ASSURING VIRTUALIZATION MANAGER HIGH AVAILABILITY

As you deploy Virtual Iron in production environments, you may want to plan for failure scenarios. Use the following procedure to assure that the Virtualization Manager, which controls virtual infrastructure, is readily available.

This assures that if the Virtualization Manager is unavailable because of a hardware or software failure, the virtual infrastructure continues to run; there is no interruption of service for any of the virtual machines in your environment.

| | Symptom | Recovery | Result |
|---|---|---|---|
| Cable or switch | Node appears to be down; loss of control | Replace faulty cables or switches; multi-pathing not available in management network | Virtual servers continue to run |
| Virtualization services | Node appears to be down | Cycle node power | Virtual servers must be restarted |
| Physical server | Node appears to be down | Use Virtualization Manager to migrate virtual servers to spare physical hardware | Virtual servers must be restarted |
| Virtualization Manager physical server | Cannot access Virtualization Manager | Fail over to passive server | Virtual servers continue to run |
| Virtualization Manager file system | Virtualization Manager error | Restore object from backup | Virtual servers continue to run |
| Virtualization Manager software | Cannot access Virtualization Manager | Restart Virtualization Manager | Virtual servers continue to run |

## High Availability Considerations

It is recommended that the Virtualization Manager database is backed up on a nightly basis. This assures that the database can be restored in the event of a disk failure.

A network power controller and network monitoring software can fully automate Virtualization Manager failover. Network monitoring software monitors port 80 or 443 to check the status of Virtualization Manager. Alternatively, a heartbeat script can be written using the command */etc/init.d/vivmgr status*.

The active server can be powered off and the passive server powered on manually, or automatically, with a network power controller. Once this server boots, the Virtualization Manager is back online without any affect on the availability of any virtual server.

If the management server fails while objects in the Resource Center are being modified, when the failover management server restarts, these objects may be locked. To remove the locks, abort any pending jobs. Operations in progress may be completed but errors could appear.

No statistics are collected while the Virtualization Manager is down. This resets the interval that policies wait to perform actions based on resource utilization.

### ACTIVE/PASSIVE SERVER CONFIGURATION

To decrease the time Virtualization Manager is offline, Virtual Iron recommends using Active/Passive clustering technology. The following steps describe how to configure your environment:

**Step 1.** Configure two identical servers. Ensure they have the same hardware. Refer to Figure 158.

**Step 2.** Install a supported server operating system—Windows 2003, Red Hat 4, or Novell SLES 9.

Configure the servers to boot from the same SAN or iSCSI LUN. We recommend that the LUN is mirrored using hardware RAID. **Do not** boot the servers simultaneously; only one server can be active at a time.

**Step 3.** Follow the steps in the *Administrator's Guide* to install the Virtualization Manager server on the Active server.

**Step 4.** Go to one of these directories:

/opt/VirtualIron/VirtualizationManager/etc

Program Files\VirtualIron\VirtualizationManager\etc

**Step 5.** Open the web.properties file and find the line:

```
# interface serving HTTP

intf = [‘00:90:96:a6:e3:6b’,]
```

Add the MAC from the *public* network NIC on the Passive server after the comma. For example:

```
intf = [‘00:90:96:a6:e3:6b’,’00:90:96:a6:e3:6f’]
```

**Step 6.** Open the tftpd.properties file and find the line:

```
#interface serving TFTP

intf = [‘00:0d:56:e7:15:49’,]
```

Add the MAC from the management network NIC on the passive server after the comma. For example:

```
intf = [‘00:0d:56:e7:15:49’,’00:90:96:a6:e3:6f’]
```

**Step 7.** Open the dhcpd.properties file and find the line:

```
# interface serving DHCP

intf = [‘00:0d:56:e7:15:49’,]
```

Add the MAC from the management network NIC on the passive server after the comma. For example:

```
intf = [‘00:0d:56:e7:15:49’,’00:90:96:a6:e3:6f’]
```

**Step 8.** Open the action.properties file and find the line:

```
# interface serving node commands

intf = [‘00:0d:56:e7:15:49’,]
```

Add the MAC from the management network NOC on the passive server after the comma. For example:

```
intf = [‘00:0d:56:e7:15:49’,’00:90:96:a6:e3:6f’]
```

