Virtual Iron Evaluator's Guide

Virtual Iron provides enterprise-class software solutions for creating and managing virtual infrastructure in the data center. The software provides advanced server virtualization and management capabilities that take advantage of industry standards and open source economics and enable companies to dramatically reduce the cost and complexity of enterprise service delivery.

With Virtual Iron, users can:

- Virtualize enterprise-class workloads.
- Improve the utilization of current systems and get more out of today's industry-standard hardware systems through server consolidation.
- Quickly set up development, test and production environments.
- Recover from hardware failures quickly, reliably and cost-efficiently.
- Match resource capacity to workload demands via capacity management capabilities.
- Reduce human labor and errors via policy-based automation.

The Virtual Iron solution consists of three components:

1. Virtual Iron Virtualization Manager provides a central place to control and automate virtual resources. It streamlines tasks that are normally highly manual and time-intensive and significantly reduce data center costs and complexity.

2. Virtual Iron Virtualization Services are deployed automatically on bare-metal, industry-standard servers without requiring software installation or management. These features streamline data center management and reduce operational costs.

3. Open Source Virtualization, based on an open source hypervisor derived from the open source community project, is the first software loaded when the physical server boots. The hypervisor manages all hardware resources and leverages the hardware-assisted virtualization capabilities built into Intel and AMD processors to create an abstraction layer between physical hardware and virtual resources.

Evaluation Steps

Step 1: Plan the Business Case

Step 2: Plan the Evaluation

Step 3: Configure Physical Environment and Install Virtual Iron

Step 4: Configure Virtual Environment through Virtualization Manager

Step 5: Evaluate use cases

Step 1: Plan the Business Case

There are a number of business drivers for virtualization.

Data Center Business Drivers	Virtualization Benefits
Low resource utilization (e.g. one application per server) leading to power, cooling and space issues	Improve resource utilization to reduce capital expenditures on servers, networks and storage; reduce power, cooling and space consumption
Insufficient resources to meet demand (e.g. lack of available SAN ports, storage, etc.)	Use virtual resources instead of physical resources to decrease the number of SAN switch ports used
Time consuming service provisioning process (e.g. weeks to order and configure hardware, networks, operating systems, and applications)	Reduce time to stand up a service from weeks to minutes; configure from “golden images” to reduce errors
Lack of comprehensive business continuity strategy (e.g. cost prevents business continuity for all enterprise applications)	Availability features allow quick, reliable and cost-efficient failure recovery (using N+1 hardware versus 2N) and simplify reconfigurations for DR scenarios
Manual service level agreement remediation (e.g. SLA management is time consuming, service delivery issues time consuming to remedy)	Policy-based automation using LiveCapacity rebalances data center workloads to ensure applications have optimal capacity, reducing quality of service issues; IT staff can focus on value-added activities
Insufficient maintenance windows to perform routine service (e.g. memory upgrade to servers indefinitely postponed)	Perform maintenance at any time using LiveMaintenance to move running applications to alternative servers; reduces overtime for IT staff while maintaining service levels

Development & Test Business Drivers	Virtualization Benefits
QA lab server sprawl or insufficient resources to perform needed tests	Set up multiple environments on shared hardware to improve resource utilization and allow QA engineers to instantly access any environment to reduce capital expenditures on servers, networks and storage; reduce power, cooling and space consumption
Setup and provisioning time for test environments	Setup and provisioning can take up to 50% of QA time, especially for complex environments; reducing this time allows QA resources to be directed towards more productive activities
Failures are hard to reproduce	Snapshotting a failure allows developers to quickly reproduce problems, eliminating manual work and incorporating into automated test and regression suites

Step 2: Plan the Evaluation

Before you begin the evaluation, you will need the following items:

- ☐ One or more servers that will be Virtualized Nodes
- ☐ One or more supported Fibre channel IO adapters per Virtualized Node (if using SAN storage)
- ☐ Virtualized Nodes with sufficient memory (at least 2GB)
- ☐ Virtualized Nodes and IO components are at latest BIOS and firmware
- ☐ A server connected to the public network to install the Virtualization Manager
- ☐ Virtual Iron installation file
- ☐ Virtual Iron license string
- ☐ Latest documentation and release notes

System Configuration Information

Please enter the information for Virtualized Nodes. Note: Virtualized nodes must have either Intel VT processors (Xeon 3000, 5000 or 7000 series) or AMD-V processors (Opteron 2200 or 8200 series). Intel Core 2 Duo and AMD Athlon 64 x2 processors are also acceptable. (See http://www.virtualiron.com/products/servers.cfm) for an up-to-date list.

Circle Manufacturer: Dell, HP, IBM, Rackable, Sun

Model _____

Number of Processors _____ Speed _____GHz

Amount of Memory _____GB

SAN FC HBAs (optional)

Circle: Emulex, QLogic

Model _____

SAN Disk Storage (optional)

SAN Storage _____GB, RAID Type _____

Circle SAN Switch Vendor: Brocade, Cisco, McData

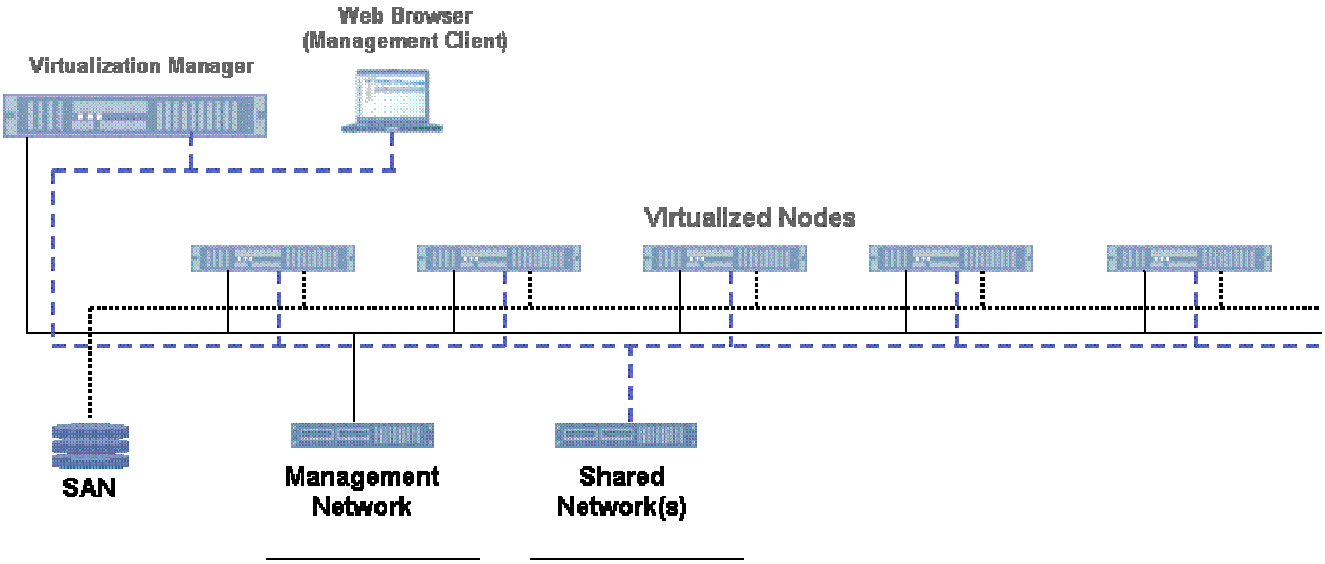
Make _____ Model _____

Local Disk Storage

Circle Drive type: SATA, SCSI

Local Storage _____GB

Network Diagram



User Accounts

Virtualization Manager Admin account password: _____

Operating Systems

☐ Red Hat Enterprise Linux 4 Update 2, 3, or 4 (32-bit)

