



Deployment Comparison for Dell PowerEdge Servers

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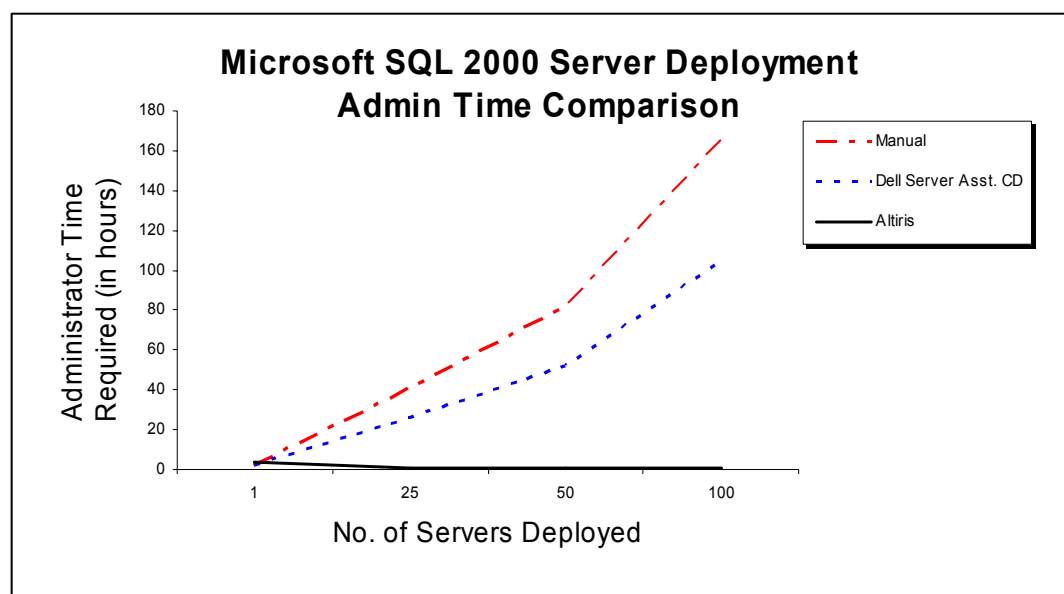
1. Executive Summary

KeyLabs has independently verified that Altiris Deployment Solution can reduce the time administrators usually spend deploying servers from hours to literally minutes.

Altiris Deployment Solution allows a complete server build to be captured as a simple drag-and-drop job. One job can be created for each server role an organization requires. Once created, these jobs can be easily executed again and again simply by dragging and dropping them onto one or more servers in the Altiris console (with no further involvement by the administrator). Altiris Deployment Solution automatically controls the entire build process.

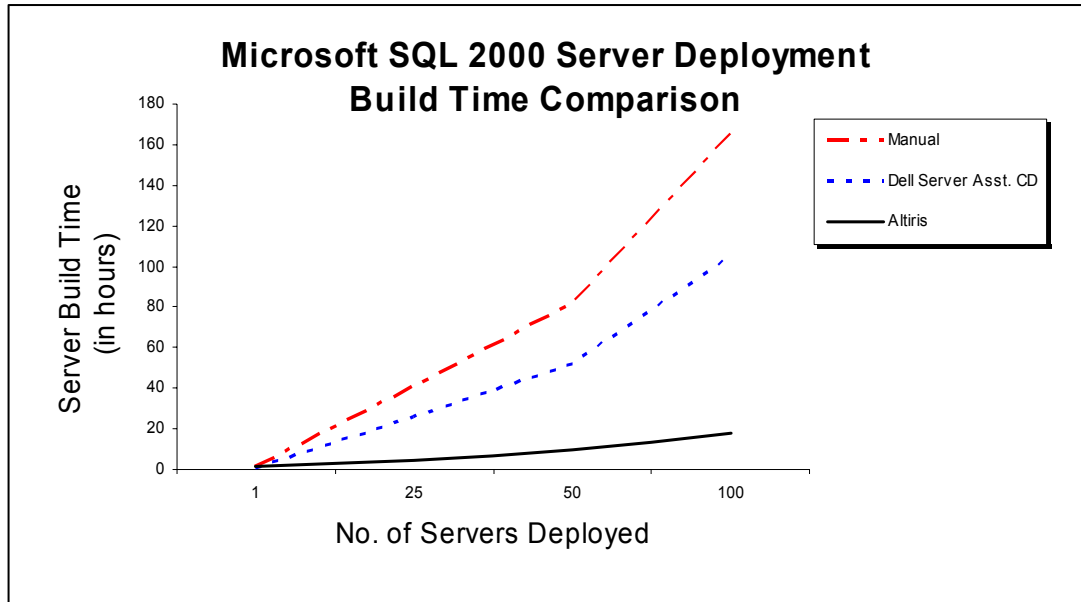
In this study, KeyLabs determined that:

- For a bare metal deployment of Microsoft Windows 2000 AS w/ SQL 2000 to 25 Dell PowerEdge 2650 servers, Altiris Deployment Solution reduced administrator involvement 91% and actual server build time 81% (including 45 minutes to install and configure the Altiris server and 3 hours to create the server deployment job).
- The Altiris server provisioning methodology began to generate significant administrator time savings after the deployment of the 3rd server when compared with manual installation processes and after the deployment of the 4th server when Dell's Server Assistant (DSA) CD was used.
- The graph below shows that the time savings administrators can realize with Altiris Deployment Server compounds significantly for every additional server deployment.

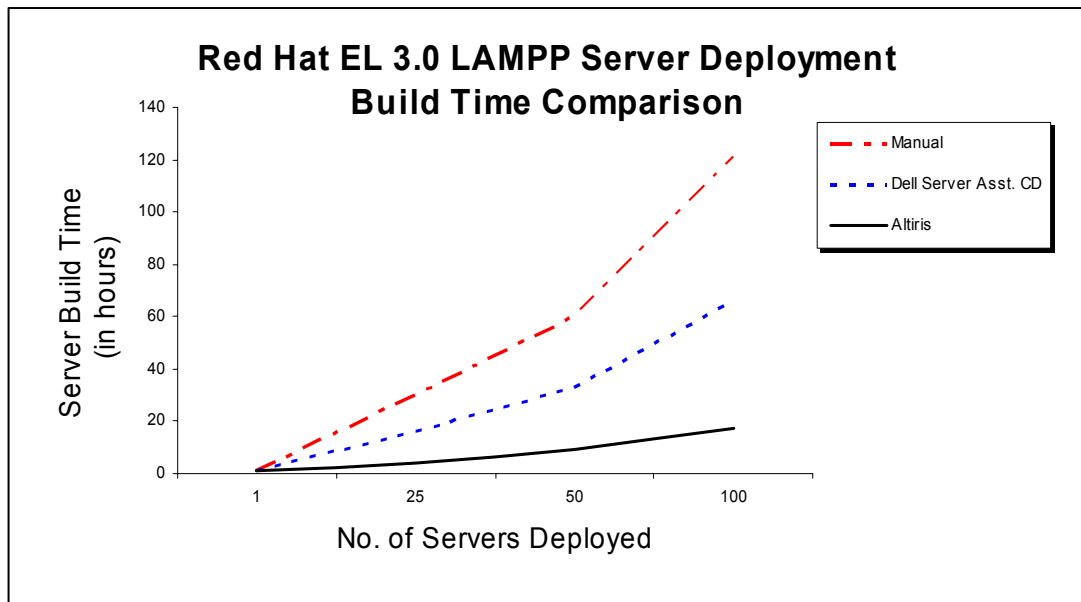


In the above graph, the results show that the administrator time required to build servers for the manual and DSA deployment methods increased with every new server while the time with Altiris decreased dramatically after the first server.

- In addition to reducing administrator time requirements, Altiris Deployment Solution also reduced server build times bringing servers into production more rapidly. Server build times were reduced up to 90% or more compared with manual installations.



- Reductions in administrator and build times with Altiris software were realized similarly in both Microsoft and Linux environments.



- An administrator can spend just 5 seconds in the Altiris Deployment Solution console to execute a job that will automatically and consistently provision 25 servers. After executing the job, the administrator can walk away from the process leaving the Altiris software to build the servers. In KeyLabs testing, all 25 servers were ready for production in about 4 hours without any additional help from the administrator.

Table 1: Administrator Deployment Time Comparison to Across Server Builds – For 25 Servers
(time measured in hh:mm)

Server Builds	Qty of 25 Dell PowerEdge 2650 Servers			
	Manual Installation (hh:mm)	Dell Server Assistant CD (hh:mm)	Altiris Admin Time* (hh:mm)	Altiris Build Time* (hh:mm)
MS SQL 2000 Server Build: - BIOS, RAID, DRAC config - Windows 2000 Advanced Server - SQL Server 2000 - Dell Update Packages	41:15	26:15 (36% reduction)	5 seconds (99% reduction)	4:15 (90% reduction)
Red Hat Linux/Apache Build: - BIOS, RAID, DRAC config - Red Hat EL 3.0 AS - LAMP (mySQL, Apache, PHP) - Dell Update Packages	30:25	16:32 (46% reduction)	5 seconds (99% reduction)	3:55 (87% reduction)
* Required an initial investment of approximately 45 minutes to install Altiris Deployment Solution and 3 hours per build to create/test the needed server deployment job.				

