



Managed Virtualization

Using Altiris Deployment Solution 6.8 to Provision & Manage
VMware VI 3
in Dell Server Environments

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About Altiris

Altiris, Inc. is a pioneer of IT lifecycle management software that allows organizations to easily manage desktops, notebooks, thin clients, handhelds, industry-standard servers, and heterogeneous software including Windows, Linux and UNIX. Altiris automates and simplifies IT projects throughout the life of an asset to reduce the cost and complexity of management. Altiris client and mobile, server, asset, network, and security management solutions natively integrate through a common Web-based console and repository. For more information, visit www.altiris.com.

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Introduction

Across the enterprise – in data centers and entire IT environments – VMware virtual infrastructure technology has approached mainstream proportions. VMware virtual infrastructure technology is the most widely deployed software for optimizing and managing IT environments through virtualization—from the desktop to the data center. Through virtualizing IT infrastructures, customers recognize tremendous benefits in reduced costs—through more efficient use of resources; faster, more flexible responsiveness to business needs—improving time to productivity and increased availability of applications and systems—to achieve stringent SLAs found into today’s datacenters around the world.

As more and more customers migrate from traditional server environments to VMware virtual infrastructures, potentially, a new challenge arises: duplicative manageability of both physical host servers and VMware virtual machines.

Managed Virtualization directly addresses this new challenge. Managed Virtualization combines Altiris’ simplified approach to IT lifecycle management with the power of VMware virtualization. This innovative approach fosters efficient ways to manage not only physical servers, but also, VMware virtual machines running on physical host servers.

Managed Virtualization allows datacenter and IT infrastructure management staff to use Altiris Server Management Suite™ to:

- 1.) provision VMware Infrastructure 3 (VI 3) servers from bare metal,
- 2.) deploy VMware virtual machines to servers in a VI 3 resource pool and,
- 3.) remotely manage VMware virtual machines and their physical host servers.

Altiris has specifically recognized VMware as a strategic alliance partner for virtualization technologies and has issued a statement regarding Altiris management capabilities in VMware environments. The **Altiris Virtual Machine Support Statement** can be downloaded at

http://www.altiris.com/upload/SS-Altiris_Virtual_Machine_Support.pdf.

This statement lists specific VMware support by individual Altiris solutions. While most Altiris products currently support virtualization to various degrees, any Altiris product with a 6.5 or higher version designation is required by Altiris Product Management to provide specific support for virtualized environments.

Altiris Deployment Solution 6.8, a key component of Altiris Server Management Suite™, was the first Altiris product to release with a VMware specific functionality for deploying and managing VI 3 servers. As such, this solution offers integration with a variety of VMware tools to produce a comprehensive solution for the provisioning and management of virtual environments. This document provides an overview of the integration in Altiris Deployment Solution 6.8 specifically as it relates to the management of Dell servers in three key areas:

1. VMware VI 3 /ESX Server 3.0 Deployment. Altiris provides a new sample drag-and-drop job that shows how to deploy the VI 3 operating system.

2. User Interface Integration with VirtualCenter Management Server. VMware VirtualCenter installations can be registered in the Altiris console to display VI 3/ESX Server 3.0 instances and the virtual machines installed on them (whether or not those virtual machines are under Altiris management)
3. Sample jobs for VMware virtual machine management. VMware provides several interfaces for programmatically managing virtual machines. Altiris provides sample jobs that can leverage these interfaces for managing VMware virtual machines within the Altiris Deployment Server 6.8 console.

Each of these three topics is covered in detail in the sections below.

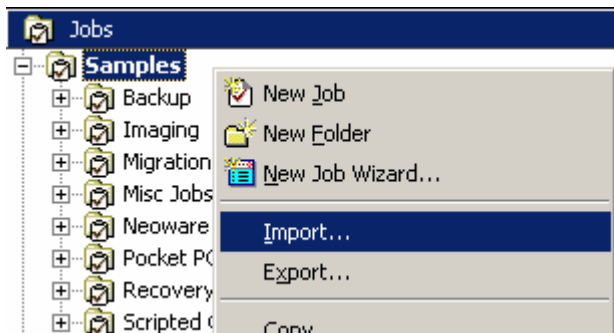
How Do I Get the VMware Jobs?

While the console integration and ESX 2.5.3 deployment job shipped with the release of Deployment Server 6.5, some of the sample jobs (including those for Virtual Infrastructure 3) referred to in this paper will be bundled with Deployment Server 6.8 in an upcoming service pack or other update. You can obtain these jobs in advance of that release by downloading them from http://apl-ibase.altiris.com/resources/vmware/other/vmware_jobs_v3.zip.

Note: The resources provided in this zip file will not be officially supported by Altiris until they are shipping with the Altiris Deployment Server 6.8 product. They can be effectively leveraged in advance of shipment to begin testing/learning various aspects of the product's VMware integration.

Extract the contents of this zip file to disk. Open the Altiris Deployment Server 6.8 console, right-click the jobs windows and select **Import**. Browse to the **VMware VI 3.0.bin** file and click **OK** to import the jobs.