**Step 9.** Open the tunnel.properties file and find the line:

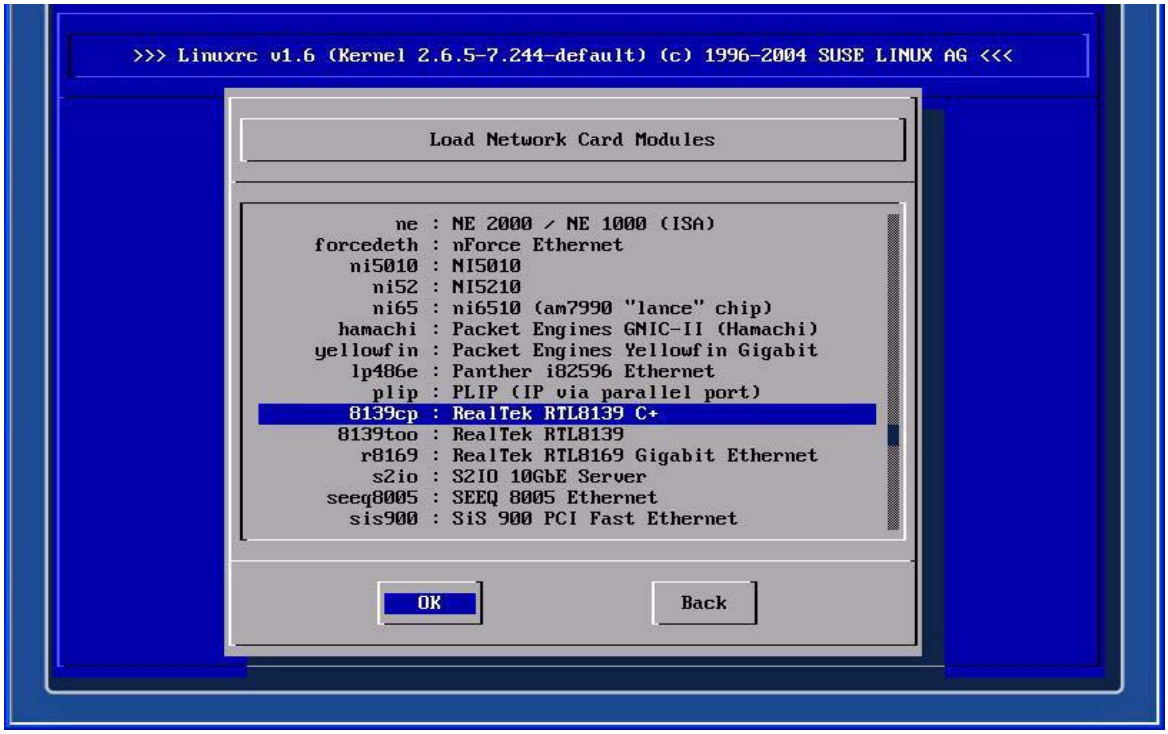
```
# interface serving node commands

intf = [‘00:0d:56:e7:15:49’,]
```

Add the MAC from the management network NIC on the passive server after the comma. For example:

```
intf = [‘00:0d:56:e7:15:49’,’00:90:96:a6:e3:6f’]
```

**Figure 158. SLES Install Driver Window**



# SINGLE NODE TO MULTI-NODE CONVERSION

**Note:** Before converting, assure that your Single Server Edition and Enterprise Edition Virtualization Managers are both running the same version of Virtual Iron Management software, and that the time and date settings are the same.

## Prior to Converting

Converting from Single Server Edition to Enterprise Edition requires a second NIC port. Your SSE server may already have a second port that is not being used.

If you need to install an additional NIC, shut down the SSE server, install the NIC, and reboot before you perform the conversion procedure.

### CONVERTING SSE TO EE VIRTUALIZATION MANAGER

**Step 1.** Launch the Virtual Iron Administration Manager on your single node Virtualization Manager.

**Step 2.** In the Administration Manager, click the pulldown arrow next to Backup and select **Database Only**. This creates a backup .tar file named **backupDB.X.Y.tar**.

**Step 3.** In the Administration Manager, click the **File Management** pulldown and select **Get a File from the Virtualization Manager**.

**Step 4.** Navigate to your backup directory and select your backup file named **backupDB.X.Y.tar**, where X is the date of the backup and Y is the product version number.

**Step 5.** Unplug the public Ethernet from your single node management server's primary Ethernet port and plug it into the secondary port.

