

## Dell ImageDirect time savings evaluation

### Executive summary

Dell Inc. (Dell) commissioned Principled Technologies (PT) to compare Dell's Online ImageDirect image creation process with a typical corporate deployment solution such as Symantec's Ghost 11.0 tool, a leading solution many organizations use. The test aimed to measure and compare the potential time an organization's IT staff might invest using the two imaging solutions and deployment processes across multiple locations.

We selected three commonly available systems that ImageDirect supports with Windows XP Professional:

- Dell Latitude D630 notebook
- Dell OptiPlex 755 desktop
- Dell Precision M2300 notebook

We found that ImageDirect could save significant amounts of IT staff members' time, time they would normally devote to imaging using a tool such as Symantec Ghost.

We first created a standard company system image using both Dell ImageDirect and Symantec's Ghost 11.0 on a Dell Latitude D630 notebook. We used Ghost as many small, medium-sized, and large organizations would. The difference between those usage models is that smaller organizations with fewer systems are more likely to install applications by hand. Larger organizations would develop silent installation scripts to speed up repeated application installations. We then ordered a pair of Dell Latitude D630 notebook systems. We ordered one of them using the Dell ImageDirect service; for the other one, we used Symantec Ghost 11.0 to set up the system. We repeated this process two more times, changing the systems each time, to mimic what would happen over time as an organization buys new and different systems and updates images and distributes them across multiple sites.

### KEY FINDINGS

- Deploying systems with ImageDirect saved as much as 82 percent of IT staff time over using an imaging tool such as Symantec Ghost 11.0.
- Deploying systems for users in remote facilities with ImageDirect saved as much as 86 percent of IT staff time over using an imaging tool such as Symantec Ghost 11.0.
- Creating images using ImageDirect saved on average 87 percent of IT staff time over creating the images with an imaging tool such as Symantec Ghost 11.0.
- ImageDirect required no additional time to deploy an image on a different Dell model as our test on the Dell OptiPlex 755 showed.

**Time savings of Dell ImageDirect over Symantec Ghost 11.0**

Area of time savings	Latitude D630	OptiPlex 755	Precision M2300	Average across all three systems we tested
<b>One-time setup (percentage)</b>	0:00:00 (NA)	1:06:28 (100%)	1:16:27 (77%)	0:47:38 (87%)
<b>Deployment (percentage)</b>	0:27:45 (77%)	0:18:04 (71%)	0:31:33 (82%)	0:25:47 (78%)
<b>Remote site deployment (percentage)</b>	0:37:31 (82%)	0:29:46 (80%)	0:42:20 (86%)	0:36:32 (83%)

**Figure 1. The time savings of Dell ImageDirect over Symantec Ghost 11.0 for setting up images and deploying images on systems (both at the central site and at remote sites) using techniques common to small organizations such as not using silent installations. The time differences are in hours:minutes:seconds with percentage differences in parentheses.**

Figure 1 shows both the time savings of Dell ImageDirect over Symantec Ghost in our testing as well as the percentage time savings. These savings are what a small organization that does not use silent installations during their imaging process might expect. We base the times in Figures 1 and 2 not on elapsed times, but rather on the time an IT staff member would actually have to devote to a task. For example, if the task of copying an image to a

system took a total of 40 minutes, but the actual time to start up the image copy and monitor its progress only took 8 minutes, we used the 8-minute figure.

The one-time setup time is the time necessary to create an image for a system either with ImageDirect or Symantec Ghost. This time would be necessary for each image within a customer's environment. IT staff members could then deploy that image on multiple similar systems. With ImageDirect, IT staff members could also deploy the ImageDirect image on different types of Dell systems with no additional setup time. As we assume the initial image is already created for the D630, no time is necessary with either method and no time savings result. The deployment time is what is necessary to get the boxed up system unboxed and up and imaged and personalized for the user. The remote site deployment time is the deployment time plus the necessary time to box the system back up, prepare it for shipping to the remote location, and unbox it there upon arrival.