Figure 1: Importing Jobs Into Altiris Deployment Server



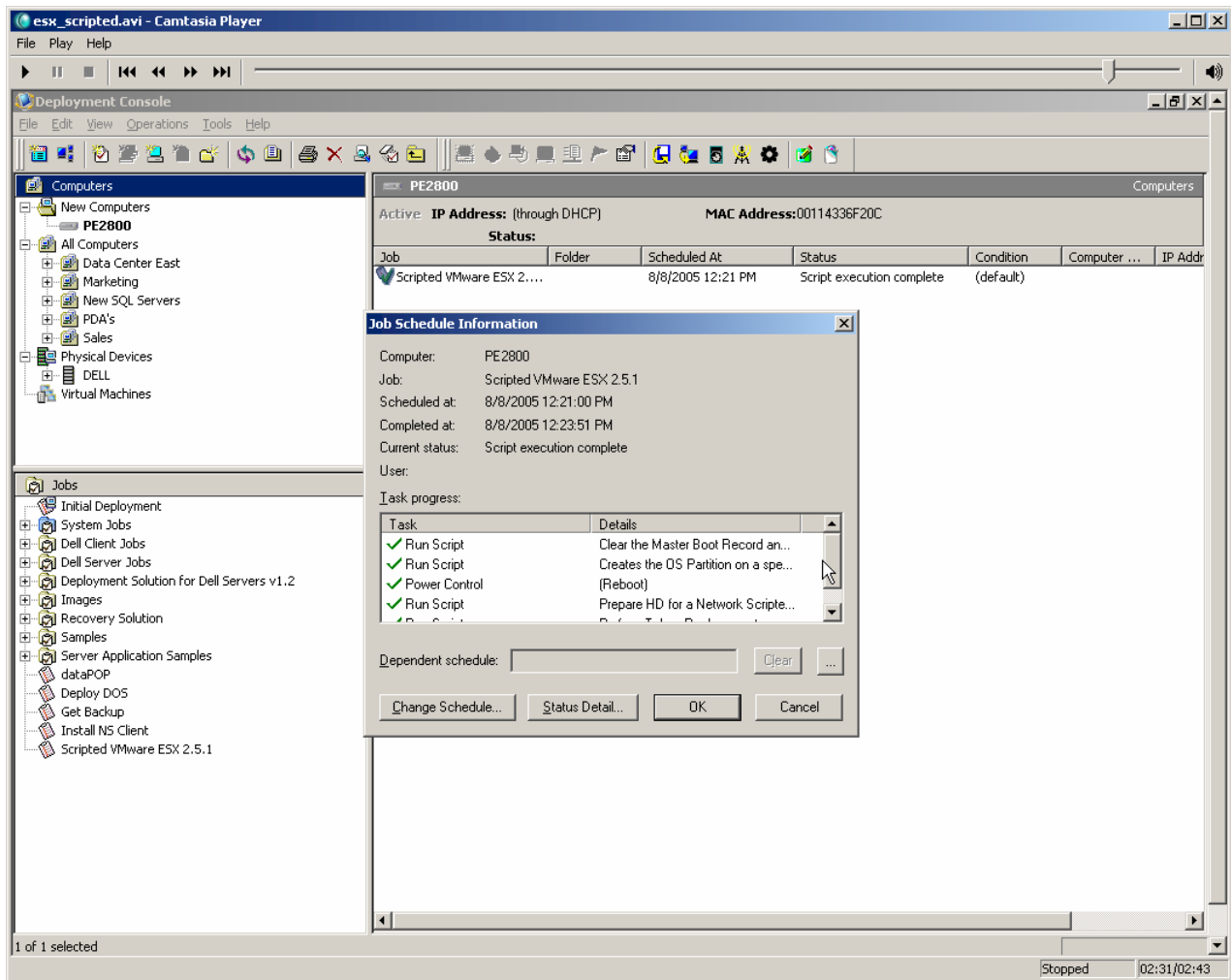
Consult the readme notes included in the zip file for more detailed, step-by-step instructions on importing and using these jobs.

VMware VI 3/ESX Server 3.0 Server Deployment

A major component of rolling out a VMware environment involves the deployment of Linux-based VMware VI 3 servers. To help facilitate this, Altiris Deployment Solution 6.8 provides a sample job for deploying the VI 3 virtual infrastructure hypervisor/virtual machine monitor.

Provisioning VI 3 servers is similar to the deployment of any server operating system with Altiris - administrators can leverage the same Altiris system tokens, custom scripts, PXE servers and pre-provisioning functions. An *.avi recording is available that shows how Altiris can deploy the ESX operating system to a Dell PowerEdge 2800 server from bare metal. This *.avi was created with an ESX 2.5 deployment but the same concepts apply to ESX 3.0 deployment. The video can be viewed at <http://apl-ibase.altiris.com/resources/dell/demo/esx.exe> (see Figure 2).

Figure 2: Camtasia Recording of ESX Deployment with Altiris



Using the Provided VI 3 Deployment Job:

The VI 3 deployment job provided in the online `vmware_jobs_v3.zip` file requires the following steps.

1. Administrators must copy the VI 3 source files from the VMware CD to a virtual directory that allows for HTTP or FTP access, or to a NFS share on an existing Linux server. Consult the readme file provided in this white paper's resource (.zip) file for complete details on how to create a virtual directory using FTP as an example.
2. "Pre-provision" the target VI 3 Server in the Altiris console using the steps below. You can view the recorded demo referenced above (i.e., <http://appliance.altiris.com/resources/dell/demo/esx.exe>) for an example of how this works.

- a. Right-click the **Computers** pane in the Altiris console and select **New Computer** and click **Add**.
- b. Enter a console name, Dell Service tag (as the Serial Number) or MAC address, and host name.

Note: The Dell Service tag or MAC address serves as the primary key for the server to be deployed. When the server to be deployed PXE boots the first time on the LAN, Altiris Deployment Server will look up the target server's Dell Service tag or MAC address to see if any pending job assignments have been created for it.

- c. Click the **TCP/IP** option on the left and then enter an IP address, subnet mask, default gateway, DNS server, etc.

Note: If deploying in an environment where a default gateway or DNS Server is not present and values are not entered as part of the pre-provisioning process, you may need to edit the accompanying KS.CFG file to remove the respective system tokens from the "# Network install type" line or the deployment of VI 3 could fail.

- d. Click **OK**.
 - e. Click **OK** again. This will add an icon to the console that contains the basic network configuration information to be assigned to the target server (as well as the unique identifier referenced above).
3. Modify the provided VI 3 Deployment job.

- a. Double-click the provided VI 3 deployment job in the Altiris console to open it for editing.
- b. Double-click the Run Script task that displays the first line (showing in the Details column) as:

```
REM Prepare HD for a Network Scripted Install of VMware VI 3.0
```

- c. Set the OSFilePath variable to the HTTP, FTP or NFS location where you copied the VI 3 source files

```
SET OSFilePath=<enter path here>
```

Note: Altiris recommends copying the VI 3 Server source files to the C:\Program Files\Altiris\Express\Deployment Server\Deploy\VMware\3.0 directory on the Altiris Deployment Server.