Take a new Ethernet cable and plug your primary network interface into the network managed by the new multi-node management server. Make sure that the BIOS on the former single node is set to PXE boot.

**Step 6.** Launch the Administration Manager on the multi-node management server.

**Step 7.** In the Administration Manager, click the pulldown arrow next to File Management and select **Put a File onto the Virtualization Manager**.

**Step 8.** Locate the **backupDB.X.Y.tar** file on your local machine and place it in the backup directory on your multi-node Virtualization Manager.

**WARNING**: Before performing the next step, note that if you have any data on the Enterprise Edition install, it will be erased.

**Step 9.** On the command line in your management server console, type

restore.sh/ .bat backupDB.datetime.4.x.x.tar

**Step 10.** Restart the Enterprise Edition Virtualization Manager.

**Step 11.** Power cycle the node that was originally the Single Server Edition Virtualization Manager.

**Step 12.** On the Enterprise Edition Virtualization Manager, copy

etc/dhcpd.conf_default

to

etc/dhcpd.conf

Copy

etc/dhcp.leases_default

to

etc/dhcpd.leases

**Step 13.** Use the same password for your Enterprise Edition Virtualization Manager that you used for your Single Server Edition, and log in.

# UNINSTALLING VIRTUALIZATION MANAGER

Following are procedures for uninstalling Virtual Iron® from Linux and Windows®.

## Uninstalling from Linux

To uninstall Virtualization Manager from Linux, enter this command:

/opt/VirtualIron/Uninstall_VirtualizationManager

## Uninstalling from Windows

Follow these steps to uninstall Virtualization Manager.

**Step 1.** As the Administrative User that installed Virtualization Manager, navigate to **Start > Programs > Virtualization Manager > Stop Service**. A command window is displayed as the service is being stopped. The window closes when the service is stopped.

**Step 2.** Select **Start > Programs > Virtualization Manager > Remove Service**.

**Step 3.** Select **Start > Programs > Virtualization Manager > Uninstall Virtualization Manager**. A Virtual Iron dialog window is displayed. Click **Uninstall** to uninstall the Virtualization Manager. Click **Done**.

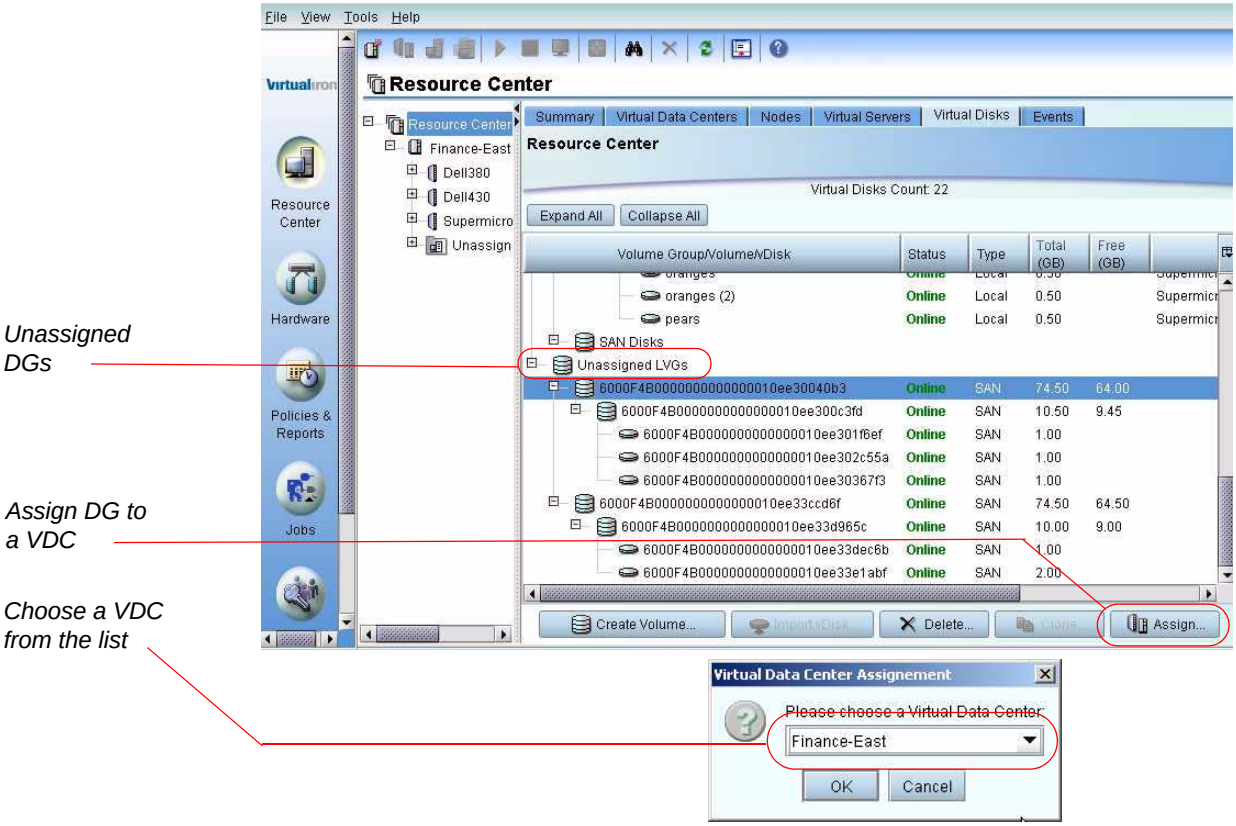
**Step 4.** Navigate to Program Files. Select the Virtual Iron folder, and delete it to complete the Uninstall process.

