

Simplifying IT Operations by Leveraging Altiris Deployment Solution for Dell Servers

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Executive Summary

The ability to quickly and easily deploy or redeploy servers is key to obtaining full utilization of those server resources. By using technology to enable quick deployment and redeployment of servers, Information Technology (IT) departments can make better use of their limited resources by being more flexible and nimble.

Dell has created a toolkit, the Dell Deployment Toolkit, for managing the configuration of hardware including BIOS and disk configuration in a pre-OS environment. Dell has partnered with Altiris to integrate this hardware configuration capability into Altiris' Deployment Solution which provides the ability to configure and deploy Operating Systems and Applications to servers. By combining the two, it is possible to deploy a Dell PowerEdge server from bare metal to production with no direct interaction with the server beyond the initial hardware setup of plugging in the cables and pressing the power button the first time.

Introduction

Dell and Altiris realize the challenges many of their customers face due to complex IT environments, rapid change and shortened timeframes in which to execute. Dell's Scaleable Enterprise strategy is positioned to help its customers with each of these challenges. One of the main principles of Dell's Scaleable Enterprise Strategy is to "Simplify Operations." Dell works with its Systems Management partners closely to improve deployment, change management and monitoring capabilities. Currently, many IT managers must work with many different tools to manage their infrastructure – from managing clients to servers to hardware. Dell and Altiris partnered to improve client management in the past and are now targeting delivering similar value in managing servers.

Altiris has integrated the Dell Deployment Toolkit as an add-on for its Deployment Solution for Servers. The package is referred to as the Altiris Deployment Solution for Dell Servers. The Dell Deployment Toolkit provides all of the necessary utilities for managing and configuring Dell server hardware in a pre-operating system environment. Altiris has integrated these command line based tools into predefined jobs that can be run from the Deployment Solution console which allows administrators to deploy a Dell server from "bare metal" to production with a few mouse clicks.

Altiris Deployment Solution for Servers is leveraged by Dell internally and has earned considerable praise from Dell customers for its automation capabilities and drag-and-drop simplicity.³ Altiris Deployment Solution for Dell Servers can address both software and hardware deployment requirements by leveraging the Dell Deployment Toolkit. This means that customers can deploy and re-deploy Dell servers consistently, quickly and automatically. A recent study indicates deployment time can be reduced from hours to minutes.⁴

This article focuses on how Dell customers can leverage Altiris Deployment Solution for Dell Servers to reduce deployment times and increase deployment consistency by greatly simplifying the process of deployment. In section 3, deployment of a Dell PowerEdge server is accomplished using a script. In section 4, the image of that first server is used to deploy a second Dell server. In section 5, Altiris Deployment Solution for Dell Servers is used to deploy Dell PowerEdge 1855 blade servers based on chassis slot location.

Deploying the Initial System

To demonstrate the ability of Altiris Deployment Solution for Dell Servers to make deployment of Dell servers easy, a team of Dell engineers set up several Dell PowerEdge servers in a lab environment with all the needed software to perform some testing. For this testing, Altiris Deployment Solution 6.1 with Service Pack 1 Hotfix D and the Deployment Solution for Dell Servers add-on was installed on a Dell PowerEdge server with a single processor and 512 MB of RAM. Microsoft® Windows Server™ 2003, Microsoft SQL Server 2000 with SP3, and Microsoft DHCP Service were installed on the system. SQL Server 2000 should be used by Altiris Deployment Solution in production. An MSDE database will also work, but is recommended only for testing and evaluation environments. Enabling the DHCP service on the system allows for systems to automatically obtain addresses during the deployment phase, regardless of whether or not they will ultimately use DHCP or be assigned a static address. It is not required that the DHCP service be on the same system as Deployment Solution. A boot floppy can be used instead of DHCP, but this would require more direct user intervention.

Altiris Deployment Solution Server Configuration

To set up servers to be managed by Altiris Deployment Solution exclusively over the network, the systems have to be connected to the same network that the Altiris Deployment Server is connected to and they must be able to boot via PXE. If not using PXE, a boot floppy can be used instead. To enable PXE on the PowerEdge 1855 blades, 2850, and 6650 servers used in testing the NICs must have PXE enabled in BIOS. By default PXE is enabled, but it is not listed first in the device boot order. The BIOS settings of the server must be changed to make PXE the first option in the boot order. This can be accomplished manually by pressing F2 during boot and then making the change directly, or by pressing F12 during initial boot to have the system PXE boot from the Altiris Deployment Solution server and then use the Configure BIOS job, included as part of the Altiris Deployment Solution for Dell Servers, to change the boot order as part of the initial deployment list of jobs.