- d. Click **Next** and then **Finish** to save your changes.
4. Copy the sample KS.CFG file included with this white paper's .zip file to the C:\Program Files\Altiris\Express\Deployment Server\Deploy\VMware\3.0 directory or the directory specified in Step 3c. Edit the KS.CFG file with Wordpad. You'll need to provide the URL to the VI 3 install files from step 1 and 3c above. Other configuration options can also be provided in the KS.CFG file.

Note: It's necessary to remove the carriage returns (CR) from the KS.CFG file otherwise the installation of the Altiris Deployment Agent for Linux (ADLagent) will not load properly as part of the post-configuration of the VI 3.0 deployment. A utility (REMOVECR.EXE) has been provided as part of this white paper's resource (.zip) as well as instructions on how to automatically remove the CR's from the KS.CFG file. Consult the readme file provided in this white paper's resource (.zip) file for complete details.

5. Drag and drop the provided VI 3 Deployment job on the icon created in step 2 above. Select the option to run the job immediately. When the Dell server you defined in step 2 is booted on the LAN the PXE boot will match up the pending deployment job with the server to be deployed and automatically execute the job.

How does the VI 3 Deployment Job work?

There are 2 different VI 3 deployment jobs. The first deploys a simple DOS image to reset the partition structure of the target server to a 2GB FAT formatted partition. The resulting C: drive is used to launch the install of VI 3. The second VI 3 deployment job accomplishes this same result by leveraging the Dell Deployment Toolkit. Instead of using a DOS image to format the partition, this job uses the Dell PARTCFG.EXE tool to clear the master boot record and then create partitions. Once the partition structure is set, a Power Control task reboots the server so the partition changes can take effect.

Note: The Dell Server add-on pack for Altiris Deployment Server is required to be installed prior to using the bare metal VI 3 Server job. This pack is required because the PARTCFG.EXE tool is bundled with the Dell Deployment Toolkit.

Once the partition structure is set, a script copies a subset of the VI 3 files needed to load the kernel down to the target server and then it starts the install process. The remaining files are copied as needed via the HTTP, FTP or the NFS share. Ultimately, an rc.local autoexec.bat is dynamically created that launches the install using the Altiris sample kickstart (ks.cfg) file for VI 3. Altiris places tokens in the kickstart file with machine specific values. These tokens dynamically provide to each server the correct IP address, hostname and other configuration parameters that were assigned during the pre-provisioning step in the Altiris console.

The bottom of the kickstart file includes a "%package" command and a "%post" command. These commands are used to install the Altiris Linux agent (ADLagent) as a function of the operating system installation. Three steps are performed by the post script to install the Altiris Linux agent:

1. The VI 3 Firewall is disabled to allow for the adlagent.custom.config file and adlagent files to be copied via a samba mounted shared. The adlagent.custom.config file tells the ADLagent how to connect to the deployment server.

2. The ADLagent .bin file installs ADLagent, and the ADLagent service is configured
3. The VI 3 Firewall is enabled and configured to allow the ADLagent to communicate with the Altiris Deployment Server.

The Altiris agent for linux provides remote management of the VI3 host server from the Altiris console. The agent's footprint is minimal. It requires about 516K of physical memory and about 392K of disk space (including log and tmp files).

Another Install Option

While most customers prefer to use the pre-provisioning deployment method described above, other options are available. One common option is to use the Altiris initial deployment job. This can be done by modifying the initial deployment job in the Deployment Server console to include VI 3 Deployment. This job can be configured to run automatically whenever the initial deployment job is executed, or a PXE boot menu can display "VI 3.0 Deployment" as one option in a list of predefined server builds an administrator can select from. Conditions can also be added to the job to ensure that only servers with certain pre-defined machine properties (e.g., only certain Dell PowerEdge Server models, machines with specific hardware components, etc.) can run the VI 3.0 Server install.

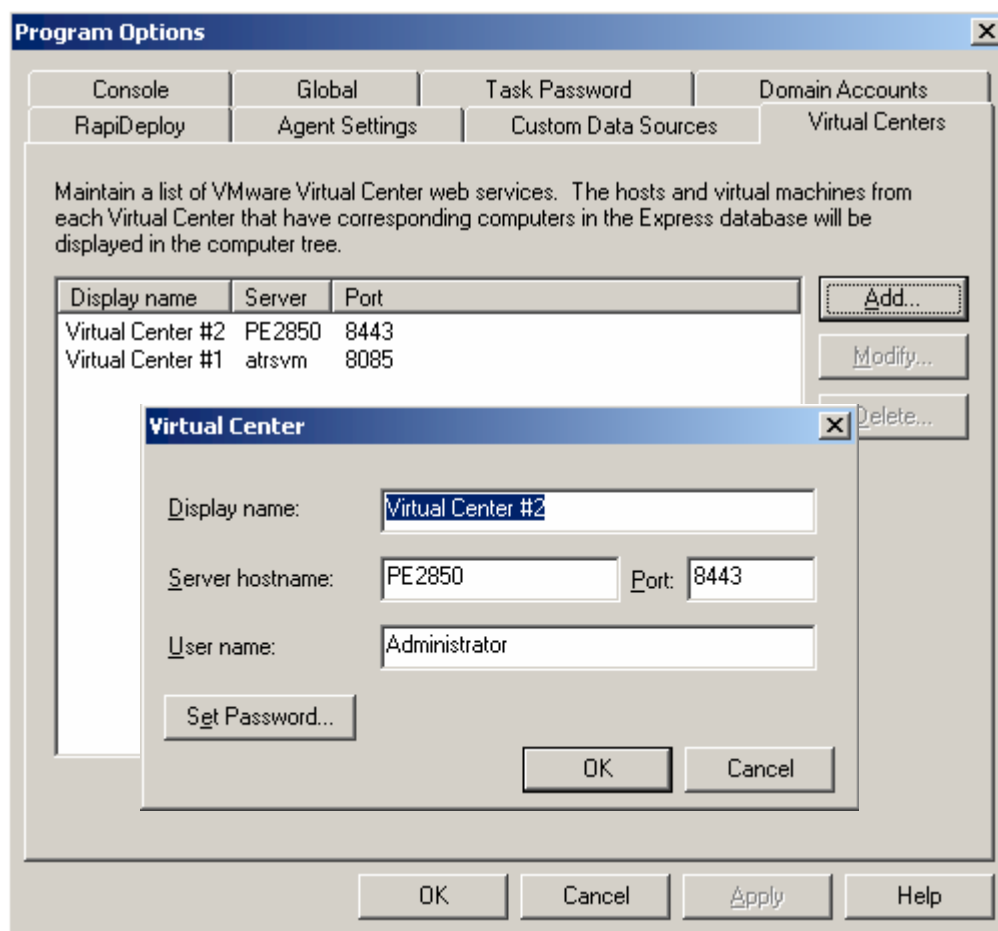
User Interface Integration with VirtualCenter