# REASSIGNING UNASSIGNED DGS

If you need to upgrade to the next version of Virtual Iron®, it is recommended that you perform a system upgrade, rather than reinstall the software. Occasionally, it may be necessary to reinstall the software.

If you reinstall the product, the associations between DGs created previously and the VDCs configured in the system's database are lost. The information associated with the DGs still exists on the SAN. However, although Virtualization Manager can discover this information during the discovery phase, it can not determine which VDC(s) to associate with these orphan DGs. They appear at the Resource Center level in the Logical Disks tab. An example is shown in Figure 159.

**Figure 159. Unassigned DGs**




For orphaned DGs to be of use, they must be reassigned to VDCs. To reassign VDCs, select each DG. Click **Assign...**, and choose the VDC from the pull down list. Click **OK**. Perform this procedure for each orphaned DG.

# ACCESSING ONLINE HELP

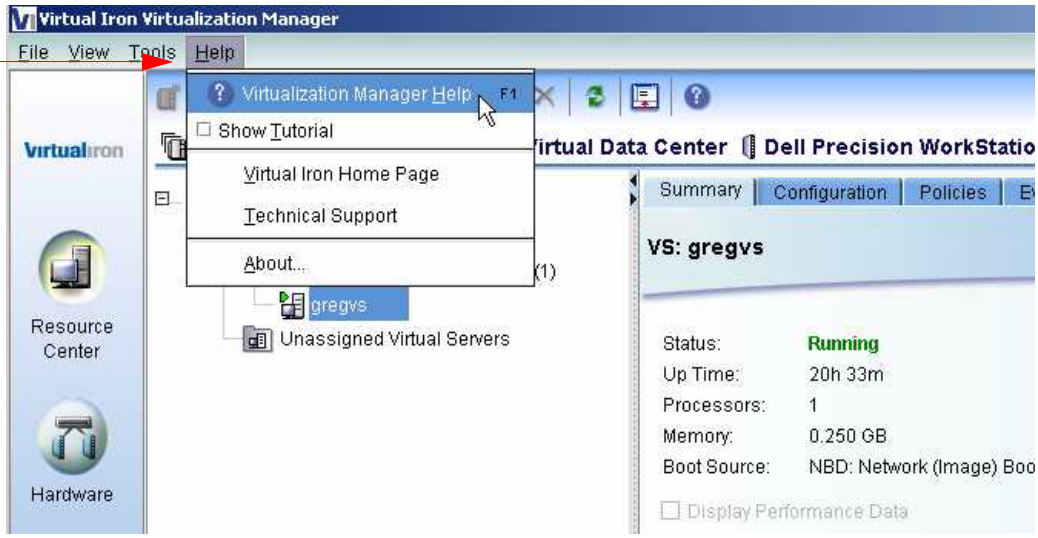
To access online Help:

**Step 1.** Perform one of the following actions.

- Select **Help** from the Help menu pull-down, as shown in Figure 160.