The Simple Install with PXE (pre-boot execution environment) Server option was selected for the Altiris Deployment Solution installation. The PXE server included with Altiris Deployment Solution allows a system with PXE enabled NICs to boot over the network from the Deployment Solution server. Once the server boots via PXE it can run DOS based scripts or commands on the system without using any of the local storage or relying on a locally installed operating system. This allows for redeployment, imaging, and - with the Dell Deployment

Toolkit integrated into Deployment Solution for Dell Servers – the ability to reconfigure the hardware settings.

Running a job or task on a server in Altiris Deployment is a drag and drop procedure. The job is clicked on and dragged to the target system and dropped. A window will then appear with the options of running the job immediately or scheduling it to run at a later time.

Scripted OS Deployment

Windows Server 2003 was installed by the Dell team on a PowerEdge 2850 using the Bare Metal to Windows Server 2003 (Scripted) job that is provided as part of the Deployment Solution for Dell Servers (see Figure 1). To prepare for this install, first the Get All Configuration Files (BIOS, DRAC, BMC) job was run against a reference PowerEdge 2850 server. This created a set of configuration files based on a PowerEdge 2850. They were automatically placed in the C:\Program Files\Altiris\Express\Deployment Server\Dell\Toolkit\System\pe2850 directory as part of the job. These files act as a template and can be modified to make changes in the hardware configuration of future PowerEdge 2850 deployments. The Bare Metal to Windows Server 2003 (Scripted) job will automatically use the configuration files in the above referenced directory when running on a PowerEdge 2850. There are also directories included in the same location as the pe2850 directory for all of the other Dell PowerEdge server models supported by the Dell Deployment Toolkit: 1655, 1750, 1800, 1850, 1855, 2650, 2800, 2850 and 6650.

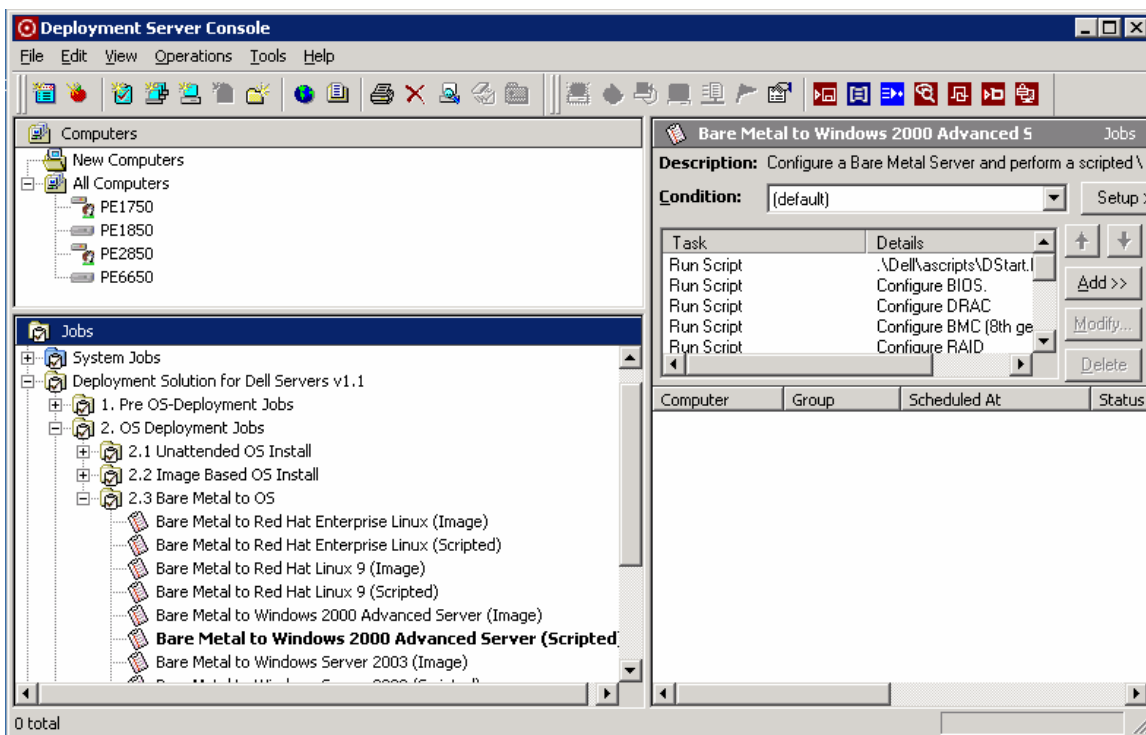


Figure 1: Altiris Deployment Solution for Dell Servers predefined jobs and subtasks.