Altiris Deployment Solution 6.8 supports the ability to register multiple VMware VirtualCenter Management Server installations within the Altiris console. Once registered, the Altiris console will display a hierarchy of VI 3 servers and virtual machines for each VirtualCenter installation (see Figure 4 below). The display will continue to be synchronized with VMware VirtualCenter in real-time via the VirtualCenter web service.

To register a VMware VirtualCenter:

1. Open the Deployment Server 6.8 console
2. Go to **View | Show Virtual Machines** (ensure this view option is checked)
3. Go to **Tools | Options** and select the **VirtualCenters** tab.
4. Click the **Add** button to add a Virtual Center installation to the list. Multiple installs can be added.

Figure 3: Registering a Virtual Center Installation in the Altiris console



5. Provide an Altiris console display name (i.e., how you want the VirtualCenter installation to be labeled in the Altiris console), hostname, port, username and password.
6. Click **OK**.
7. Click **OK** again.

Once the VMware VirtualCenter installation is registered in the Altiris console it will display in the Computers pane along with all the other servers and custom views (such as the Dell blade view).

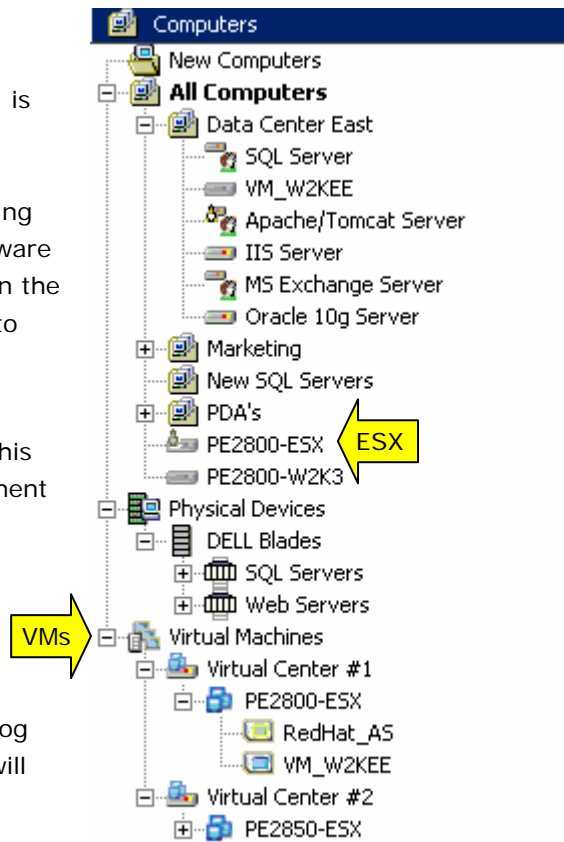
Under each VirtualCenter installation a hierarchical listing of VI 3 servers are displayed along with any Virtual Machines installed on the VI 3 servers.

In the screenshot to the right, VirtualCenter install #1 is managing one VI 3 server. That VI 3 Server has two virtual machines registered on it. The blue icon for VM_W2KEE indicates that this virtual machine is running the Altiris agent. Once the agent is installed on a VMware virtual machine the virtual machine shows up higher in the tree just as a physical server would. In the example to the right, the VM_W2KEE VM shows up as a managed server in the Data Center East folder.

The yellow icon beside the Redhat_AS indicates that this virtual machine is not currently under Altiris management (i.e., it does not have the Altiris agent installed yet).

Part of the VMware integration also involves shutting down VI 3 servers remotely from the Altiris console. If an admin tries to execute a job in the Altiris console that will power off an VI 3 server, and that server is running a live virtual machine session, a dialog will display warning the admin that virtual machines will be lost if the job is executed.