☐ Red Hat Enterprise Linux 4 Update 2, 3, or 4 (64-bit)

☐ Suse Linux Enterprise Server 9 Service Pack 3 (32-bit)

☐ Suse Linux Enterprise Server 9 Service Pack 3 (64-bit)

☐ Microsoft Windows XP (32-bit)

☐ Microsoft Windows 2003 (32-bit)

Applications

Please circle, and add where appropriate, the applications you will be testing.

Category	Application
Application Servers	JBoss, WebSphere, WebLogic
Backup Services	Veritas

Custom Applications	
Database	DB2, Oracle, Sybase
Development / QA	
Directory / Domain Controller	Active Directory
Enterprise Applications	SAP
File and Print Services	
Firewall / Proxy Server	
Messaging	Sendmail, Exchange
Network Services	
Remote Desktop	Citrix, Windows Terminal Services
System Management	OpenView, Tivoli, Unicenter
Web Services	Apache
Other	

Forums

Virtual Iron Forums are a great place to get help and provide feedback!

http://www.virtualiron.com/fusetalk/forum/index.cfm?forumid=2

Step 3: Installation

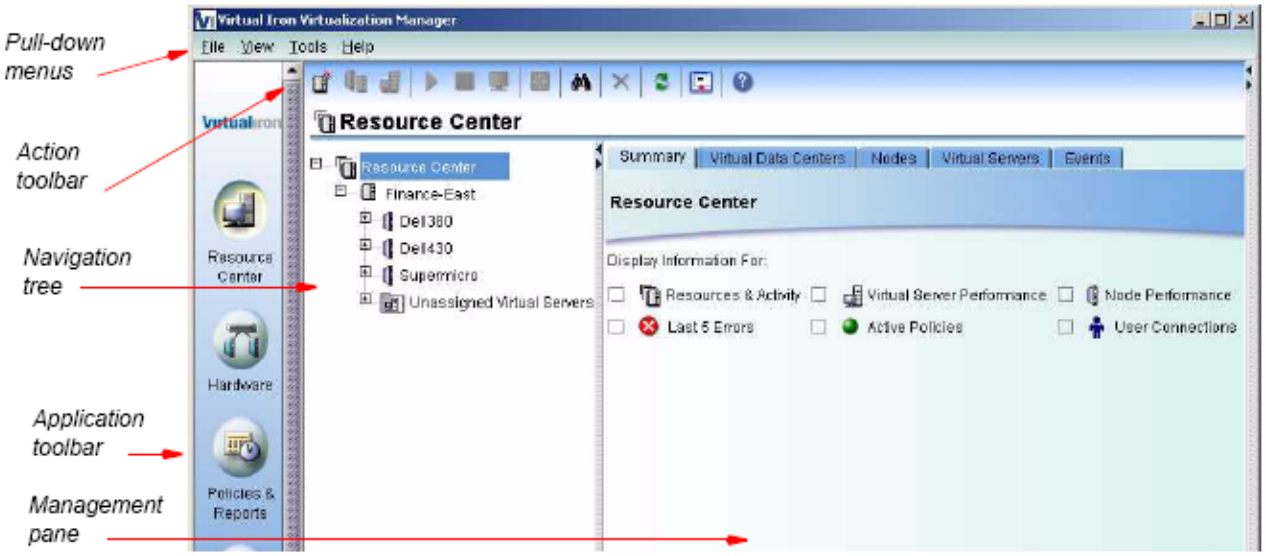
Please follow the installation and configuration steps described in the *Quick Start Guide*, downloadable from http://s3.amazonaws.com/VIDownloads/QuickStartGuide31.pdf

One of the key values of Virtual Iron is a simplified deployment process compared to other products in the market. There is nothing to install on the virtualized nodes; the virtualization software is automatically deployed from the Virtualization Manager.

Step 4: Virtual Environment Configuration

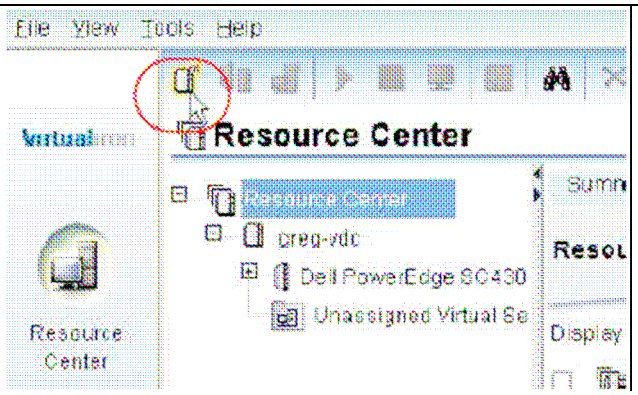
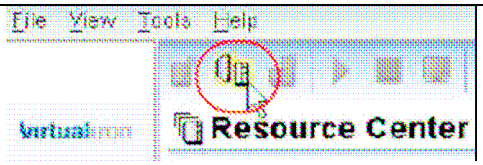
During the installation process you set up the first user account. User accounts provide security and a record of who performed actions in the Virtualization Manager. These actions, called Jobs, are described in detail in the *Administrator's Guide* Chapter 3 "About the Jobs Framework". Job reports are useful to determine what has happened in the virtualization environment. You can create additional user accounts through the Users button on the application toolbar.