Time savings of Dell ImageDirect over Symantec Ghost 11.0				
Area of time savings	Latitude D630	OptiPlex 755	Precision M2300	Average across all three systems we tested
One-time setup (percentage)	0:00:00 (NA)	1:04:15 (100%)	1:15:50 (77%)	0:46:42 (86%)
Deployment (percentage)	0:13:34 (62%)	0:10:42 (60%)	0:19:05 (74%)	0:14:27 (66%)
Remote site deployment (percentage)	0:23:20 (74%)	0:22:24 (76%)	0:29:52 (82%)	0:25:12 (77%)

Figure 2. The time savings of Dell ImageDirect over Symantec Ghost 11.0 for setting up images and deploying images on systems (both at the central site and at remote sites) using techniques common to medium-sized or larger organizations. The time differences are in hours:minutes:seconds with percentage differences in parentheses.

Figure 2 shows both the time savings of Dell ImageDirect over Symantec Ghost in our testing as well as the percentage time savings. These savings are what organizations (typically medium-sized or larger ones) that use silent installations during their imaging process might expect. Note the 100% savings indicates that there was no time required for ImageDirect imaging when switching to a different model of computer.

## Test methodology

The overall goal of the test was to use a set of computers with both ImageDirect and Symantec Ghost 11.0 in situations that an organization's IT staff typically encounters. We first tested a Dell Latitude D630 notebook system with an existing image. We then tested an OptiPlex 755 desktop system with as similar an image as possible. This is the situation the IT staff faces when adding a new model of computer to the set of computers they support. We chose a desktop to emphasize the difference versus a notebook. We finally tested a Precision M2300 notebook with an updated image. This situation is a common one where the IT staff needs to add additional updates, new applications, and other changes settings over time.

We executed this scenario twice, once using Dell's ImageDirect tool and once using Symantec Ghost 11.0; in both cases we assumed that the initial image was already in place.

The initial image contained the following applications as part of our hypothetical company's corporate build:

- Adobe Acrobat Reader 7.0.8
- Adobe Photoshop CS2
- Macromedia DreamWeaver 8
- Microsoft Access 2003
- Microsoft Excel 2003
- Microsoft Outlook 2003
- Microsoft PowerPoint 2003
- Microsoft Project 2003
- Microsoft Word 2003

- Microsoft Visio 2003
- SPECjbb2005 v1.07
- Symantec EndPoint Protection 11.0
- WinZip 11.1

We also set the following in the image:

- IE home page to [www.principledtechnologies.com](http://www.principledtechnologies.com)
- Corporate desktop wallpaper
- Corporate-mandated policy settings:
  - Under Security Settings→Account Policies→Password Policy→Change Maximum Password age to 20 days
  - Under Security Settings→Local Policies→User Rights Assignment→Add Administrator to Lock pages in memory (recommended for running SPECjbb2005)
  - Under Security Settings→Local Policies→Security Options→Rename guest account to PT Guest
- Critical Windows Updates through 01/14/08

For the second pair of systems, we recorded the amount of time that it took to deploy the corporate image to a remote location using the two imaging tools.

On the third pair of systems, we updated the corporate image to simulate quarterly changes. We made the following changes to the image:

- replaced Symantec EndPoint Protection 11.0 with McAfee VirusScan Enterprise 8.5i
- replaced Adobe Reader 7.0.8 with Adobe Reader 8.1.2
- changed IE home page from [www.principledtechnologies.com](http://www.principledtechnologies.com) to [www.dell.com](http://www.dell.com)
- added one system policy: Under Security Settings→Local Policies→Security Options→Rename Administrator account to PTAdmin
- applied Critical Windows Updates through 03/21/08

## Dell Latitude D630

We measured amount of time we used with each of the two imaging solutions—Dell ImageDirect and Symantec Ghost 11.0—to go from unboxing the notebook to having a functioning system with the following applications and settings:

- Adobe Acrobat Reader 7.0.8
- Adobe Photoshop CS2
- Macromedia DreamWeaver 8
- Microsoft Access 2003
- Microsoft Excel 2003
- Microsoft Outlook 2003
- Microsoft PowerPoint 2003
- Microsoft Project 2003
- Microsoft Word 2003
- Microsoft Visio 2003
- SPECjbb2005 v1.07
- Symantec EndPoint Protection 11.0
- WinZip 11.1
- IE home page to [www.principledtechnologies.com](http://www.principledtechnologies.com)
- Corporate desktop wallpaper
- Corporate-mandated Policy settings
  - Under Security Settings→Account Policies→Password Policy→Change Maximum Password age to 20 days
  - Under Security Settings→Local Policies→User Rights Assignment→Add Administrator to Lock pages in memory (recommended for running SPECjbb2005)