Figure 4: Altiris Console View of VMware Virtual Center Installs



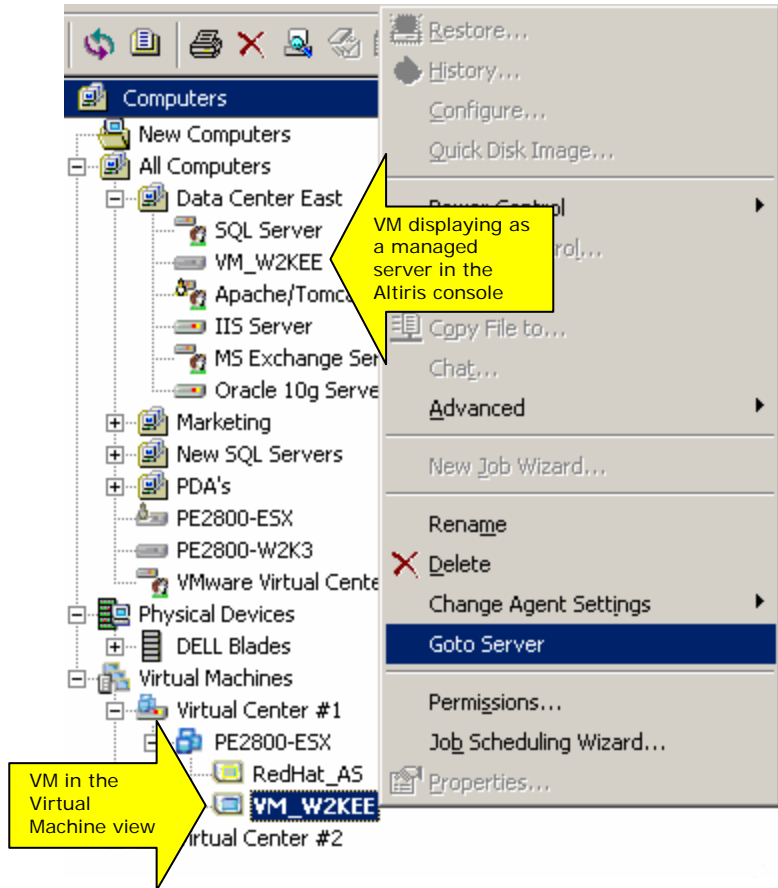
Administrators can right-click a virtual machine icon in the Virtual Center tree and select **Goto Server** to jump up to the VMware virtual machine's corresponding icon in the management tree.

Conversely, administrators can right-click the server icon in the management tree to jump down to the icon in the virtual machine listing.

The Altiris integration with VMware VirtualCenter provides:

1. A centralized view of all virtual and physical servers in the environment
2. A visual indication of whether the virtual servers are managed by Altiris
3. A visual association of how virtual servers relate to their physical hosts
4. A single console for provisioning and managing both physical and virtual servers

Figure 5: Jumping Between Virtual and Managed Server Views in the Altiris Console



Sample Jobs for Virtual Machine Management

Once the Altiris agent is installed, Altiris can manage a VMware virtualized server just as it would a physical server – i.e., VMware virtualized servers can be inventoried, imaged, etc. Altiris Deployment Server 6.8 provides many out-of-the-box functions that can improve the manageability of your virtual and physical machines. These include:

- Dell server hardware configuration (including BIOS, RAID, DRAC, and BMC)
- Scripted OS installations (of Windows or Linux Platforms)
- Capturing Images (Image explorer provided for adding/editing captured images)
- Deploying Images (including support for many file formats such as NTFS, ext2, ext3, etc.)
- Packaging Software (bundled Wise Packaging solution)
- Delivering Software Packages in many formats including *.rpm, *.pkg, *.bin, *.tar, *.deb, etc.
- Modify Computer Configuration (TCP/IP, Domain Membership, User Accounts, etc...)
- Backup/Restore the system registry
- Inserting user custom scripts at any point in a workflow sequence including support for DOS command language, VB Script, PERL, BASH scripts, etc. This capability allows users to wire together native Altiris tools with entirely non-Altiris utilities as this section will demonstrate. User custom scripts can be included at any point in an Altiris job that can be executed using the scheduling and pre-boot features of the Altiris platform.
- Remote Power Control Options (Wake on LAN, OFF, RESTART, LOGOFF)
- More...

In addition to native Altiris management functions, Altiris can leverage various interfaces that VMware has published to allow VMware-specific (non-Altiris) management functions to be performed within the Altiris console. For example, the ability to start, stop, and create a virtual machine are all virtual machine-specific functions that standard Altiris solutions do not provide. The ability to call VMware interfaces to perform these functions within the Altiris toolset provides flexibility and management continuity (bridges workflow between tasks where an Altiris agent is not yet available).

Within the online `vmware_jobs_v3` zip file, there are several sample jobs that can be used to perform a variety of VMware-specific management functions. They are provided as a resource kit that administrators can use to build their own jobs for virtualization management.

VI 3 Deployment

The jobs in this folder will perform an unattended installation of VMWare VI 3 or install Dell Open Manage Server Administrator on the ESX Server.

VM Virtual Disk Creation (vmkfstools)

This job utilizes the **vmkfstools** utility to create virtual machines disks. This job can run on any Altiris managed ESX server.

Virtual Machine Creation

The jobs in this folder utilize the **vmware-cmd** and **vmkfstools** utility to dynamically create virtual machines and their disks. These jobs can be run on any VI 3 Server (running Altiris ADLagent).

VM Management (vmware-cmd)

The jobs in this folder utilize the **vmware-cmd** utility. These jobs can be run on any VI 3 Server (running Altiris ADLagent).

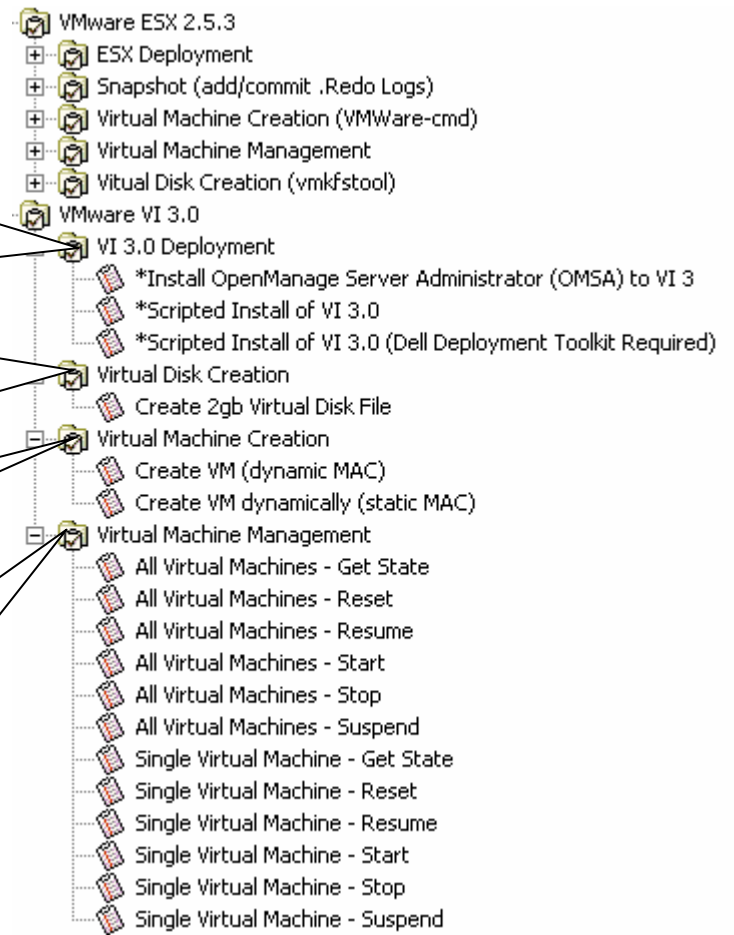


Figure 6: View of the Sample VMware Jobs provided with this white paper.