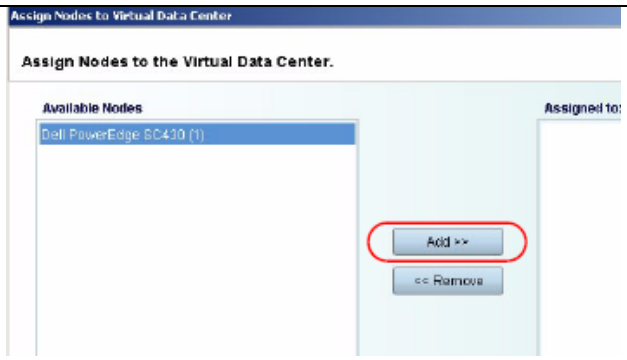
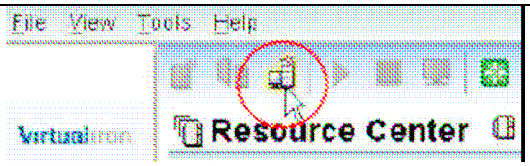
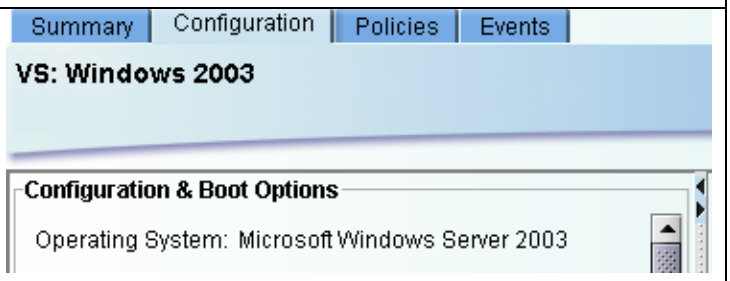
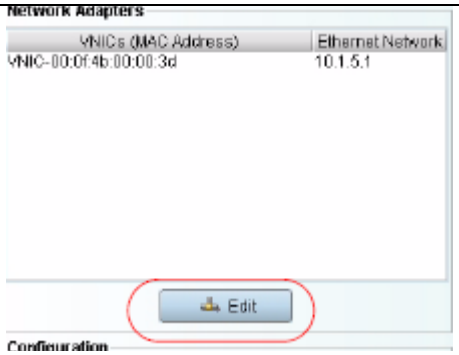
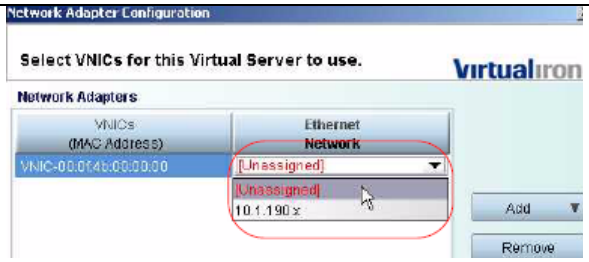
The Virtualization Manager is organized in a hierarchy using a tree to support many physical and virtual servers. Resource Center is the top button in the Application toolbar, and the location for the resources you manage in the virtualization framework. It is in the Resource Center that you create virtual data centers (VDCs), assign managed nodes to VDCs, and then create and configure virtual servers (VSs) on the nodes. Resource Center is the top-level object in the navigation tree. Virtual data centers allow you to segment the virtual environment into logical groupings that relate to how your business is run.

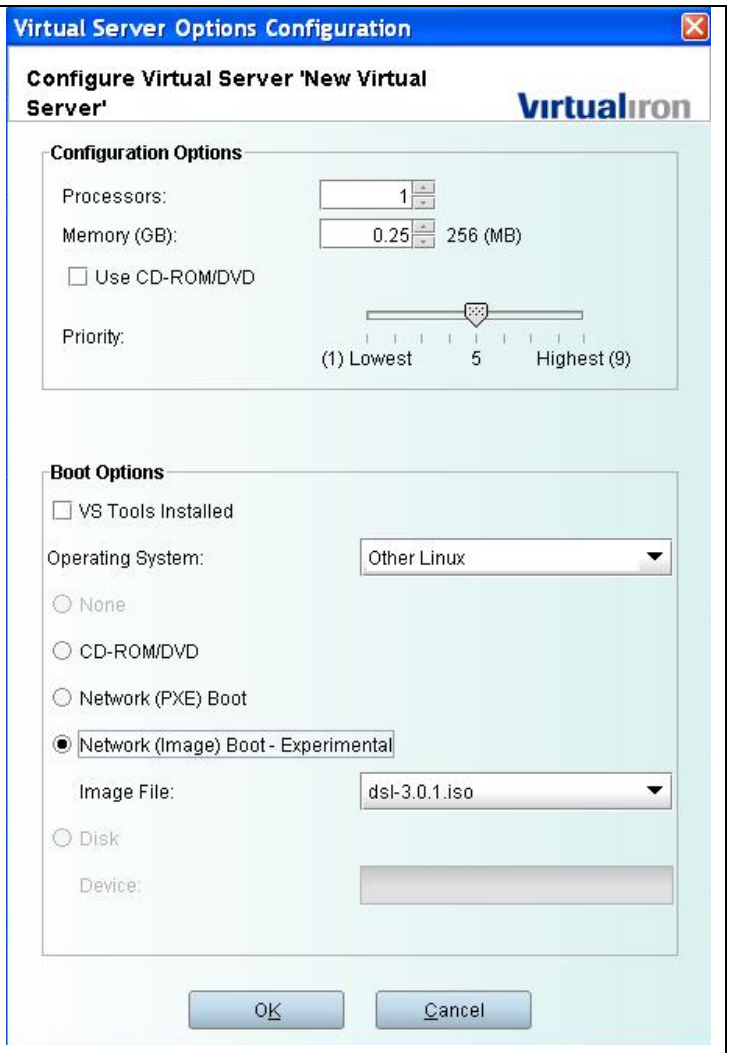
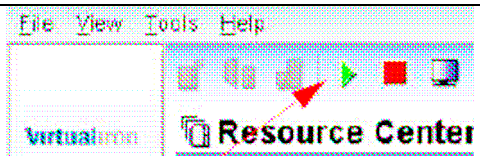


The Policies and Reports area allows you to configure policies that affect virtual servers in the environment. This area also allows you to run different types of reports on system activities, such as to view historical information on system performance or administrative actions in the data center. This is useful for capacity planning, billing, and compliance auditing.

Let's create a virtual server:

Step 1. **In the Application toolbar, click on the Resource Center button. The new VDC (called New Virtual Data Center) appears in the navigation tree as shown. Then Click the Create new Virtual Data Center icon as shown here. The new VDC appears in the Navigation Tree. Note that a yellow lock icon appears beside the new VDC. The icon indicates that you are making a change to this objects (creating the object is a change). While you are performing this operation, the objects cannot be managed by other users. To release the locks, you need to commit or undo the operation you have begun. You do this by clicking on Commit or Undo in the Jobs Operations tab at the bottom of the window.**	
Step 2. To add nodes to the VDC, select its name in the navigation tree, and click the Assign Nodes icon as shown here.	

Step 3. This brings up the Assign Nodes dialog. This dialog contains the name and information associated with all nodes that have been discovered by the Virtual Iron management server, but that are not already assigned to another VDC. To move the node to the VDC you have created, select the node and click Add >>. Then click OK. 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.	
Step 4. To create a virtual server, select the node you added earlier, then click the Create Virtual Server icon on the application tool bar. The new VS shows up in the navigation tree.	
Step 5. Next, select the configuration tab for the VS.	
Step 6. Each network adapter consists of a virtual NIC (VNIC), associated with a specific, external subnet. Once you have installed VSTools, you can add more than one VNIC to each VS, each allowing the VS to connect to a different subnet. Click the Edit button in the Network Adapters section of the Configuration tab as shown here.	
Step 7. In the Network Adaptor Configuration dialog box that appears, click Add to add any available VNIC to the virtual server. Initially, the VNIC you added is listed as Unassigned to any Ethernet Network, as shown in the figure.	

Step 8. The last step in VS configuration is to choose boot options. In the boot options window, choose a boot method for the VS. Select the operating system type (choose Other Linux and Network (Image) Boot (choose dsl-3.0.1.iso). Once you select “OK”, click the Commit button.	
Step 9. Start the virtual server and hit the commit button. You can now open the virtual console and watch the virtual server boot. The stop button located in between the start button and the console button.	