- Under Security Settings→Local Policies→Security Options→Rename guest account to PT Guest
- Critical Windows Updates through 01/14/08

### **Dell OptiPlex 755**

We measured amount of time we used with each of the two imaging solutions—Dell ImageDirect and Symantec Ghost 11.0—to go from unboxing the notebook to having a functioning system with the following applications and settings:

- Adobe Acrobat Reader 7.0.8
- Adobe Photoshop CS2
- Macromedia DreamWeaver 8
- Microsoft Access 2003
- Microsoft Excel 2003
- Microsoft Outlook 2003
- Microsoft PowerPoint 2003
- Microsoft Project 2003
- Microsoft Word 2003
- Microsoft Visio 2003
- SPECjbb2005 v1.07
- Symantec EndPoint Protection 11.0
- WinZip 11.1
- IE home page to [www.principledtechnologies.com](http://www.principledtechnologies.com)
- Corporate desktop wallpaper
- Corporate-mandated Policy settings
  - Under Security Settings→Account Policies→Password Policy→Change Maximum Password age to 20 days
  - Under Security Settings→Local Policies→User Rights Assignment→Add Administrator to Lock pages in memory (recommended for running SPECjbb2005)
  - Under Security Settings→Local Policies→Security Options→Rename guest account to PT Guest
- Critical Windows Updates through 01/14/08

### **Dell Precision M2300**




We measured amount of time we used with each of the two imaging solutions—Dell ImageDirect and Symantec Ghost 11.0—to go from unboxing the notebook to having a functioning system with the following applications and settings:

- Adobe Reader 8.1.2
- Adobe Photoshop CS2
- Macromedia DreamWeaver 8
- Microsoft Access 2003
- Microsoft Excel 2003
- Microsoft Outlook 2003
- Microsoft PowerPoint 2003
- Microsoft Project 2003
- Microsoft Word 2003
- Microsoft Visio 2003
- SPECjbb2005 v1.07
- McAfee VirusScan Enterprise 8.5i
- WinZip 11.1
- IE home page to [www.dell.com](http://www.dell.com)
- Corporate desktop wallpaper
- Corporate-mandated Policy settings
  - Under Security Settings→Account Policies→Password Policy→Change Maximum Password age to 20 days

- Under Security Settings→Local Policies→User Rights Assignment→Add Administrator to Lock pages in memory (recommended for running SPECjbb2005)
- Under Security Settings→Local Policies→Security Options→Rename guest account to PT Guest
- Under Security Settings→Local Policies→Security Options→Rename Administrator account to PTAdmin.
- Critical Windows Updates through 03/21/08

## Appendix A – System configuration information

This appendix provides detailed configuration information about the systems.

System	Dell Latitude D630 Intel Core 2 Duo Mobile T7250	Dell OptiPlex 755 Intel Core 2 Duo E6550	Dell Precision M2300 Intel Core 2 Duo Mobile T7500
			
<b>General</b>			
Processor and OS kernel: (physical, core, logical) / (UP, MP)	1P2C2L / MP	1P2C2L / MP	1P2C2L / MP
Number of physical processors	1	1	1
Single/Dual Core processors	Dual	Dual	Dual
System power management policy	Portable/Laptop	Home/Office Desk	Portable/Laptop
Processor power-saving option	Enhanced Intel SpeedStep Technology	Enhanced Intel SpeedStep Technology	Enhanced Intel SpeedStep Technology
<b>CPU</b>			
Vendor	Intel	Intel	Intel
Name	Core 2 Duo mobile	Core 2 Duo	Core 2 Duo mobile
Model number	T7250	E6550	T7500
Stepping	D	B	B
Socket type and number of pins	Socket P (478)	Socket 775 LGA	Socket P (478)
Core frequency (GHz)	2.00	2.33	2.20
Front-side bus frequency	800 MHz	1,333 MHz	800 MHz
L1 cache	32 KB + 32 KB (per core)	32 KB + 32 KB (per core)	32 KB + 32 KB (per core)
L2 cache	2 MB (shared)	4 MB (shared)	4 MB (shared)
<b>Platform</b>			
Vendor	Dell	Dell	Dell
Motherboard model number	0KU184	0GM819	0TN102
Motherboard chipset	Intel GM965	Intel Q35	Intel GM965
Motherboard revision number	C0	A2	C0
System/motherboard serial number	4S2KXF1	4ZHCFY1	B60D0G1
Bios name and version	Dell A07 (01/30/2008)	Dell A08 (02/19/2008)	Dell A04 (02/28/2008)
BIOS settings	Default	Default	Default
<b>Memory module(s)</b>			
Vendor and model number	Nanya Technology NT512T64UH8B0FN- 3C	Hynix HYMP164U64CP6-Y5	Qimonda 64T64020HDL3SB
Type	PC2-5300	PC2-5300	PC2-5300
Speed (MHz)	667	667	667