The provided sample jobs for virtual machine creation allow customers to create their own jobs to perform complex management functions. For example, some of the sample jobs can be combined to deploy and VI 3 /ESX Server instances and then dynamically create virtual machines to run on it.

VMware virtual machines can be PXE boot and imaged by Altiris just like physical servers. Customers commonly provide feedback that they appreciate the ability to have the same Altiris jobs deploy both their physical and virtual servers thereby promoting standardized configurations and reducing the number of jobs required to support physical and virtual environments.

Additional benefits include the ability to pre-provision virtual servers just like physical servers. The sample job "Create VM Dynamically (static MAC Address)" shows how VM MAC addresses can be set on-the-fly when Altiris dynamically creates the VM. This allows administrators to pre-define VMs in the Altiris console and go ahead and assign deployment jobs to those VMs. When the VM is needed, third party monitoring tools can direct Altiris to start the VM.

Once the VM is dynamically created and boots the first time, standard Altiris features will recognize the new VM and provision it in accordance with the predefined jobs. This allows for a variety of creative “fail over” scenarios in which VMs are predefined in the Altiris console and deployed only as needed to assume additional load based on monitored utilization or to take the place of a failing physical server, etc. Even though the VM definition and deployment job is set in the Altiris console, the VM itself is not created on the VI 3.0 Server by Altiris until it is required. This reduces the need to have the VM consume memory and disk resources until it becomes necessary.

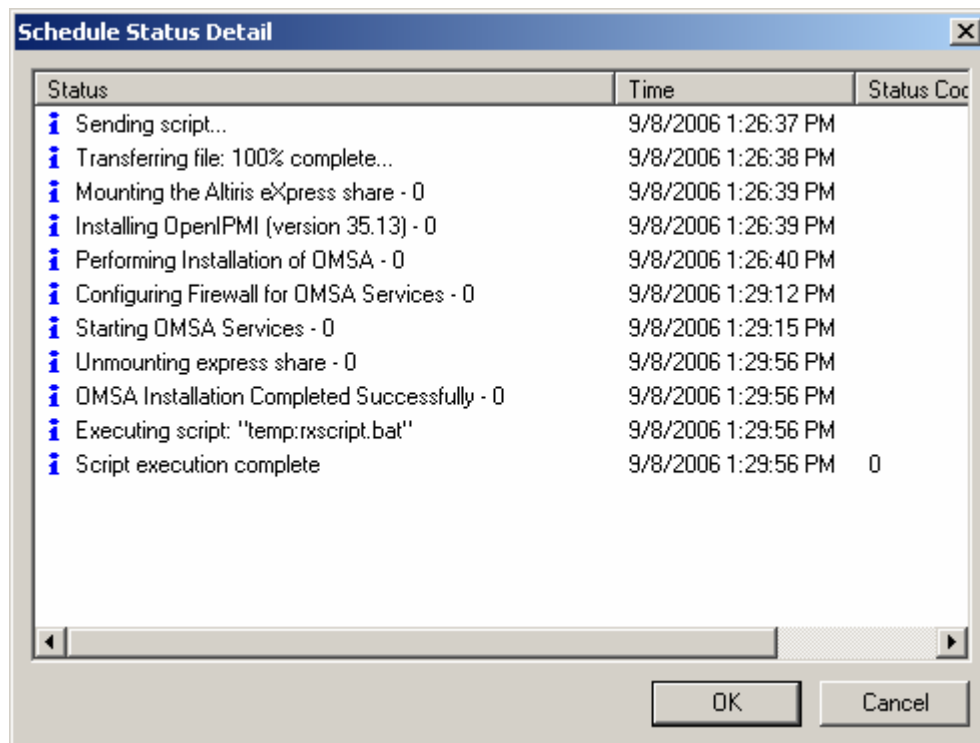
Installing OpenManage 5 on VI 3

Altiris provides a sample job to install the Dell OpenManage Server Administrator 5 on VMware VI 3 servers.

The manual installation of OpenManage requires that you run a script on each VI 3 server either via CD or by copying, extracting, executing a .tar file obtained from support.dell.com.

The Altiris provided job allows for remote execution with a single drag-and-drop in the Altiris console. This job executes a pre-built Linux shell script that pulls the required installation files from the Deployment Server network share (or some other accessible network location). Using Altiris, you can simply drag-and-drop the job on multiple VI 3 servers in the console without having to visit each server and manually supply the installation CDs. Consult the comments in the sample Altiris job for details.

Figure 7: Installing Dell OMSA on VMware VI 3.0 via Altiris



Conclusion

Managed Virtualization is a result of the collaboration between Altiris and VMware. The collective efforts of these two companies will extend customer capabilities to manage VMware Virtual Infrastructures today and into the future. Moreover, through Managed Virtualization, customers gain a framework to encapsulate best practices, manage and view an inventory of VMware virtual machines, update and patch applications and monitor VMware virtual machine systems. Now customers can thoroughly maximize their investments in Altiris and VMware software technologies.