**Figure 160. Help Pull-down Menu**

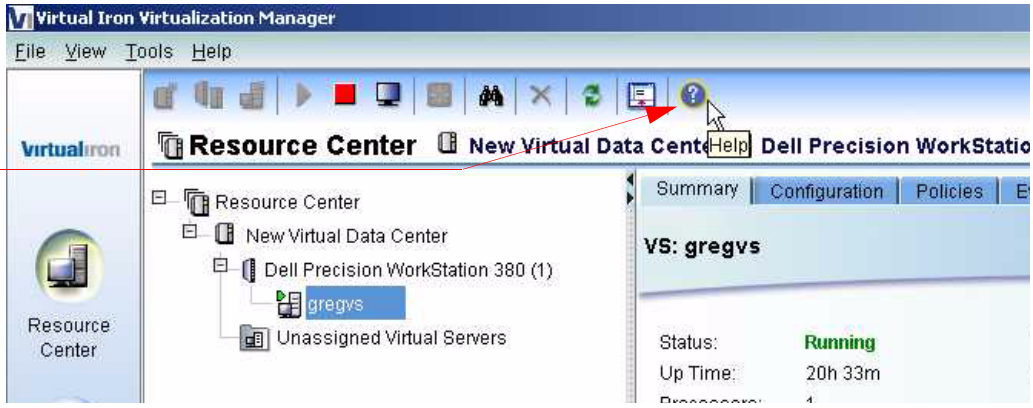
*Help menu option*




- Click on the Help icon in the application toolbar, as shown in Figure 161.