Step 5: Evaluation

Improve Data Center Utilization

Virtual Iron software allows a physical server to be partitioned into multiple virtual servers that work identically to a physical server and are completely isolated from each other. The use cases in this part of the guide provide an understanding of how Virtual Iron can support a data center initiative for consolidating the current number of physical servers and optimizing the utilization and management of newly purchased servers.

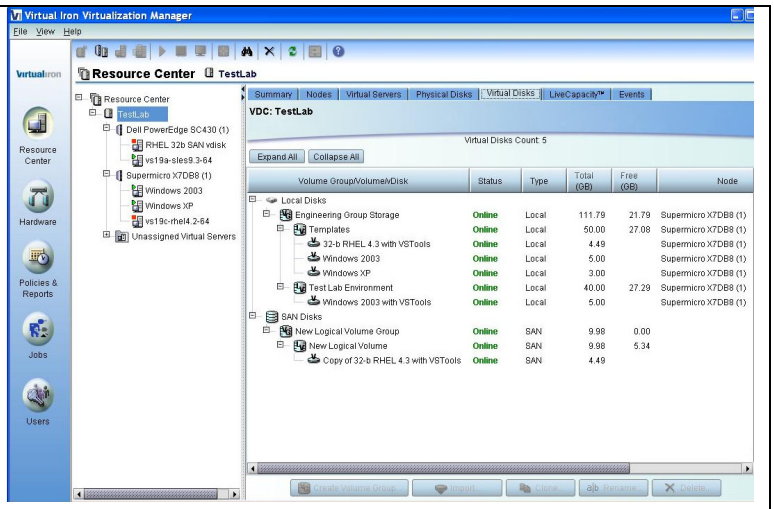
Objectives: Project activities will focus on validating customer software stacks, applications, and configurations that are targets for consolidation. Application compatibility will be verified, overhead will be determined and performance expectations will be set.

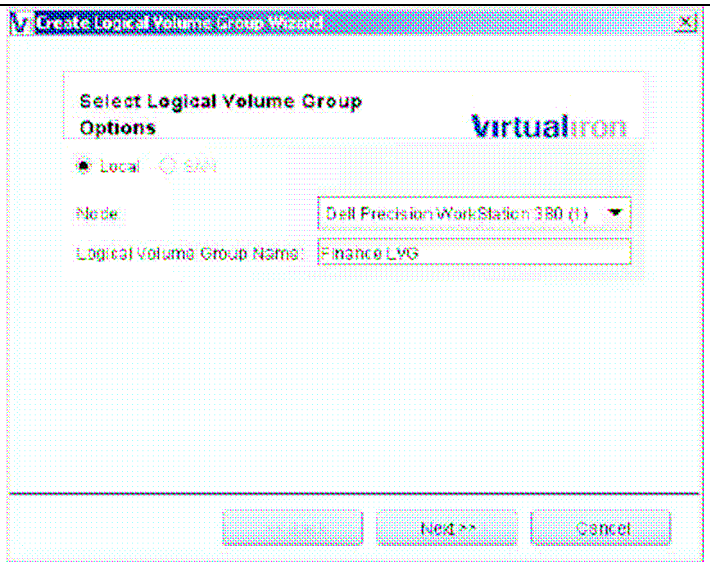
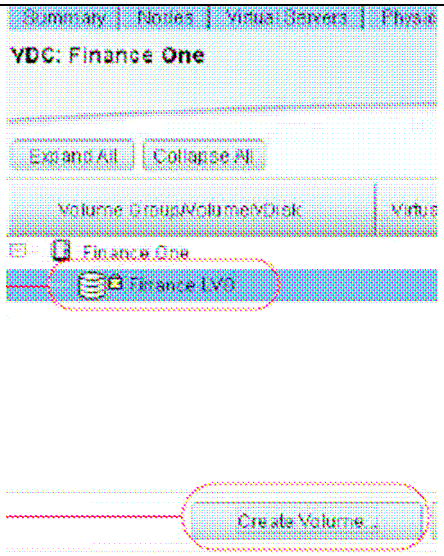
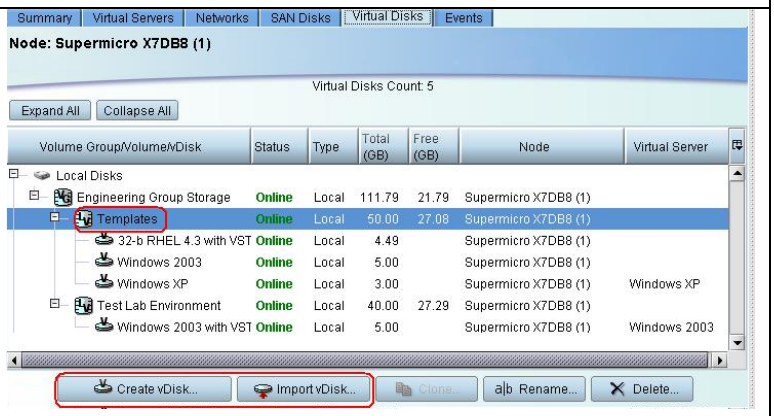
- Reduce power, cooling and space issues costs by consolidating hardware
- Reduce costs by using existing hardware
- Migrate legacy operating systems to newer hardware