Appendix A

Kickstart Sample file for VI 3 / ESX Server 3.0 Deployment

```
# Auto-Generated Scripted Install Configuration file.
# This file is used for VMware VI 3 Server Scripted Install Deployment

# Installation Method
url --url ftp://192.168.2.1/esx3

# root Password "altiris"
rootpw --iscrypted $1$VyY2lVA1$02kDc6ijSDFu.oa/jsgKA/

# Authconfig
authconfig --enablesshadow --enablemd5

# BootLoader ( The user has to use grub by default )
bootloader --location=mbr

# Timezone
timezone America/Chicago

# X windowing System
skipx

# Install or Upgrade
install

# Text Mode
text

# Network install type
network --device eth0 --bootproto dhcp --hostname PE2800

# Language
lang en_US

# Language Support
langsupport --default en_US

# Keyboard
keyboard us

# Mouse
mouse none

# Reboot after install ?
reboot

# Firewall settings
firewall --disabled

# Clear Partitions
```

```

clearpart --all --initlabel --drives=sda

# Partitioning
# Warning, the order of these lines determines placement on the disk!
# Based on best practice recommendations
# %hddevice% will be defined by the lib/bin32/linux/vmesx.sh script prior to
file placement
# 100MiB boot partition first
part /boot --size 100 --fstype ext3 --ondisk sda
# Root filesystem partition - default is ~5GiB, can be made larger if desired
part / --size 5000 --fstype ext3 --ondisk sda
# Swap partition (~2x Service Console RAM allocation, Linux kernel maximum of
2048MiB)
part swap --size 1024 --fstype swap --ondisk sda
# System log partition - always break out.
part /var/log --size 2000 --fstype ext3 --ondisk sda
# /tmp partition - always break out.
part /tmp --size 2000 --fstype ext3 --ondisk sda
# Local VMFS partition (not used much in shared SAN environments)
# First argument must be "None" or install will halt
# Minimum size for a VMFS3 volume is 1200MiB
# This only creates the partition, you must create the filesystem later
part None --size 10000 --grow --fstype vmfs3 --ondisk sda
# vmkernel core dump partition - must be 100MiB
# First argument must be "None" or install will halt
# Must keep this as the last line in partitioning section, to place at the end
of the disk
part None --size 100 --fstype vmkcore --ondisk sda

# VMware-specific licensing commands
# must accept EULA, or install will halt
vmaccepteula
# Using served licenses from VI3 License Server
vmlicense --mode=server --server=27000@192.168.2.1 --edition=esxFull --
features=vsmp,backup

%packages
@base

%post

%post

# ***** Begin DS 6.8 section *****
# =====
# Create a script to install the altiris-adlagent
# This script(ddp-post-install.sh) will be called by rc.local
# when the system boots for the first time.
# -----
mkdir /tmp/ddp
cat > /tmp/ddp/ddp-post-install.sh << EOF1
#!/bin/bash
sleep 20
cd /tmp/ddp/
mkdir /mnt/ddp

```

```

echo "Disabling Firewall"

chkconfig firewall --level 2345 off
/usr/sbin/esxcfg-firewall --AllowIncoming
/usr/sbin/esxcfg-firewall --AllowOutgoing

echo "MOUNTING EXPRESS SHARE"

# Mount the eXpress share to the mount point /mnt/ddp
# -----
mount -t smbfs -o username=administrator,password=altiris //192.168.2.1/express
/mnt/ddp

echo "Copying ADLAgent Config File"

# Before we install the Altiris Linux Agent, check if adlagent.conf.custom
exists.
# If so, move it to the proper location
# -----
if [ -f /mnt/ddp/Agents/ADLAgent/adlagent.conf.custom ]; then
    mkdir -p /opt/altiris/deployment/adlagent
    cp /mnt/ddp/Agents/ADLAgent/adlagent.conf.custom
/opt/altiris/deployment/adlagent/adlagent.conf.custom
fi

echo "Copying ADLAgent"

foo=`ls -v /mnt/ddp/Agents/ADLAgent/altiris-adlagent-2.6-7.i386.bin | tail -n
1`\`
if [ -f "$foo" ]; then
    $foo 1>>/tmp/ddp/rhel-install.log 2>>/tmp/ddp/rhel-install.log
else
    echo "Didn't find an altiris-adlagent bin file." 1>>/tmp/ddp/rhel-install.log
2>>/tmp/ddp/rhel-install.log
fi
# ***** End DS 6.8 section *****

# Unmount the eXpress share and remove the mount point.
# -----
umount /mnt/ddp
#rmdir /mnt/ddp

mv -f /etc/rc.d/rc.local.sav /etc/rc.d/rc.local
#Starts adlagent, creates default config file
/etc/init.d/adlagent restart

#Replace Config file with custom and restart agent
mv -f /opt/altiris/deployment/adlagent/adlagent.conf.custom
/opt/altiris/deployment/adlagent/conf/adlagent.conf
/etc/init.d/adlagent restart

echo "Enabling Firewall"

chkconfig firewall --level 2345 off
/usr/sbin/esxcfg-firewall --BlockIncoming

```

```

/usr/sbin/esxcfg-firewall --BlockOutgoing

### Firewall configuration
# We need to enable adlagent port and file transfer port
# You need to set a static port ("4321" in this example) for file transfer in
the deployment
# console under Tools->Options->Global
esxcfg-firewall --openPort 402,tcp,out,adlagent
esxcfg-firewall --openPort 4321,tcp,out,adlagentFileTransfer

EOF1

# make ddp-post-install.sh executable
chmod +x /tmp/ddp/ddp-post-install.sh

#####
### Create script to configure ESX at first boot ###
#####
cat > /tmp/esxcfg.sh <<\EOF2
#!/bin/sh
# Configure ESX Server

# Create new vmfs3 volume on designated partition
# First, determine the partition number (assumes SmartArray)
export VMFS_PARTITION=`fdisk -l /dev/sda | grep fb | sed -e
"s/\dev/sda\(\.\).*\/1/"`
# Now we make a VMFS3 volume on that partition
vmkfstools -C vmfs3 -S storagel vmhba0:0:0:$VMFS_PARTITION

### Configuration Examples
# Uncomment and/or modify the example lines below to use in your configuration

# Setup your VMkernel and Virtual Machine networking:

# EXAMPLE: Add VMotion portgroup
#esxcfg-vswitch --add-pg=VMotion vSwitch0

# EXAMPLE: Make VMotion portgroup part of VMKernel stack
# Remember to enable VMotion on this interface using the VI Client!
# IP address can be obtained from the Windows licensing user field during token
replacement
#esxcfg-vmknics --add --ip %#!computer@lic_os_user% --netmask 255.255.255.0
VMotion

# EXAMPLE: Setup the VMkernel IP Stack default gateway
# GW address can be obtained from the Windows licensing organization field
during token replacement
#esxcfg-route %#!computer@lic_os_org%

# EXAMPLE: Create production vSwitch using remaining physical NICs and default
portgroup(s)
#esxcfg-vswitch --add prodSwitch
#export VMNICS=`esxcfg-nics --list | sed -e '1d' -e '/vmnic0/d' | awk '{print
$1}'`
#for i in $VMNICS; do esxcfg-vswitch --link=$i prodSwitch; done
#esxcfg-vswitch --add-pg=defaultProd prodSwitch
# or