The script based install of Windows Server 2003 on the PowerEdge 2850 used the i386 directory from the Windows Server 2003 installation CD-ROM. The entire installation was done over the network with no intervention required locally on the system. The installation of the Altiris Aclient, the Altiris Deployment Solution agent, was also installed as part of the job so that the system is ready for future deployment jobs.

To complete the system installation any additional services that are wanted can also be installed with Altiris Deployment Solution. For the 2850, the Install Dell OpenManage Server Administrator job was used to get the Dell management software loaded. The server was now ready to be imaged so that this base configuration can be easily and quickly redeployed to other systems.

Capturing and Deploying the System Image

Capturing and replicating a system image across multiple servers with Altiris Deployment Solution is easily accomplished. When using the Altiris Deployment Solution for Dell Servers with the integrated Dell Deployment Toolkit (DTK) it is also possible to replicate or configure system hardware settings as well. The ability of the DTK to reconfigure Dell PowerEdge RAID Controllers and BIOS settings allows for a single deployment job to image and make hardware configuration changes. Within the predefined jobs provided as part of the Altiris Deployment Solution for Dell Servers, a single job includes tasks for configuring BIOS, configuring RAID, and image deployment tasks.

For testing, an image was taken from the PowerEdge 2850 server that was previously installed with Windows Server 2003 via an Altiris Deployment Server scripted OS install in the previous section. In order to have the complete system configuration both the hardware configuration and the Operating System installed image were captured. The hardware configuration and Operating System image were then installed onto another 2850. All steps were accomplished via the Altiris Deployment Server with Dell Deployment Toolkit integrated.

Capturing Hardware Configuration

The Altiris Deployment Solution for Dell Servers has integrated the Dell Deployment Toolkit and includes predefined jobs that enable simple drag and drop operations to configure the BIOS, Dell Remote Assistant Card (DRAC) settings, and PowerEdge RAID Controller (PERC) settings.

The PowerEdge 2850 that was previously installed with Windows Server 2003 using Altiris Deployment Solution was instrumented with the Altiris Deployment client, known as the Aclient. In order to capture the BIOS and DRAC configuration, the Get All Configuration Files (BIOS, DRAC, BMC) job from the Deployment Solution for Dell Servers was started on the 2850 via a drag and drop.

The server rebooted several times as the job was running on it. At the conclusion of the job the configuration was stored in the Deployment Server\Dell\System\pe2850 directory under the BIOS and DRAC subdirectories. These are text files that can be edited with Notepad or any text editor if any changes are desired from what was captured from the original system.

Capturing OS Image

An image of the system can be taken in Altiris Deployment Solution by right clicking on the icon for the system and then selecting Quick Disk Image. This creates a job to take the image and prompt for scheduling of the job. If there is a requirement to store the image or images in different location than the default, then it is necessary to create a new job that specifies the non-default location.

The server used for testing had a C: drive partition of only 10 GB, so it was necessary to move the image location to the D: drive, which was mapped to some storage on a Dell/EMC CX 700 SAN attached storage array. To accomplish this, an edit was made to the autoexec.bat file of the PXE boot environment for Managed PC, to map an I: drive that would allow access to the additional storage during the imaging. Specifically the following line was added just after an existing very similar line that maps the eXpress share to F:

```
A:\net\net use I: \\W2K3ALTIRIS1\images /yes
```

In the image job, the location for storing the image was then simply modified from F:\images to be I:\images.

The actual image capture of Windows 2003 Server Enterprise Edition with no additional applications installed took about 20 minutes. The deployment job accomplished this by shutting down the server and booting into an Altiris managed environment where the imaging tool ran and captured the image to the location specified in the job.