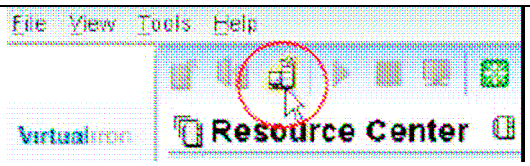
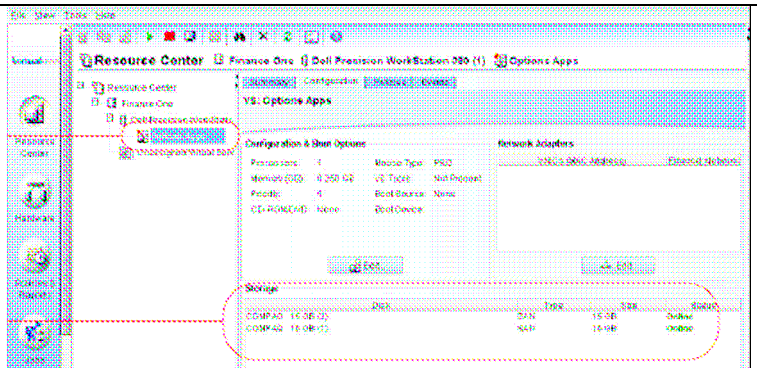
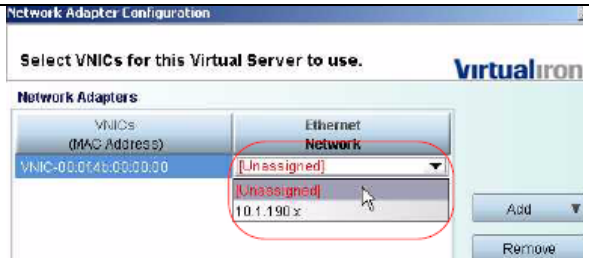
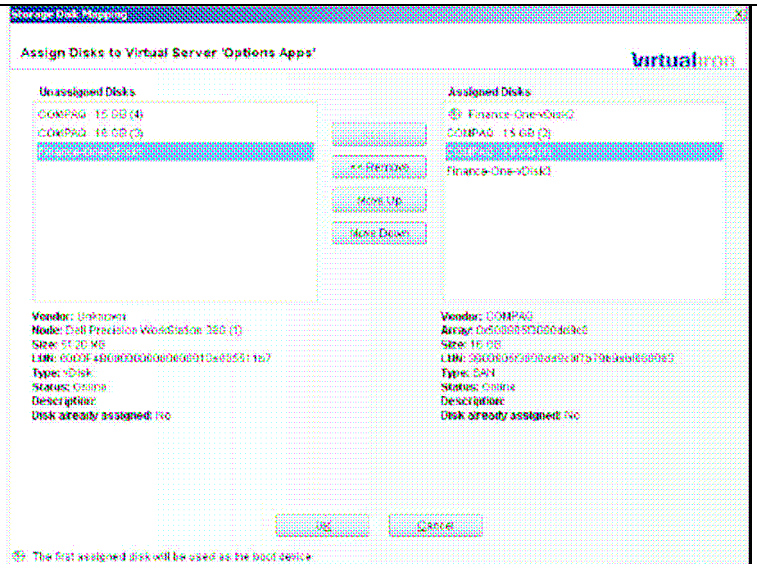
Virtual Iron allows you to deploy multiple 32 or 64-bit independent operating system instances on a physical server. A crash in one virtual server cannot impact other virtual servers on the same hardware. A virtual server cannot access the memory or I/O operations of another virtual server on the same hardware.

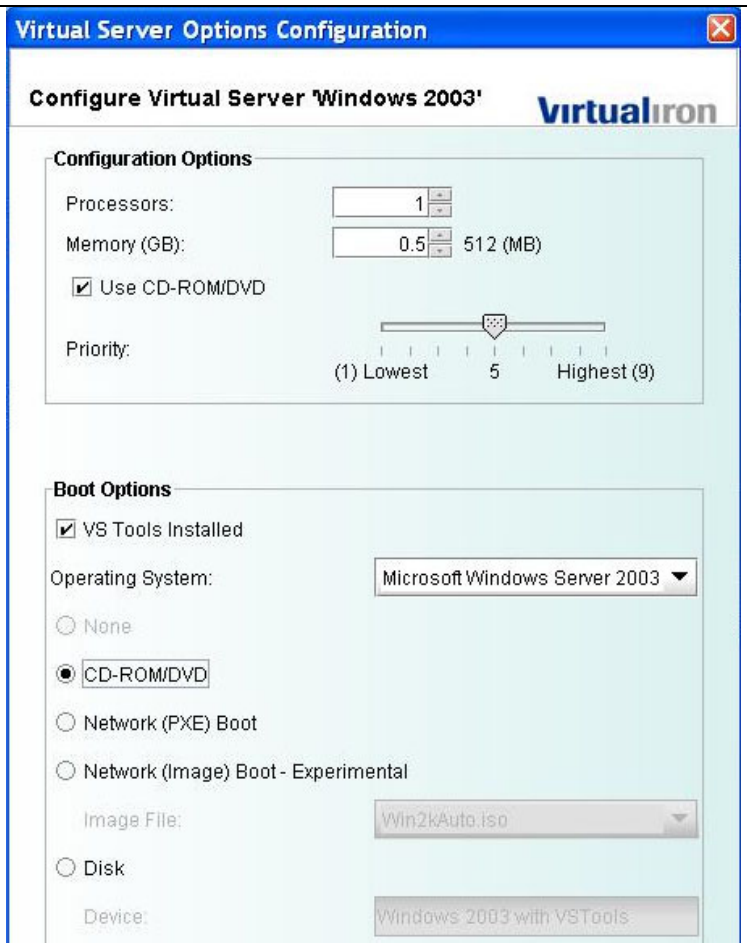
Virtual Iron requires no change of operating systems from what is used in existing data center servers and receives support from application and operating system vendors including standard security patches.

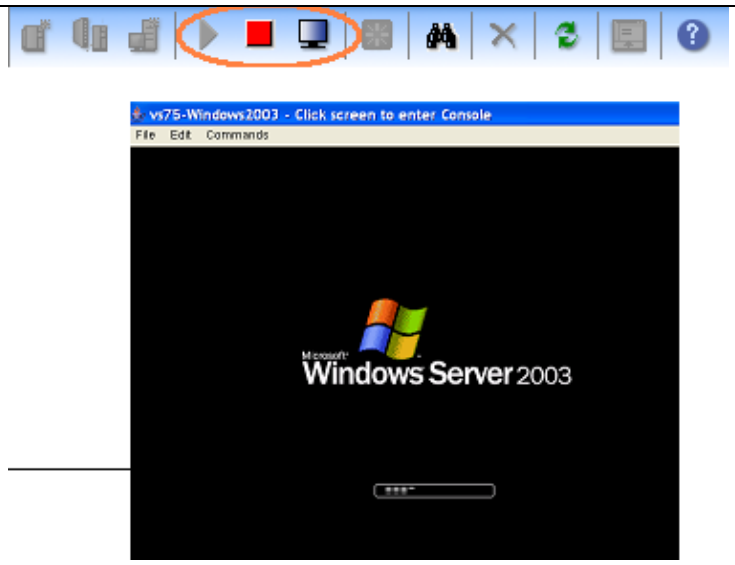
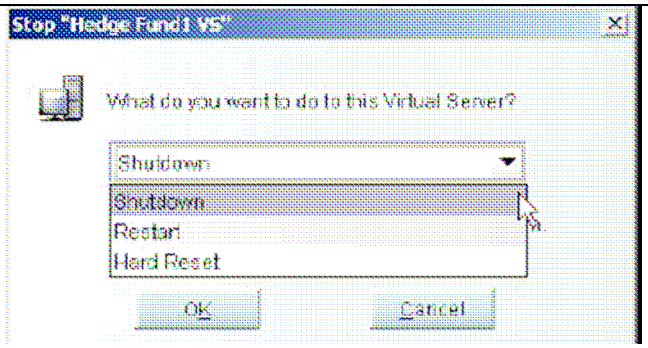
Encapsulation and resource controls allow efficient sharing of physical resources and prevents runaway applications on one virtual server to impact other virtual servers.