```

```

#esxcfg-vswitch --vlan=1 -p defaultProd prodSwitch

# EXAMPLE: Create private vSwitch and default portgroup
#esxcfg-vswitch --add privateSwitch
#esxcfg-vswitch --add-pg=defaultPrivate privateSwitch
# or
#esxcfg-vswitch --vlan=11 -p defaultPrivate privateSwitch

# SSH Access:

# EXAMPLE: Create additional user account for SSH access
# The encrypted password is 'password'
useradd -p '$1$MLsmTO/Q$A8QI139I.QqRVVjXPYfDU1' -c "Guest Account" guest

# EXAMPLE: Enable root login via SSH
# WARNING: This is not the most secure course of action!
#sed -e 's/PermitRootLogin no/PermitRootLogin yes/' /etc/ssh/sshd_config >
/etc/ssh/sshd_config.new
#mv -f /etc/ssh/sshd_config.new /etc/ssh/sshd_config
#/etc/init.d/ sshd restart

EOF2

# make configuration script executable
chmod +x /tmp/esxcfg.sh

#####

# save a copy of rc.local
cp /etc/rc.d/rc.local /etc/rc.d/rc.local.sav

# add ddp-post-install.sh and esxcfg.sh to rc.local
cat >> /etc/rc.d/rc.local <<EOF
cd /tmp
/tmp/esxcfg.sh
cd /tmp/ddp
/tmp/ddp/ddp-post-install.sh
EOF

```

Appendix B

Create VM Dynamically

```
#Creates a new Virtual Machine

#####USER MODIFICATION#####
#VMDIR is the directory which hold the .vmx file
#VMNAME is the name of the new virtual machine
#VMOS specifies which Operating System the virtual machine will have (consult vmware
documentation for valid options)
#VMDSIZE is the size of the virtual disk to be created (300m) or (60g)
#VMMAC is the MAC address the VM will use (must start with 00:50:56)
#####

VMDIR="vm_directory" #Specify only the folder name to be created; NOT the complete path
VMNAME="MYTEST"
VMOS="winNetEnterprise"
VMDSIZE="200m"
VMMEMSIZE="256"
VMMAC="00:50:56:33:44:55" #Address must start with 00:50:56

#####END MODIFICATION#####

#LOG="/opt/altiris/deployment/adlagent/bin/logevent"

#$LOG -l:1 -ss:"Creating VMX Configuration File"
mkdir /vmfs/volumes/storage1/$VMNAME
exec 6>&1
exec 1>/vmfs/volumes/storage1/$VMNAME/$VMNAME.vmx

# write the configuration
echo #!/usr/bin/vmware
echo config.version = ""8""
echo virtualHW.version = ""4""
echo floppy0.present = ""TRUE""
echo nvram = ""TEST.nvram""
echo powerType.powerOff = ""default""
```

```

echo powerType.powerOn = ""default""
echo powerType.suspend = ""default""
echo powerType.reset = ""default""
echo displayName = ""$VMNAME""
echo extendedConfigFile = ""$VMNAME.vmx""
echo scsi0.present = ""true""
echo scsi0.sharedBus = ""none""
echo scsi0.virtualDev = ""buslogic""
echo memsize = ""$VMMEMSIZE""
echo scsi0:0.present = ""true""
echo scsi0:0.fileName = ""$VMNAME.vmdk""
echo scsi0:0.deviceType = ""scsi-hardDisk""
echo ide0:0.present = ""true""
echo ide0:0.clientDevice = ""FALSE""
echo ide0:0.deviceType = ""cdrom-image""
echo ide0:0.startConnected = ""true""
echo floppy0.startConnected = ""false""
echo floppy0.clientDevice = ""true""
echo ethernet0.present = ""true""
echo ethernet0.allowGuestConnectionControl = ""false""
echo ethernet0.networkName = ""VM Network""
echo guestOS = ""$VMOS""
echo ide0:0.fileName = ""/vmimages/tools-isoimages/winpe.iso""
echo floppy0.fileName = ""/dev/fd0""
echo sched.cpu.affinity = ""all""
# close file
exec 1>&-

# make stdout a copy of FD 6 (reset stdout), and close FD6
exec 1>&6
exec 6>&-
#$LOG -I:1 -ss:"VMX Configuration File Created Successfully"

chmod 755 /vmfs/volumes/storage1/$VMNAME/$VMNAME.vmx
# Create Disk & Register the .vmx configuration

#$LOG -I:1 -ss:"Creating Virtual Disk"
#Creates 300mb disk (can be modified for larger disk sizes)

```

```
vmkfstools -c $VMDSIZE /vmfs/volumes/storage1/$VMNAME/$VMNAME.vmdk
#$LOG -l:1 -ss:"Virtual Disk Created Successfully"
```

```
#$LOG -l:1 -ss:"Registering .vmx Configuration"
vmware-cmd -s register /vmfs/volumes/storage1/$VMNAME/$VMNAME.vmx
#$LOG -l:1 -ss:"VMX Initialization Completed Successfully"
```