- Altiris Deployment Solution offers numerous ancillary benefits that are not provided by the two other deployment methods KeyLabs tested. These benefits include:
 1. Build consistency. With a manual server build every keystroke represents a potential difference that can translate into an improperly configured server, and ultimately, downtime. The automation provided by Altiris entirely eliminates build discrepancies.
 2. Detailed Server History. Altiris maintains a complete history of the server's initial build and any configuration changes over time.
 3. Scheduled Execution. Servers can be tagged for immediate provisioning or scheduled for later deployment during off-peak hours days or months in advance.
 4. Quick Recovery. The recovery process for each server is significantly reduced by leveraging the same jobs used to deploy servers. Jobs can be

quickly and easily modified to help recover failed servers or quickly provision entirely new servers with the same build configuration as a failed server.

5. Resource Archiving and Reuse. As a consequence of building and maintaining Altiris jobs, administrators pull together a robust archive of images, scripts, software packages, etc. that can be easily reused.
6. Role/scope Security. Altiris security can limit access to servers and management capabilities based on a user's role. Altiris also provides a complete audit trail detailing who configured what and when.

In short, Altiris provided substantial time savings and added benefits over the other server deployment methods we tested.

2. Introduction

Altiris and Dell jointly commissioned KeyLabs to empirically substantiate that Altiris Deployment Solution dramatically reduces the time that an administrator spends deploying and repurposing servers. To evaluate this claim, Keylabs compared the administrator time required to deploy Dell servers using three popular build methodologies:

- 1.) Manual server deployment
- 2.) Server Deployment using Dell's Server Assistant (DSA) CD, and
- 3.) Altiris Deployment Solution for Dell Servers

Altiris Deployment Solution automates the server build process so the administrator can start or schedule the process and then move on to other tasks – the administrator no longer has to physically attend any install functions. The objective of this study is to quantify how much deployment time Altiris can eliminate for server administrators when compared against more traditional server build methods.

What is Altiris Deployment Solution?

Altiris Deployment Solution for Dell Servers is a powerful solution for completely automating the provisioning and rapid repurposing of a Dell server. The product consists of the standard Altiris Deployment Solution product in addition to approximately 50 Dell-specific server configuration jobs that leverage the latest version of Dell's Deployment Toolkit. By using the toolkit, Altiris jobs can provide very Dell-centric management tasks including the ability to:

- remotely configure hardware components (BIOS, RAID, DRAC, BMC, etc.)
- install Dell Utility Partitions
- capture hardware component configuration settings on reference servers
- install Dell's OpenManage Server Administrator software
- more...

Customers are expected to study the provided Dell jobs and use them as a reference for creating their own jobs. A job can represent a task as simple as distributing an image to a server or it can represent a group of tasks as complex as provisioning an entire Linux or Microsoft server from bare metal (including the hardware, operating system, and application configuration).

For purposes of this study, KeyLabs created two Altiris jobs: one for deploying a Microsoft SQL server and another for deploying Red Hat Enterprise Linux 3.0 AS running LAMPP (mySQL, Apache, PHP, and Perl).

3. Methodology

Before reviewing the results of the study, this section will briefly review the test methodology KeyLabs employed.

Builds Tested

Dell PowerEdge 2650 servers were selected to be the hardware platform for this study because they are a popular member of Dell's PowerEdge server family. Using this Dell server hardware, two different server builds were identified for testing. Each of these builds is identified below along with a listing of the configuration steps that were tested.

- Server Build 1 – Microsoft Windows 2000 Advanced Server w/ SQL 2000
 - Configure BIOS, DRAC and RAID components
 - Set a RAID 5 Configuration
 - Install Windows 2000 Advanced Server
 - Apply Windows 2000 Advanced Server updates/patches
 - Install Microsoft SQL 2000
 - Apply Microsoft SQL 2000 SP3
 - Install Dell OpenManage Server Administrator (OMSA)
 - Apply Dell Update Packages to update server components including BIOS, ESM, DRAC, etc. and apply any OS-specific drivers to support RAID and NIC components

- Server Build 2 – Red Hat Enterprise Linux 3.0 AS Server
 - Configure the server BIOS, DRAC and RAID components
 - Set a RAID 5 Configuration
 - Install Red Hat Enterprise Linux 3.0 Advanced Server
 - Install LAMP for Linux (MySQL, Apache, PHP, and Perl)
 - Install Dell OpenManage Server Administrator (OMSA)
 - Apply Dell Update Packages to update server components including BIOS, ESM, etc. and apply any OS-specific drivers to support RAID and NIC components

Methodologies Used

The administrator time required for each of the above server builds was recorded using three different deployment methodologies:

- 1.) Manual server deployment – no automation. With a manual server deployment administrators cycle through CDs, software installation screens, BIOS configuration screens, etc. as needed to install and

configure each server. No efficiencies are gained as new servers are deployed. All tasks are repeated manually again and again for each server deployment (or redeployment).