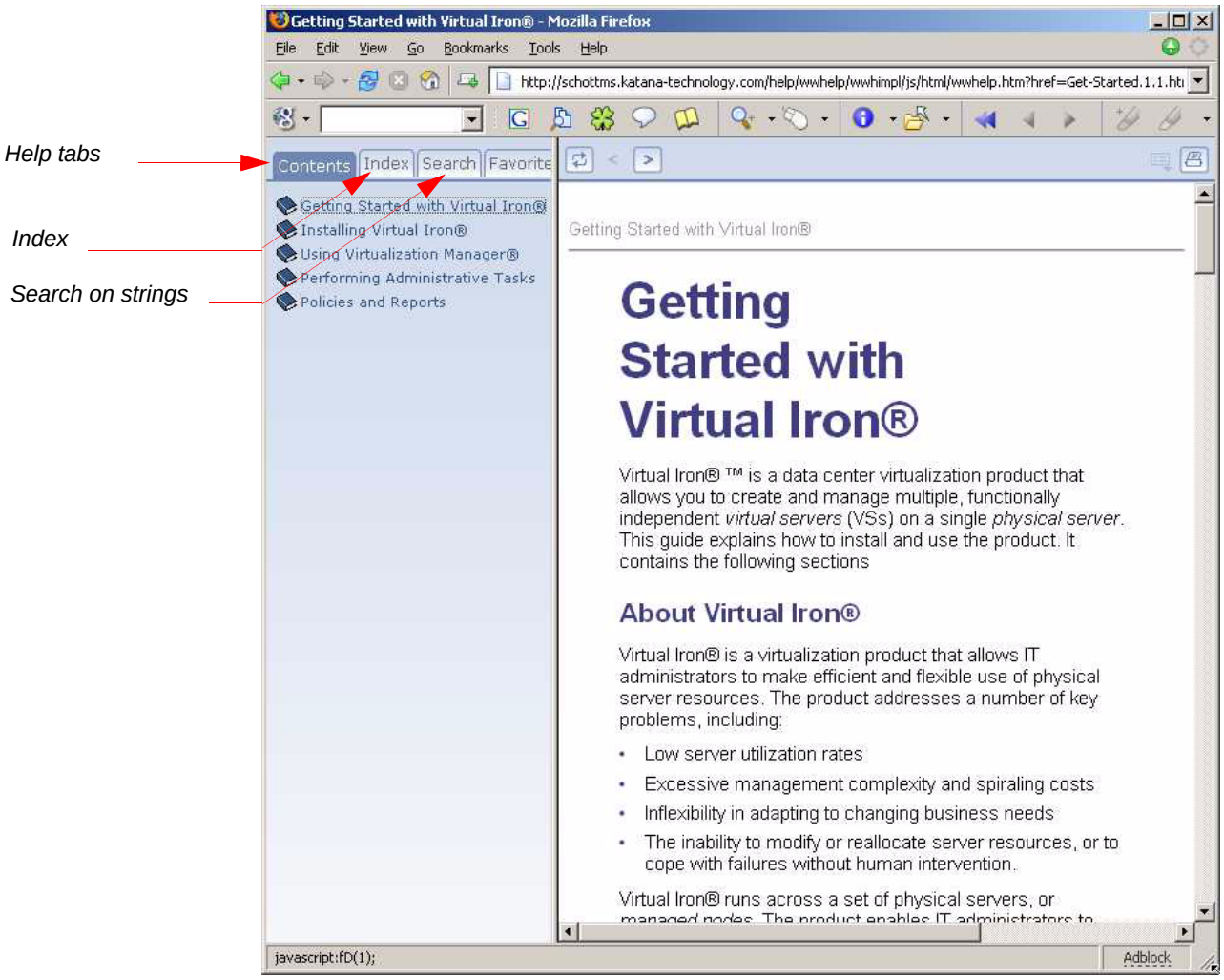
**Figure 161. Help Icon**

*Help icon*




**Step 2.** The HTML-based Help system opens in a separate browser window. A sample window is shown in Figure 162. The left pane contains tabs for Contents, Index, and Search. Help content is displayed by default. Use the tabs as needed to search Help based on text strings or indexed entries.

**Figure 162. Sample Help Window**

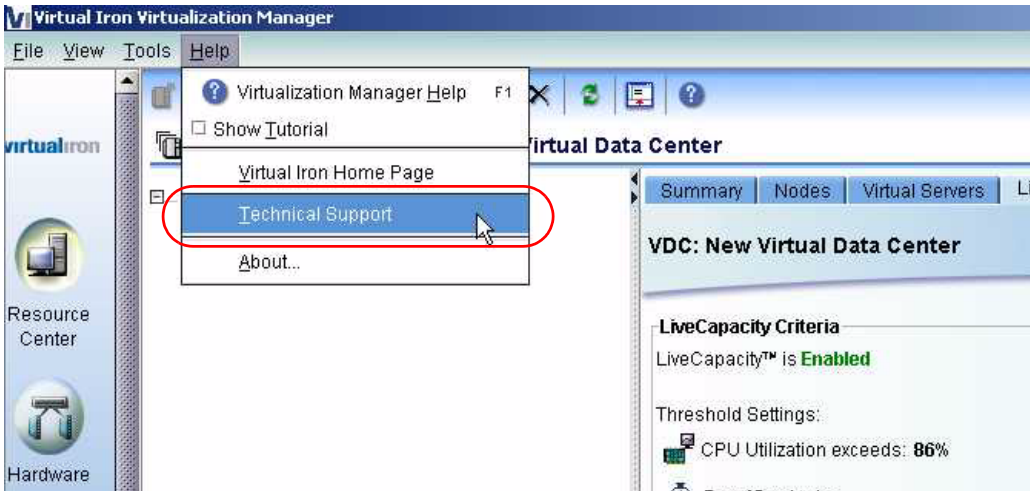


# ACCESSING TECHNICAL SUPPORT

To access technical support:

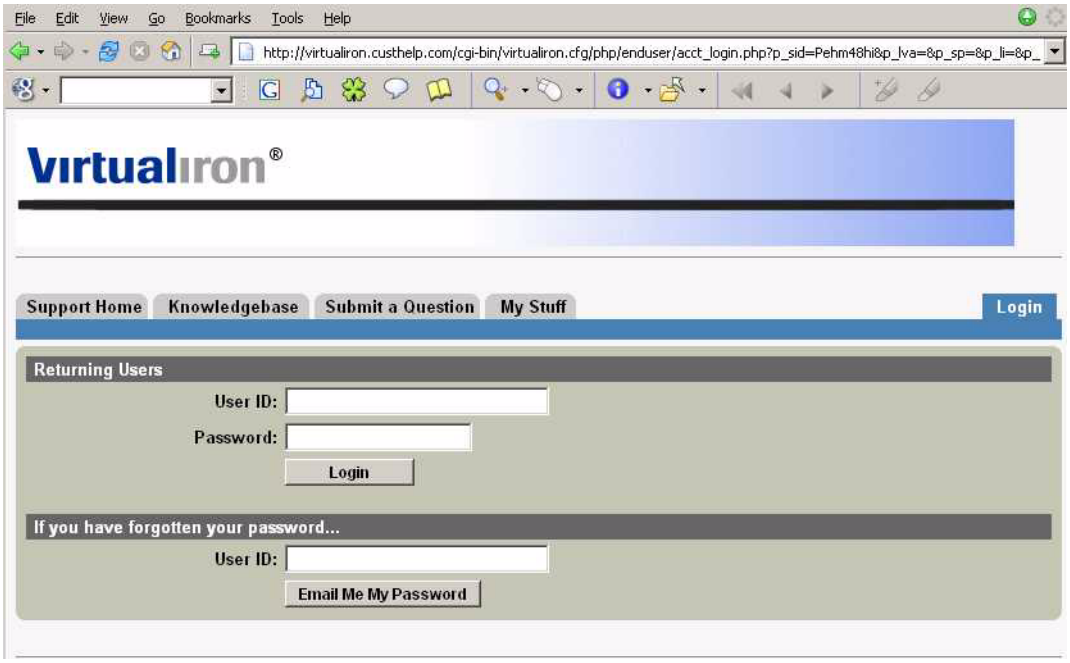
**Step 1.** Select **Technical Support** from the Help pull down menu.