Step 1. **Virtual server storage can consist of raw access to SAN LUNs or virtual hard disks that can be stored on SAN LUNs or local drives. In this example, we will use virtual hard disks on local drives. Select the virtual data center, then select the Virtual Disks tab as shown to the right. Note: your server will need a local hard disk.**	

Step 2. Create a Volume Group from the server's local hard disk. This starts the Logical Volume Group Wizard. In the window that appears, all nodes in the VDC are listed in the Nodes pulldown. The LVG Name New Logical Volume Group is assigned to by default. Click Next>> to continue. The next window allows you to choose the disk on which to place the LVG. To assign a disk to the LVG, select a disk in the Unassigned Disks pane. Then click Add>>. Click Finished when through.	
Step 3. Next, create a Logical Volume (LV) on the LVG. Each LV is a defined subset of the storage available on the LVG. You can think of each LV as a file system that houses a number of files (virtual disks).	
Step 4. Last, create a vDisk on the LV. Each vDisk is a defined subset of the storage available on the LV, which can be seen and accessed by a single VS. To the VS accessing it, each vDisk appears and performs in the same way as a physical disk. Note: Alternatively, you can import a virtual appliance. Virtual Iron supports the Microsoft VHD format. Click the Import vDisk button. After performing these operations, click Commit in the jobs tab at the bottom of the management window.	

Step 5. In the resource center, create a new virtual server.	
Step 6. Next, select the configuration tab for the virtual server.	
Step 7. Add a vNIC and assign it to a subnet.	
Step 8. In the virtual server's Configuration tab Storage section add the virtual hard disk you created in step 3.	

Step 9. In the virtual server's Configuration tab Configuration & Boot Options section, select *Use CD-ROM/DVD* in the Configuration Options, select the operating system you will install and select *CD-ROM/DVD* in the Boot Options section.	
Step 10. Put an operating system installation disk in the physical server's CDROM drive (32 and 64 bit SLES 9.3, RHEL 4.4, Windows 2003 and Windows XP are supported). Tip: You can also use an ISO. See the *Administrator's Guide* for more information.	

Step 11. Start the virtual server and open the virtual console. Install the operating system.	
Step 12. Install the VSTools to provide accelerated drivers for high performance. The following steps will be for Windows; if you need Linux instructions see Chapter 5 of the Quick Start Guide, Installing VSTools to the OS Disk. Start the Windows virtual server, open the console, and Log in as Administrator.	
Step 13. Open a browser within the virtual server. Enter the IP address of the management server and browse to the /vstools/win directory. Select the exe file, and download it to your desktop or some other location. Then, execute this file.	
Step 14. Reboot the virtual server. In Virtualization Manager, stop the virtual server using Hard Reset. Commit the operation. Then open the VS Configuration window as shown in Step 9 and check “VSTools Installed”.	
Step 15. Start the virtual server. During boot, Windows discovers the Virtual Iron Ethernet driver. In the Found New Hardware Wizard, answer the questions as follows:	

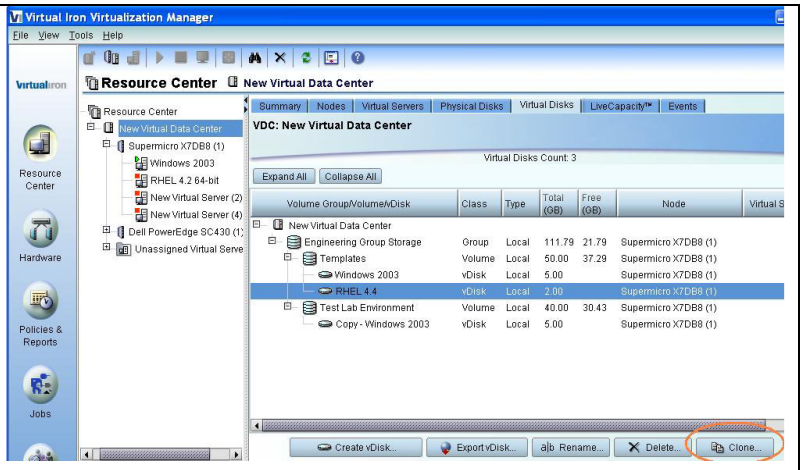
a. Select No Not this time when prompted to look for a driver update. Click Next. b. Check Install Software Automatically. Click Next. c. Windows begins installing the network driver. A warning dialog may be shown. Click Continue Anyway.	
Step 16. To create more virtual servers, follow the proceeding steps, or to create from a template image, go to the next section.	

Faster Provisioning

Virtual Iron software can be used to provision new equipment, operating systems and software. Initial installs and configurations of enterprise software can be very complicated, error-prone and arduous - often taking days or weeks to get just right. The use cases in this part of the guide provide an understanding of how Virtual Iron improves provisioning and manageability of software installations and deployments. Results will be leveraged to define processes for: rapidly provisioning servers and OS images and defining development-to-test-to-production plans based on managing reference software images.

Objectives: Project activities will focus on validating installation and provisioning processes, creating and managing software reference stacks, and understanding storage/network management.

- Reduce provisioning time by using existing hardware (e.g. weeks to order and configure hardware, networks, operating systems, and applications).
- Improve accuracy by using “golden images”

Step 1. **First we will make the virtual server created in the previous step a template. If this virtual server uses a Microsoft operating system, you may need to use the sysprep utility to prepare the image for cloning. (See** http://support.microsoft.com/kb/302577**)** **Note: You can download and import production-ready software packaged in ready-to-run virtual appliances. Enterprise software deployment now becomes as easy as downloading and running a virtual appliance.**	

Step 2. The fastest way to create an identical virtual server to the template is to clone the virtual server by right clicking on it as shown in the figure to the right. The template virtual server must be stopped before a clone can be performed. This clones all virtual hard disks and configuration settings. An alternative if you would like to adjust configuration options is to clone the virtual hard disks used by the template as shown in the screenshot in Step 1.	