- 2.) Dell's Server Assistant CD. This bootable CD ships with every Dell PowerEdge server and helps automate operating system deployment by automatically scripting the OS installation to include Dell-specific drivers. This CD does not provide setup assistance for the BIOS, DRAC and BMC components nor does it help with post-OS tasks such as applying hardware updates or installing applications. Operating system install times are reduced slightly but the same tasks continue to be repeated by an administrator for each server deployed.
- 3.) Altiris Deployment Solution – automates server builds. Requires an initial investment of time to install the Altiris environment and create/test server build jobs. After that investment, Altiris Deployment Solution provides completely hands-free, remote provisioning of one or more servers including hardware, OS and application configuration. One job is created for each server role an organization requires and it is repeatedly executed in the Altiris console as needed.

Please note that best practices were used for each tested methodology. For example, for manual installations, up to four servers were installed at once with the administrator cycling between them.

Other Considerations

It is important to understand that much of the fundamental value of Altiris Deployment Solution is centered in its ability to abstract administrators away from many of the tasks that they perform manually. Altiris Deployment Solution allows a wide range of tasks to be captured as an Altiris “job” that can be executed by Altiris Deployment Solution. A job is a sequence of one or more tasks that can be easily executed on remote servers that are managed by Altiris Deployment Solution.

Altiris Deployment Solution requires an infrastructure – a dedicated Altiris server that requires a backend SQL 2000 database. To facilitate truly hands-free functionality, many advanced deployment features such as pre-provisioning (the ability to assign a server build to a Dell Service Tag for a new server that has not yet been physically added to the LAN – when the server boots the first time Altiris will provision it automatically) or rip-and-replace (the ability to dynamically provision blades based on their location in a chassis) require the use of an Altiris PXE server.

The installation and configuration of Altiris Deployment Solution including the PXE server and creation of virtual boot floppies took KeyLabs approximately 45 minutes. In addition to this install time KeyLabs built two jobs, one for each server build as defined earlier in this section. Every detail of each server build was included and sequenced in

the Altiris job. The process of creating and testing these jobs took approximately 3 hours per job (6 hours total).

Once the Altiris job is created, it can be executed automatically by Altiris Deployment Solution on one or more servers – there is no need to repeat the mundane process of cycling through the same CDs and entering the same keystrokes over and over from server to server. An administrator can simply create one Altiris job for each server role their organization requires and then quickly execute it on any managed server via the Altiris console.

Once the investment in creating jobs is made it does not have to be repeated. The job will only need periodic updating to reference new source files, configuration parameters etc. as they may change over time. Executing a job is as simple as dragging and dropping it onto server icons in the Altiris console.

The time required to pull together needed install CDs, download Dell Update Packages and determine standard configuration parameters (static IP addresses, NetBIOS server name, domain membership, etc.) has been removed from the study. The time needed to collect these resources is common to all 3 server deployment scenarios and therefore has been isolated from this study.

Unlike the manual and Dell Server Assistant CD installation methods, Altiris required an initial investment of approximately six to seven hours before the two server builds in the study could be deployed. The breakdown for this time requirement is conveyed in the table below:

Table 2: Altiris Setup Time Including Job Creation/Testing for both Server Builds Tested

Task	Time
Altiris Deployment Solution Installation	15 minutes
Altiris Deployment Solution Configuration/Testing (PXE, Boot Disk Creator, etc.)	30 minutes
Creation/Testing of Windows Server Build Job	3 hours
Creation/Testing of Linux Server Build Job	3 hours
Total Altiris Setup Time*	6 hours and 45 minutes
* The KeyLabs engineer who performed the Altiris testing had completed basic Altiris product training. These numbers may be slightly longer or shorter for other organizations depending on the level of Altiris training and experience on staff.	

The above steps involved installing and configuring the Altiris software as well as creating a reference PowerEdge 2650 server. The hardware components of this reference server were properly configured and the appropriate operating system was installed and configured. Once the reference server's deployment was completed, Altiris out-of-the-

box jobs were used to capture the BIOS and DRAC settings into a template file on the Altiris server. An image of the reference server's operating system was also captured using the Altiris white paper entitled "Building a Single Image for Dell PowerEdge Servers with Altiris Deployment Solution." Once these resources were collected, the aforementioned jobs were created: one to build a Microsoft SQL 2000 server and the other to build a Red Hat Enterprise Linux 3.0 server. The template files and images created by the Altiris-provided jobs were used by the KeyLabs custom deployment jobs.