Deploying Hardware Configuration and OS Image

To deploy the image to a new server one of the jobs provided with the Altiris Deployment Solution for Dell Servers was used. Predefined jobs exist for deploying from bare metal via scripting or images for both Red Hat® Enterprise Linux and Windows 2000 Advanced Server and Windows Server 2003.

To deploy the image of the 2850 that was captured onto a new 2850 the Bare Metal to Windows Server 2003 (Image) job from the Altiris Deployment Solution for Dell Servers was used. A single modification was required to change the path the image. By selecting the job and then scrolling down the list of tasks to the Deploy Task and then clicking on Modify it was possible to change the image path to I:\images. This change was only required because the images were captured and stored on a second partition that resides on the SAN.

Deploying the new server can be done by predefining the deployment job based on the MAC address, Dell service tag, or asset tag of the new server, or by waiting for the new system to appear in Altiris and then dragging and dropping the job onto the new server. Both require that the system PXE boot from the Altiris server or boot from a properly configured boot floppy and then the assigned job will be run. The jobs included have tasks that will first configure the BIOS and hardware settings, copy the image onto the system, and reboot the server to that image. Following the initial boot, Deployment Server can be configured to do an initial configuration which allows for the system to be given a new personality based on the settings that have been specified for that specific system.

Using Dell PowerEdge 1855 Blades with Altiris

Dell's PowerEdge 1855 blade server and chassis are also supported with Altiris Deployment Solution and the integrated Dell Deployment Toolkit. In addition to all of the imaging and scripting functionality that is possible with other Dell PowerEdge servers, Altiris Deployment Solution has additional capability with the PowerEdge 1855 blade servers. This additional capability is to recognize what slot a blade is located in and to have slot specific jobs which enable automatic blade deployment based on location.

PowerEdge 1855 Blade Servers

The Dell PowerEdge 1855 blade server can have up to two Intel® Xeon™ processors, 2 hot-swappable SCSI disks, and two on-board gigabit¹ Ethernet adapters. The Dell chassis that supports the 1855 blade servers can contain up to 10 blades as well as one or two Ethernet switches or passthroughs and an additional 1 to 2 fibre channel passthroughs.

There are several advantages of using blade servers over standard 1U servers. Density of servers is higher with blade servers than 1U servers. The Dell blade chassis can hold 10 PowerEdge 1855 blade servers in a 7U space, whereas 10 PowerEdge 1850 1U servers would need 10U of space. Cables can also be greatly reduced when using blade servers in comparison to 1U servers. The Dell blade chassis provides all of the power for the 10 blades that reside inside it. It requires 4 power cables to provide fully redundant power. Each 1U server requires two power cables to have fully redundant power. Ten 1U servers would need 20 power cables, as opposed to 4 power cables for the fully loaded 1855 blade chassis. Similar cable reductions are possible when using the chassis based Ethernet switches.

Deployment Solution Automatically Deploying Blades

When using Altiris Deployment Solution for Dell Servers it is possible to assign a deployment job based on a slot in a Dell Blades chassis. This means that when a new blade server is inserted into a slot, Altiris can be configured to take a variety of actions automatically. The options are to re-deploy the system, run a predefined job, wait for user interaction, or ignore the change (see Figure 2).

This enables what is commonly referred to as "rip and replace." An example of this would be a blade in a specific slot as a web server that is part of a load-balanced farm of web servers. This blade could be removed and replaced with a new blade server in the same slot. Upon insertion of the new blade server, Altiris would automatically deploy the image for the web server and put the same

identity on the new blade. This deployment would rapidly redeploy and replace the blade that was removed or ripped out.