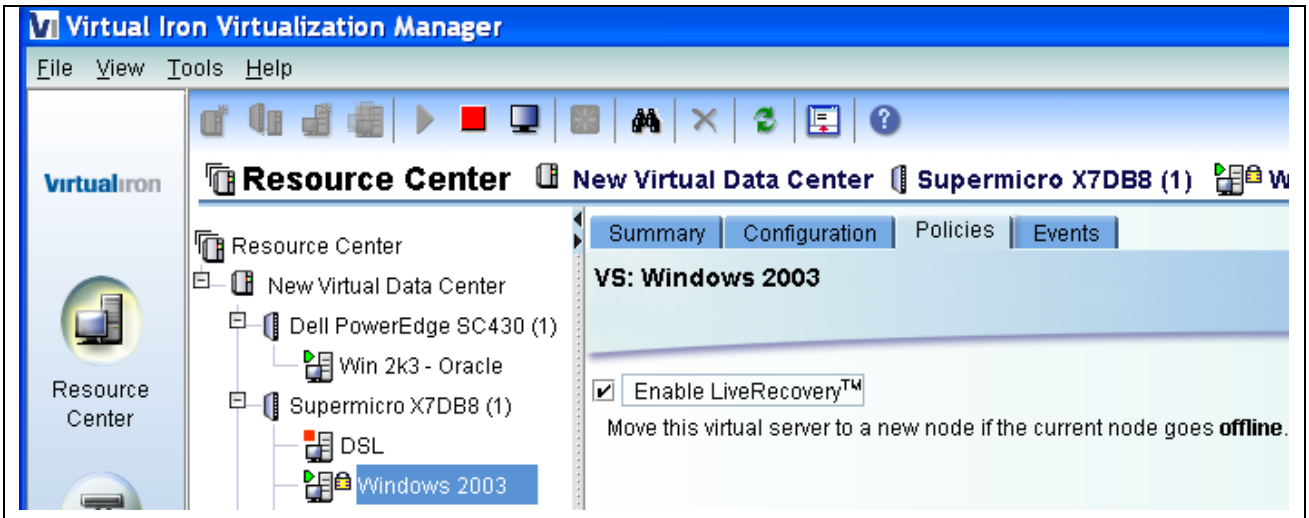
Comprehensive Business Continuity

Virtual Iron software improves the resource efficiency of high availability solutions by allowing multiple "primary" servers to share a "secondary" server - significantly reducing the number of back-up servers needed. This is often referred to as "N+1 failover" which is defined as one shared secondary server for N primary servers. The use cases in this part of the evaluation will provide an understanding of Virtual Iron's high availability and maintenance capabilities, illustrating how users perform routine and non-routine maintenance without stopping applications. The team will identify specific customer applications that can leverage Virtual Iron to reduce the hardware required for high availability, failover and disaster recovery.

Objectives: Project activities will focus on validating customer failover scenarios for maximizing up-time and optimizing disaster recovery.

- Provide HA benefits across a greater range of enterprise applications
- Rapidly restart virtual servers in minutes in case of hardware failure
- Reduce cost of backup data centers by running older hardware and non-mission critical applications

LiveRecovery™ automates virtual server recovery from physical hardware failures without the cost and complexity of clustering software. Virtual servers can be automatically restarted on new hardware when physical hardware fails, reducing outage duration and operational costs.



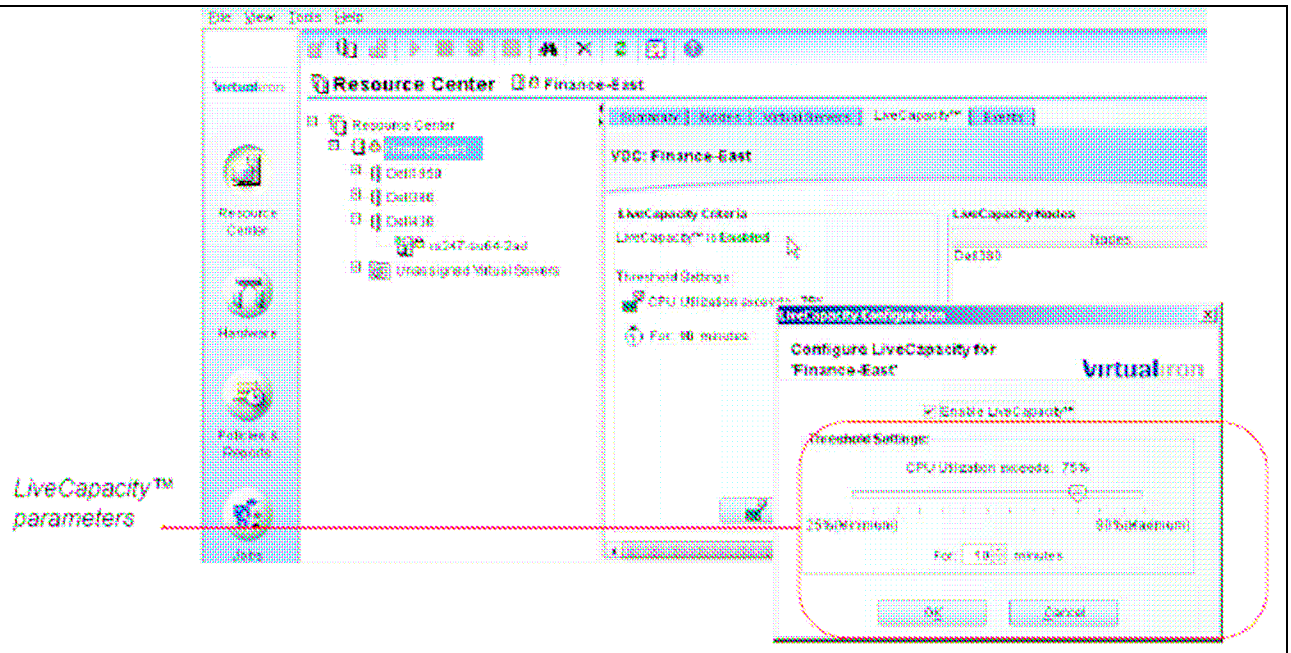
Step 1. Set the LiveRecovery flag on each virtual server's Policies tab and hit the commit button.
Step 2. Make sure there are sufficient resources (e.g. memory, disk and network access) for the virtual servers to migrate to other nodes in the virtual data center.
Step 3. Test LiveRecovery by pulling the power cable on a node that is running virtual servers.

Improve Ability to Meet Service Levels

Virtual Iron software scales dynamically to accommodate changing resource demands and enables any application to run on any resource at any time. The use cases in this part of the guide provide an understanding of Virtual Iron's "Live Migrate" and "Live Capacity" features and how these capabilities allow you to change underlying hardware without application interruption. The team will define a process for rapidly allocating hardware resources to adjust capacity to handle spikes, peak loads and scheduled workloads for several customer applications.

- Manual service level agreement remediation (e.g. SLA management is time consuming)
- Eliminate planned downtime due to hardware refresh or maintenance

LiveCapacity™ automatically moves running virtual servers to a new physical server in a VDC, if any or all of these servers exceed a specified CPU threshold for a fixed period of time. This optimizes virtual server utilization across a shared pool of resources. LiveCapacity™ works by continuously samples performance data from every server and every virtual server. The movement of virtual servers is policy driven: when a threshold is reached, Virtual Iron® LiveMigrate™ technology is used to relocate running OS's and 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.



Step 1. Set up LiveCapacity on the virtual data center's LiveCapacity tab. First check the Enable LiveCapacity checkbox, then choose the criteria for LiveCapacity. We suggest a relatively low CPU utilization for a small amount of time (e.g. 50% for 1 minute). Last, select the resources in the virtual data center that should participate in the policy. Click commit when finished.

Step 2. On each physical server, create at least 3 virtual servers. Make sure there are sufficient resources (e.g. memory, disk and network access) for the virtual servers to migrate to other nodes in the virtual data center.