Once the Altiris setup was finished and the two new server build jobs were tested successfully, KeyLabs began testing each of the identified build methodologies. Data was compiled for server deployments of various sizes (including deployments of 1 server, 25 servers, 50 servers and 100 servers).

Test Environment

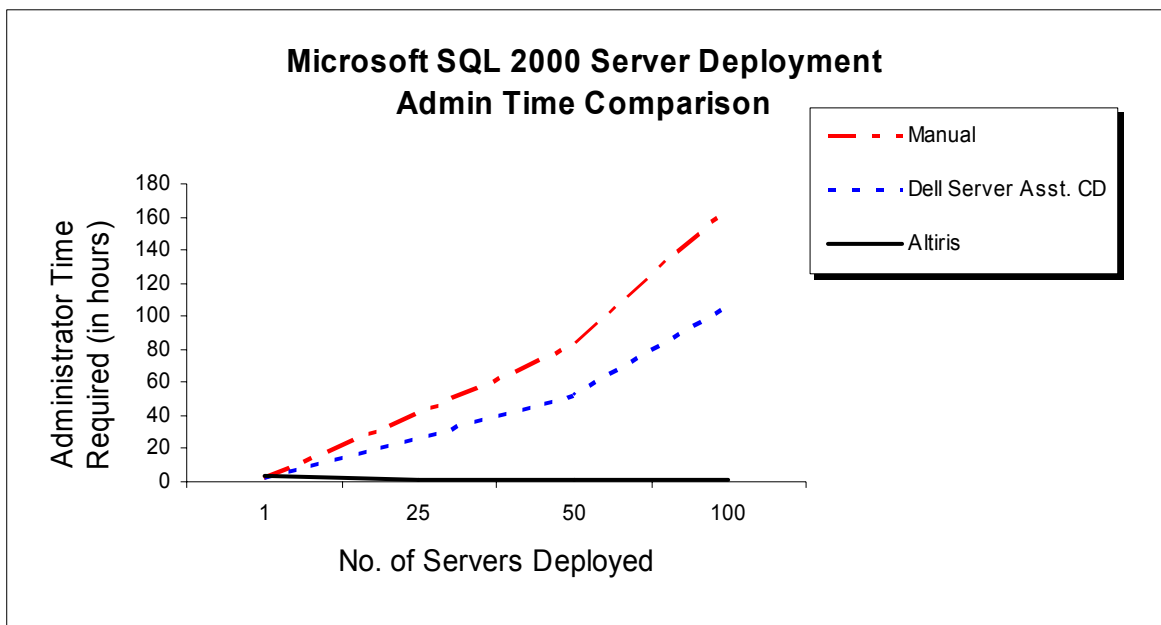
Every effort was made to isolate physical layer setup concerns from the study. All servers were unboxed, racked, cabled and powered on prior to recording administrator deployment times (the time when the first response from an engineer was required). This detail makes the findings of this study equally applicable across all blade, rack and tower server models. For example, any time savings blade servers provide over rack mount servers due to physical layer manageability improvements are isolated out of this study. Administrator time is only recorded for those provisioning tasks that affect hardware component configuration, operating system deployment and application installation.