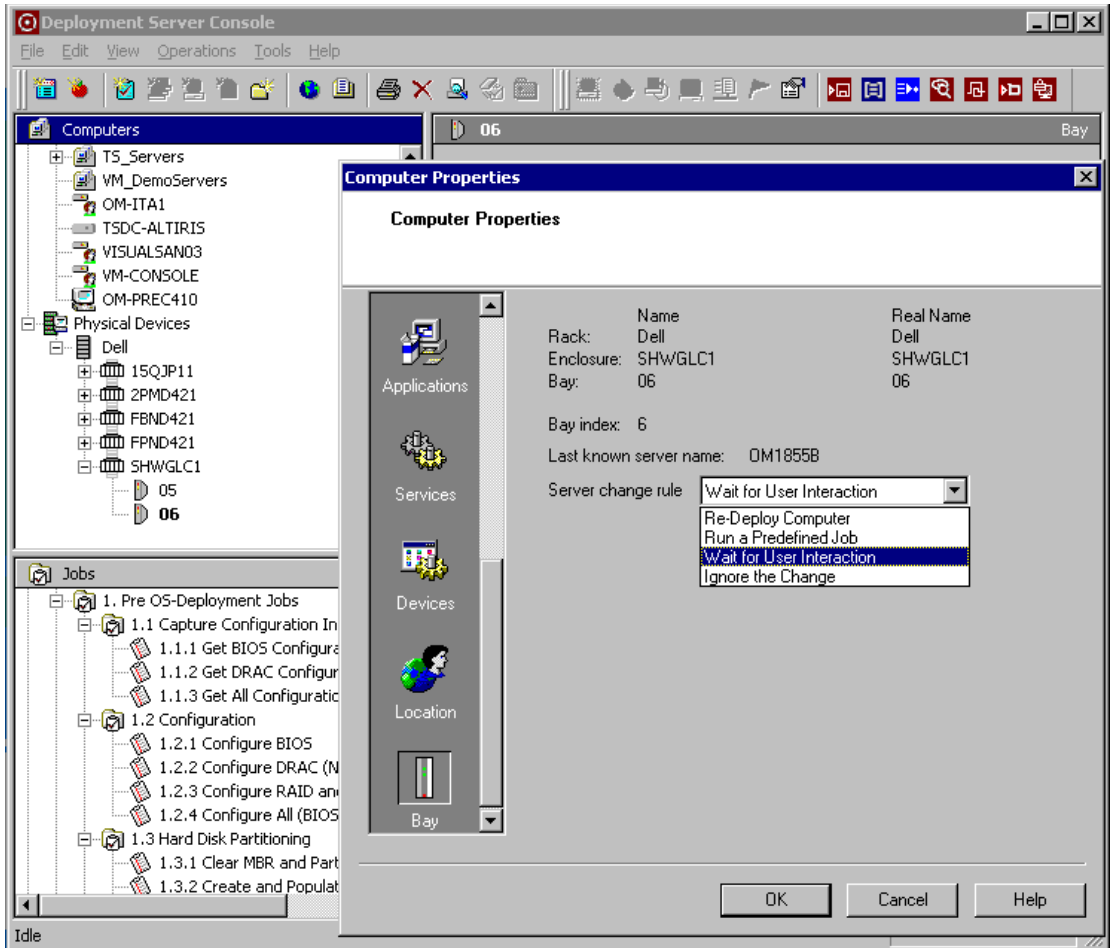


Figure 2: Altiris Deployment Solution configuring jobs based on blade server location

The additional level of management at the chassis level allows the Altiris Deployment Solution to take advantage of the blade and chassis relationship and be able to automatically deploy servers based on location. All of the features of Altiris Deployment Solution that work on non-blade servers also work on the new 1855 blade servers.

Conclusions

Altiris Deployment Solution with the Deployment Solution for Dell Servers add-on simplifies the deployment of Dell servers. The capability to use the drag and drop interface of Altiris Deployment Solution to install a server from bare metal greatly simplifies system management. Additionally, the new “rip and replace” functionality with the 1855 blade servers allows for automatic redeployment of systems especially in load balanced farms.

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¹ This term does not connote an actual operating speed of 1 Gb/sec. For high speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

² Service may be provided by third-party. Technician will be dispatched if necessary following phone-based troubleshooting. Subject to parts availability, geographical restrictions and terms of service contract. Service timing dependent upon time of day call placed to Dell. U.S. only.

³ Case studies of customers using Dell hardware with Altiris Deployment Solution can be located at the following locations: [Ford Canada, http://www.dell.com/downloads/global/casestudies/2004_ford_canada.pdf](http://www.dell.com/downloads/global/casestudies/2004_ford_canada.pdf) and [Rockwell Automation, http://www.altiris.com/docs/sales/customerwins/Rockwell_Success.pdf](http://www.altiris.com/docs/sales/customerwins/Rockwell_Success.pdf).

⁴ Time Savings Comparison for Dell Server Deployment Via Altiris, a Keylabs white paper sponsored by Dell and Altiris, January 14, 2005.

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