**Figure 163. Accessing Technical Support**




**Step 2.** This connects you to the Virtual Iron® Technical Support database. A sample of the connection screen is shown in Figure 164.

**Figure 164. Virtual Iron® Technical Support Home Page**



Use the tabs on the Support home page to access and search the Virtual Iron knowledge base, submit a question, or connect to your own area of the support site. To login, enter your User ID and Password in the fields provided, and click **Login**.

# INDEX


## A

Active/Passive Server Configuration 214
Application Toolbar 76
    Hardware 77
    Jobs 79
    Policies and Reports 77
    Resource Center 76
    Users 81
architecture, overview 4
archive manager, configuring 212
assigning disks to virtual servers 125
assigning nodes, virtual data centers 118

## B

backing up
    configuration database 209
    management server database 66
backup and restore operations 209
bonded networks for failover 58
boot methods 9
boot options 127

## C

changing management server IP address 211
client requirements, Virtualization Manager 16
cloning
    logical disks 108
    virtual servers 133
closing job tabs 91
configuration database
    backing up 209
    restoring 209
configuring
    archive manager 212
    bonded networks 58
    boot options 127
    Ethernet networks 47
    ILO 20
    IP address 53
    IPMI 20
    LDAP 191
    logical disks 98
    network adaptors 127
    networks 45
    non-English keyboards 198
    policies 170
    processors, number of 131
    server, active/passive 214
    storage, Enterprise Edition 103
    unassigned virtual servers 122
    user accounts 188
    virtual servers 122
    VLANs 55
connecting to management server 40
creating
    disk groups 99
    failover network 58
    gold master 167
    user accounts 188
    virtual data centers 116
    VLAN groups 55

## D

Data protection, and Virtualization Manager 34
dedicated management network 18
default management network, Enterprise Edition 45
default public network, Single Server Edition 46
defining networks 42
deleting user accounts 189
DHCP
  IP address configuration 53
  iSCSI port 53
disk groups
  creating 99
  defined 98
disks, assigning to virtual servers 9

## E

editing user accounts 190
Enterprise Edition
  default management network 45
  exporting a logical disk 103
  importing a logical disk 103
  importing a virtual disk 105
  managed servers, requirements 15
  management server, requirements 15
Ethernet networks, configuring 47
Event Report 175
exporting a logical disk, Enterprise Edition 103
exporting a virtual disk, Single Server Edition 106
exporting VHD files 110

## F

failover network, creating 58
failover, bonded networks 58
File menu 72

## G

General Public License files viii
generating reports 172
gold master
  creating for logical disk 167
  provisioning virtual servers with 167
GPL source files viii
guest operating system
  installing to a logical disk 139
  installing VSTools on 141
guest operating systems, supported by virtual servers 16

## H

hardware requirements 15
Hardware, Application Toolbar 77
Help, accessing 221
hiding job tabs 91
high availability, Virtualization Manager 213

## I

ILO, configuring 20
importing a virtual disk
  Enterprise Edition 105
  Single Server Edition 107
importing VHD files 110
installing
  guest OS to a logical disk 139
  Virtual Iron 12
  VS Tools
    on guest OS 141
  VSTools on Linux guests 141
IP address
  changing management server's 211
  configuraton 53
IPMI, configuring 20