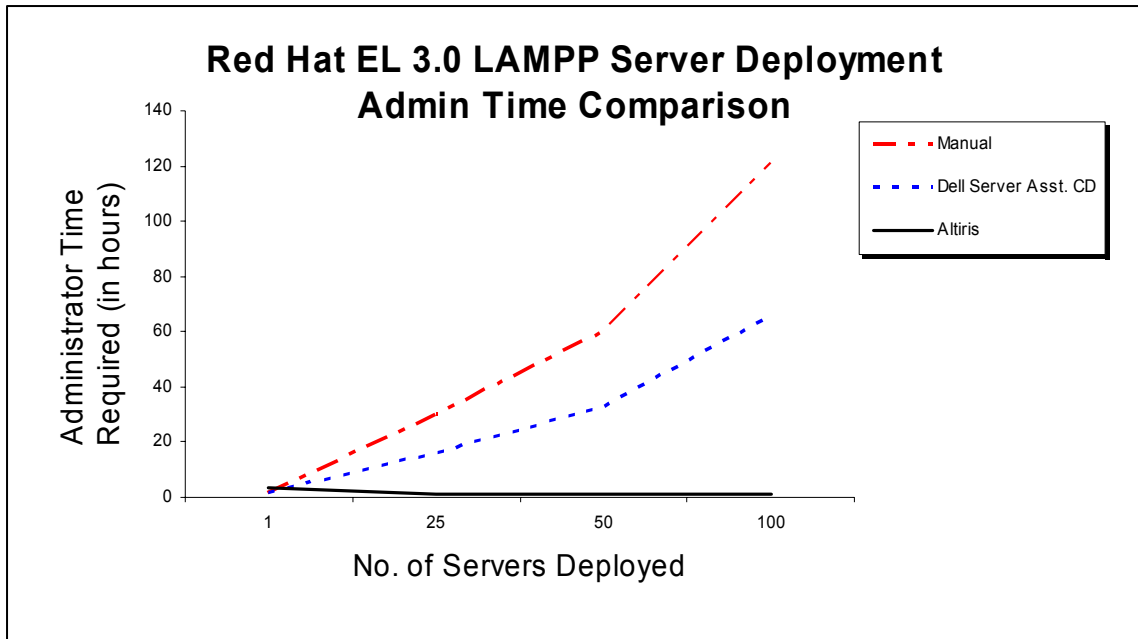
A standard 100 Mbps Ethernet network infrastructure was utilized with no attempt made to determine the relative impact of network latencies across the various test cases. The resulting data has been verified and is reproducible as required. The servers tested did not rely on any remote storage (SAN, NAS, etc.). Even though Altiris can be configured to support such scenarios, this study references the configuration of servers with internal disk arrays.

4. Results

KeyLabs has determined that the Altiris Deployment Server significantly reduces the administrator time required to deploy servers when compared with manual server deployments or server deployments that leverage Dell's Server Assistant CD. KeyLabs found that, once the initial time investment was made to set up the Altiris infrastructure, reductions in administrator time compounded exponentially. Simply dragging and dropping server build jobs onto groups of 5, 10, 25 or 50+ servers in the Altiris console took only a matter of seconds and could execute completely unattended.

As evidenced in the graphs below, the Altiris server deployment methodology began to generate significant time savings after the deployment of the 3rd server when compared with manual installation processes and after the deployment of the 4th server when Dell's Server Assistant (DSA) CD was used. This reduction in time was realized similarly in both Microsoft and Linux environments.





Both the above graphs chart the results showing that the administrator time for the manual and DSA deployment methods increased with every new server build while the time with Altiris decreased after the first server.

Detailed information for each tested server build is presented in the tables below. For Altiris, data is listed for both the total administrator time required and the actual server build time.

Table 3: Administrator Deployment Time Comparison to Across Server Builds – For **One** Server (time measured in hh:mm)

Server Builds	Qty of 1 Dell PowerEdge 2650 Servers			
	Manual Installation (hh:mm)	Dell Server Assistant CD (hh:mm)	Altiris Admin Time* (hh:mm)	Altiris Build Time* (hh:mm)
MS SQL 2000 Server Build: - BIOS, RAID, DRAC config - Windows 2000 Advanced Server - SQL Server 2000 - Dell Update Packages	2:28	2:06	5 seconds	1:35
Red Hat Linux/Apache Build: - BIOS, RAID, DRAC config - Red Hat EL 3.0 AS - LAMP (mySQL, Apache, PHP) - Dell Update Packages	1:43	1:35	5 seconds	1:15
* Required an initial investment of approximately 45 minutes to install Altiris Deployment Solution and 3 hours per build to create/test the needed server deployment job.				

As previously noted, Altiris requires approximately 3 hours to create and test a comprehensive server deployment job. Once that job is created it only requires 5 seconds to execute on one or more servers. The actual build time recorded above for a single server does not vary significantly from a manual build process.

Actual build time for an Altiris job can vary dramatically depending on how the job is built. For example, instead of executing application installations for Dell OMSA and Microsoft SQL directly from a network share, we built our jobs to first copy the needed install files to each server. This added significant time that slowed deployment speed for each server but it also ensured that the installation never hung due to a failed network connection. If the file copy failed, the Altiris console would indicate the failure without starting the application install.

This practice ensured that the application installation would only start when there was a high probability that it would complete. However, it also contributed more than 30 minutes to the Altiris build times listed above. Comparisons to manual installations can be difficult because Altiris provides the flexibility to architect jobs very differently to achieve the same end result. The individual requirements of various server deployment projects may suggest different job designs.

After kicking off the job, build status is indicated real-time in the Altiris console. Administrators do not have to physically attend any servers. Jobs can be configured to send email or call into other messaging systems to notify an administrator of problem conditions or status. Administrators can view the console to determine when server deployments are complete and they can remote control servers to manually verify that the new servers are ready for production. To further reduce manual verification times, Altiris jobs can be configured to automatically run customer-defined test scripts as a final task in a server deployment job. These scripts can be used to exercise the server and/or validate its configuration. Altiris utilities can be called at any point within customer scripts to send verification status to the Altiris console.