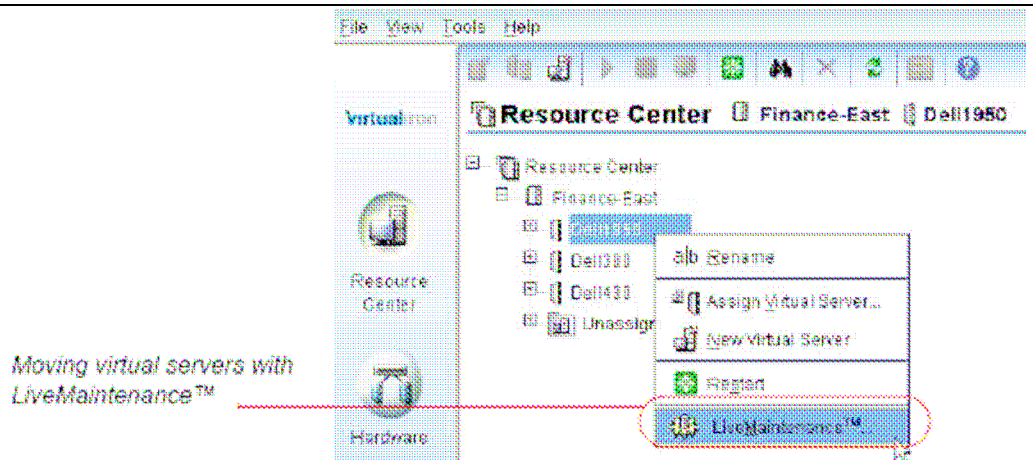
Step 3. Test LiveCapacity by adding a load to one of the virtual servers. Once the physical server's load goes above the threshold (shown in Node performance on the VDC summary screen), virtual servers will

Node Performance for vdc

Node	CPU's	Processor Speed	Total Memory	Available Memory	Virtual Servers	CPU Utilization	Relative Load
Woodcrest-2 (HP)	4	2.67 GHz	3.998 GB	1.271 GB	3	27%	
Woodcrest-1 (IBM)	4	2.67 GHz	3.998 GB	0.761 GB	4	26%	

be migrated to other nodes in the virtual data center.

LiveMaintainence™ moves virtual servers to a new machine based on administrative intervention, in the event a host server needs to be serviced. This enables server maintenance to be performed outside of scheduled maintenance windows without application downtime – for example, if a fan fails in a physical server. With LiveMaintenance™, physical servers can be removed and reinstated at any time, changing the pool's capacity dynamically. Placement of virtual servers from removed physical servers is automatically optimized. This allows operating system and application patch management activities to be tested with a snapshot of a "live" configuration before production deployment.



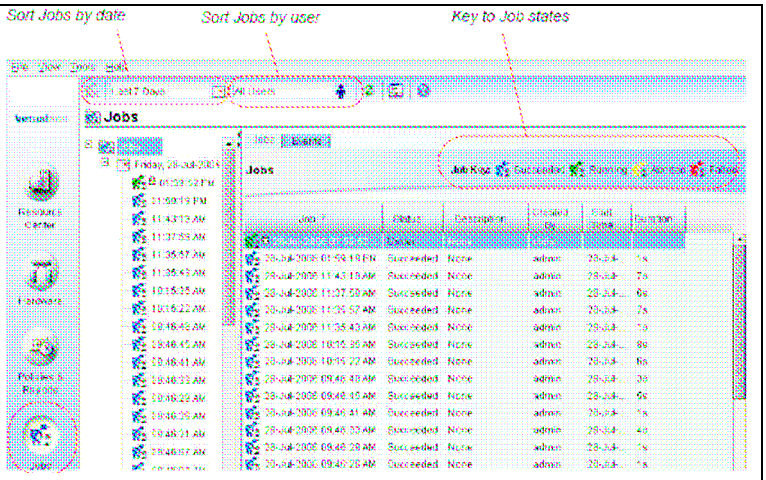
Step 1. On each physical server, create some virtual servers. Make sure there are sufficient resources (e.g. memory, disk and network access) for *all* the virtual servers on the selected node to migrate to other nodes in the virtual data center.

Step 2. Test LiveMaintenance and watch the servers migrate.

Reporting & Auditing

Reporting is often used for compliance or to as part of root cause analysis when managing physical or virtual environments. Virtual Iron provides a number of tools to report of Virtualization Manager activity. The primary resource is the Job.

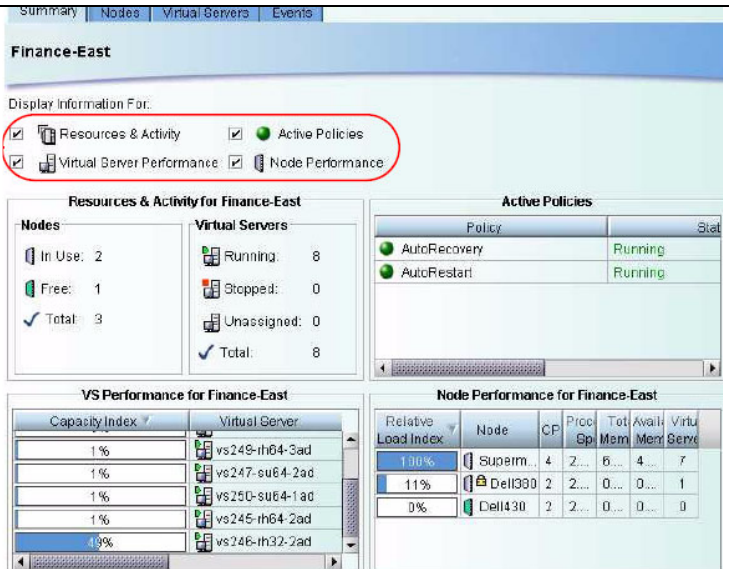
Step 1. **Open the jobs view**



Step 2. Filter on date or user.

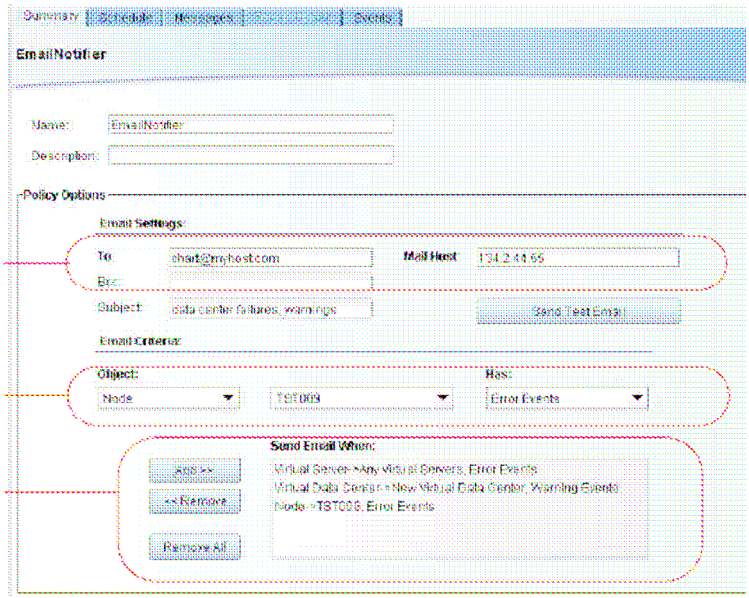
Monitoring

The Virtualization Manager provides a capability to monitor the physical and virtual resources through dashboards on the virtual data center, node, and virtual server levels.

Step 1. **Look at the virtual data center Summary tab and select the desired information.**	

Policies

The Virtualization Manager has a flexible API that allows customized policies and integration with third party applications. Sample policies, such as the Email Notification policy, are included and can be customized using the Python scripting language.

Step 1. **Select the Policies & Reports tab and the EmailNotifier policy.** **Add info to the fields, such as your email address, the name of your mail host, and what you would like reported.**	
Step 2. Start the policy by selecting the green start arrow and clicking the commit button.	