## J

Job Operations tab 85
Job report 176
jobs
  aborting 90
  closing job tabs 91
  determining cause of failure 91
  events 87
  failure of 87
  multi-user environment 85
  operations 85
  resource locks 85
  states of 87
Jobs, Application Toolbar 79

## L

launching a virtual server console 154
LDAP
  authentication 191

changing configuration of 197
component Information 191
configuring 191
support and administration 191
license
accessing information about 74
for additional features 64
new 64
obtaining viii
Linux, management server 207
LiveCapacity 155
LiveCapacity policy 182
LiveMaintenance 160
LiveMigrate
moving virtual servers 164
requirements 164
LiveRecovery 156, 182
LiveRecovery policy 182
logical disk
cloning 108
configuration 98
creating 101
importing, Enterprise Edition 103
overview 98
LVM Snapshot Utilization 183


## M


managed nodes
minimum requirements 15
overview 6
managed nodes, minimum requirements 15
management server
connecting to 40
database, backing up 66
IP address, changing 211
Linux® 207
reloading 67
requirements 15
restarting 67
Run command 68
starting 207
Windows® 207
maximum limits, Virtual Iron 16
memory 8
memory allocation 131
menus, pull-down 72
monitoring performance 201
moving nodes to virtual data center 161
moving virtual servers 85
multiple-users, and jobs 86
multi-user environment, managing in 85


## N


Navigation Tree 82
network adapters, configuring 127
network configuration 45
network connections, VNICs 9
Node Report 177
node states, color indicators 120
node statistics 202
non-English keyboards, configuring 198


## O


Online Help 221
opening a virtual server console 154
overbook limit 113


## P


performance monitoring 201
Policies and Reports 77, 170
Application Toolbar 77
policy
configuing 170
LiveCapcity 182
LiveRecovery 182
Snapshot 183
system 182
User 178
policy-based management 170
Priority 132
priority, setting of virtual servers 132
processing priority 8
Processors 8
processors, configuring number of 131
product requirements 5
public network 18
pull-down menus defined 72


## R


reloading management server 67
reports
generating 172
types 172
requirements

hardware 15
software 15
requirements, LiveMigrate 164
Resource Center
Application Toolbar 76
statistics 202
resource locking 85
restarting management server services 67
restoring the configuration database 209
Run command 68

## S

server configuration, active/passive 214
Single Server Edition
configuring storage 106
default public network 46
exporting a virtual disk 106
importing a virtual disk 107
managed server requirements 15
Snapshot
Overbook Limit 113
policy 183
Snapshots
operational considerations 136
software requirements 15
starting
virtual server 152
virtual server console 154
states, jobs 87
statistics
nodes 202
Resource Center 202
virtual data center 202
virtual server 204
stopping a virtual server 152
system policies 182

## T

technical support 223
tutorial, accessing 70

## U

unassigned virtual servers 117
and virtual data centers 121
configuring 122
deploying 122
overview 121
UPS protection 34
user accounts
configuring 188
deleting 189
editing 190
User policies 178
Users, Application Toolbar 81

## V

VHD files, importing and exporting 110
View menu 73
virtual data center
and unassigned virtual servers 117, 121
assigning nodes to 118
creating 116
moving nodes to 161
statistics 202
virtual disk
importing, Enterprise Edition 105
importing, Single Server Edition 106, 107
virtual infrastructure, overview 3
Virtual Iron
maximum limits 16
virtual server
assigning disks to 125
characteristics 8
cloning 133
console, opening 154
deploying 122
guest operating systems supported by 16
memory allocation 131
moving 85
moving to a new node 164
moving to a node 122
moving to Unassigned 123
priority options 132
processors 131
starting 152
statistics 204
stopping 152
virtual server characteristics
boot methods 9
disks 9
memory 8
network connections 9
processing priority 8
processors 8
Virtual Server Report 177

virtual servers
creating storage for 125
Virtualization 211
Virtualization Manager
client requirements 16
data protection 34
high availability 213
overview 2
uninstalling from Linux 219
uninstalling from Windows© 219
UPS protection 34
Virtualization Manager, client requirements 16
VLAN
configuraton 55
groups, creating 55
VS Tools
installing on Linux guests 141
silent install 149
VS Tools Installed option 132

## W

Windows 2000 OS
CPU usage 151
special considerations 151
Windows, management server 207

# Index