Table 4: Administrator Deployment Time Comparison to Across Server Builds – For 25 Servers (time measured in hh:mm)

Server Builds	Qty of 25 Dell PowerEdge 2650 Servers			
	Manual Installation (hh:mm)	Dell Server Assistant CD (hh:mm)	Altiris Admin Time* (hh:mm)	Altiris Build Time* (hh:mm)
MS SQL 2000 Server Build: - BIOS, RAID, DRAC config - Windows 2000 Advanced Server - SQL Server 2000 - Dell Update Packages	41:15	26:15	5 seconds	4:15
Red Hat Linux/Apache Build: - BIOS, RAID, DRAC config - Red Hat EL 3.0 AS - LAMP (mySQL, Apache, PHP) - Dell Update Packages	30:25	16:32	5 seconds	3:55
* Required an initial investment of approximately 45 minutes to install Altiris Deployment Solution and 3 hours per build to create/test the needed server deployment job.				

See Appendix A for additional deployment time comparisons.

Added Benefits

KeyLabs noted several additional benefits with Altiris Deployment Solution that were beyond the scope of the original study. These are briefly listed below.

1. Build consistency. With a manual server build every keystroke represents a potential difference that can translate into an improperly configured server, and ultimately, downtime. The automation provided by Altiris entirely eliminates build discrepancies. Altiris ensures that every server is built exactly the same way resulting in higher availability and easier troubleshooting if a problem does occur.
2. Detailed Server History. Altiris maintains a complete build history of each server's deployment. Every status message that returns from the server is recorded (you can even send status from your own custom shell scripts, VBscript, or batch files). After deployment, all subsequent management of the server is recorded in the job history including such tasks as software updates/installs, configuration tasks (IP address changes, renaming the server, etc.), etc. The manual and Dell Server Assistant CD install methods did not provide this benefit.

-
3. **Cross-platform Support.** The efficiencies discussed throughout this paper are gained similarly in both Windows Server and Red Hat Linux server environments – both are managed using the same conventions from the same Altiris console.
 4. **Scheduled Execution.** Servers can be tagged for immediate provisioning or scheduled for later deployment during off-peak hours days or months in advance. Deployment jobs can be assigned and set to execute long before new server hardware even arrives on site.
 5. **Quick Recovery.** The recovery process for each server is significantly reduced by leveraging the same jobs used to deploy servers. Jobs can be quickly and easily modified to help recover failed servers or quickly provision entirely new servers with the same build configuration as a failed server.
 6. **Resource Archiving and Reuse.** As a consequence of building and maintaining Altiris jobs, administrators pull together a robust archive of images, scripts, software packages, etc. that can be easily reused. This resource pool can be leveraged by new jobs and other projects beyond initial server deployment. When using the manual or the Dell Server Assistant installation methods no such archive is available.
 7. **Role/scope Security.** Altiris security can limit access to servers and management capabilities based on a user's role. Altiris also provides a complete audit trail detailing who configured what and when.

5. Test Details

Prior to deployment testing each Dell PowerEdge Server was set to out-of-the-box Dell factory settings as indicated below.

Table 5: Hardware Component Configuration

Component	Pre-Test Configuration	Post-Test Configuration
RAID	Version: 75279 None	Version: 81224 RAID 5 (32KB chunk with read caching enabled)
Operating System	None	Windows 2000 Server or Red hat linux
BIOS	Version: A19 Boot Order: 1. CDROM, 2. Floppy, 3 NIC1, 4. HDD, 5. NIC2	Version A20 Boot Order: 1. NIC1, 2. Floppy, 3. HDD
ESM	Version: A01	Version: A02
DRAC	Version: 72650 Static IP: 10.10.10.0	Version: 83674 Static IP: 10.10.10.5
RAID driver	47959 (Windows default)	74082

A detailed breakdown of specific administrator deployment time is detailed below for deploying a single Microsoft Windows Server running Microsoft SQL Server 2000.

Table 6: Administrator Deployment Time Comparison for a Single Microsoft Windows 2000 Server Build (time measured in hh:mm)

Task	Manual Install	Dell Server Assistant CD	Altiris Deployment Solution
BIOS, DRAC, RAID configuration	0:09	0:09	N/A
Operating System Installation from the Microsoft CD	0:47	0:37	N/A
Operating System Updates via Automatic Updates Utility	0:35	0:28	N/A
Dell OpenManage Server Administrator Install/Config	0:18	0:18	N/A
SQL 2000 SP3 Installation	0:14	0:14	N/A
Applying Dell Update Packages	0:25	0:20	N/A
Other	N/A	N/A	0:00:05*
Total Elapsed Administrator Deployment Time	2:28	2:06	0:00:05*

* Time required to drag and drop the server build job in the Altiris console on one or more target servers.

A detailed breakdown of specific administrator deployment time is detailed below for deploying a single Red Hat Linux server.

Table 7: Administrator Deployment Time Comparison for a Single Red Hat Enterprise Linux 3.0 AS Build
(time measured in hh:mm)

Task	Manual Install	Dell Server Assistant CD	Altiris Deployment Solution
BIOS, DRAC, RAID configuration	0:09	0:09	0:00
Operating System Installation from the Red Hat CD	0:41	0:33	0:00
Dell OpenManage Server Administrator Installation	0:11	0:11	0:00
LAMPP Installation (mySQL, Apache, PHP, and Perl)	0:20	0:20	0:00
Apply Dell Update Packages*	0:14	0:14	0:00
Other	0:08	0:08	0:05*
Total Elapsed Administrator Deployment Time	1:43	1:35	0:05*

* Time required to drag and drop the server build job in the Altiris console on one or more target servers.

Note: Only BIOS and ESM Dell Update Packages were available for Dell PowerEdge 2650 servers running Red Hat Linux at the time this testing was conducted.

Downloads

You can download the KeyLabs test jobs at:
<http://www.keylabs.com/results/Altiris/408032AltirisDS.html>

These jobs can be imported into Altiris Deployment Solution by right-clicking in the Jobs pane and selecting “Import” from the popup menu. Please note that these jobs do not contain all the resources (images, software, and scripts) required to deploy a server. The jobs are provided simply as an example of how Altiris can facilitate complex server builds. Customers are expected to revise the sample jobs to provide their own licensed software and configuration parameters.

6. Conclusion

KeyLabs has verified the Altiris claim that Altiris Deployment Server can effectively reduce server provisioning time.

Furthermore, the Altiris solution offers additional benefits that may be of value to server administrators. Advanced Altiris features such as pre-provisioning or blade server rip-and-replace can further extend the time savings offered by Altiris Deployment Solution.

Consult Altiris documentation for specific information regarding Altiris implementation, architecture and capabilities.

Appendix A: Additional Deployment Times

The tables below present tested deployment times for quantities of 50 and 100 servers respectively.

Table 8: Administrator Deployment Time Comparison to Across Server Builds – For 50 Servers
(time measured in hh:mm)

Server Builds	Qty of 50 Dell PowerEdge 2650 Servers			
	Manual Installation (hh:mm)	Dell Server Assistant CD (hh:mm)	Altiris Admin Time* (hh:mm)	Altiris Build Time* (hh:mm)
MS SQL 2000 Server Build: - BIOS, RAID, DRAC config - Windows 2000 Advanced Server - SQL Server 2000 - Dell Update Packages	82:30	52:30	30 seconds†	9:45
Red Hat Linux/Apache Build: - BIOS, RAID, DRAC config - Red Hat EL 3.0 AS - LAMP (mySQL, Apache, PHP) - Dell Update Packages	60:50	33:05	30 seconds†	9:25
<p>* Required an initial investment of approximately 45 minutes to install Altiris Deployment Solution and 3 hours per build to create/test the needed server deployment job.</p> <p>† Time is increased from 5 seconds to 30 seconds to account for different configuration parameters common to larger simultaneous deployments. For example, administrators may choose to execute deployments in batches of 25 servers with a time interval between each batch.</p>				

Table 9: Administrator Deployment Time Comparison to Across Server Builds – For **100** Servers
(time measured in hh:mm)

Server Builds	Qty of 100 Dell PowerEdge 2650 Servers			
	Manual Installation (hh:mm)	Dell Server Assistant CD (hh:mm)	Altiris Admin Time* (hh:mm)	Altiris Build Time* (hh:mm)
MS SQL 2000 Server Build: - BIOS, RAID, DRAC config - Windows 2000 Advanced Server - SQL Server 2000 - Dell Update Packages	165:00	105:00	30 seconds†	18:05
Red Hat Linux/Apache Build: - BIOS, RAID, DRAC config - Red Hat EL 3.0 AS - LAMP (mySQL, Apache, PHP) - Dell Update Packages	121:40	66:10	30 seconds†	17:45
<p>* Required an initial investment of approximately 45 minutes to install Altiris Deployment Solution and 3 hours per build to create/test the needed server deployment job.</p> <p>† Time is increased from 5 seconds to 30 seconds to account for different configuration parameters common to larger simultaneous deployments. For example, administrators may choose to execute deployments in batches of 25 servers with a time interval between each batch.</p>				