<b>System</b>	<b>Dell Latitude D630 Intel Core 2 Duo Mobile T7250</b>	<b>Dell OptiPlex 755 Intel Core 2 Duo E6550</b>	<b>Dell Precision M2300 Intel Core 2 Duo Mobile T7500</b>
Speed running in the system (MHz)	667	667	667
Timing/Latency (tCL-tRCD-tRP-tRASmin)	5-5-5-15	5-5-5-15	5-5-5-15
Size	1,024 MB	1,024 MB	1,024 MB
Number of memory module(s)	2 x 512 MB	2 x 512 MB	2 x 512 MB
Chip organization (single-sided, double-sided)	Double-sided	Single-sided	Double-sided
Channel (Single/dual)	Dual	Dual	Dual
<b>Hard disk</b>			
Vendor and model number	Western Digital WD800BEVS-75RST0	Western Digital WD800JD-75MSA3	Seagate ST9120823ASG
Size	80 GB	80 GB	120 GB
Buffer size	8 MB	8 MB	8 MB
RPM	5,400	7,200	7,200
Type	SATA 150 Mb/s	SATA 300 Mb/s	SATA 300 Mb/s
Controller	Intel 82801HBM (ICH8-ME)	Intel ID2914	Intel 82801HBM (ICH8-ME)
Driver	Intel 8.2.0.1011 (11/15/2006)	Intel 7.8.0.1012 (09/29/2007)	Intel 8.2.0.1011 (11/15/2006)
<b>Operating system</b>			
Name	Windows XP Professional Service Pack 2	Windows XP Professional Service Pack 2	Windows XP Professional Service Pack 2
Build number	2600	2600	2600
File system	NTFS	NTFS	NTFS
Kernel	ACPI Multiprocessor PC	ACPI Multiprocessor PC	ACPI Multiprocessor PC
Language	English	English	English
Microsoft DirectX version	DirectX 9.0c	DirectX 9.0c	DirectX 9.0c
<b>Graphics</b>			
Vendor and model number	Intel GMA X3100	Intel GMA 3100	NVIDIA Quadro FX 360M
Type	Integrated	Integrated	Discrete
Chipset	Mobile Intel 965 Express Chipset	Intel Q35 Express Chipset	Quadro FX 360M
BIOS version	1466	1459	60.86.5A.00.10
Graphics memory	256 MB	384 MB	256 MB
Resolution	1,280 x 800 x 32 bit	1,280 x 1,024 x 32 bit	1,440 x 900 x 32 bit
Driver	Intel 6.14.10.4831 (05/16/2007)	Intel 6.14.10.4837 (06/05/2007)	NVIDIA 6.14.11.5655 (08/23/2007)
<b>Sound card/subsystem</b>			
Vendor and model number	Sigma Tel High Definition Audio	SoundMAX Integrated Digital HD Audio	Sigma Tel High Definition Audio
Driver	Sigma Tel 5.10.0.5515 (05/10/2007)	AnalogDevices 5.10.1.5491 (08/03/2007)	Sigma Tel 5.10.0.5515 (05/10/2007)

<b>System</b>	<b>Dell Latitude D630 Intel Core 2 Duo Mobile T7250</b>	<b>Dell OptiPlex 755 Intel Core 2 Duo E6550</b>	<b>Dell Precision M2300 Intel Core 2 Duo Mobile T7500</b>
<b>Ethernet</b>			
Vendor and model number	Broadcom NetXtreme 57xx Gigabit Controller	Intel 82566DM-2 Gigabit Network Connection	Broadcom NetXtreme 57xx Gigabit Controller
Driver	Broadcom 10.26.0.0 (03/06/2007)	Intel 9.8.20.0 (04/13/2007)	Broadcom 10.42.0.0 (07/22/2007)
<b>Wireless</b>			
Vendor and model number	Dell Wireless 1395 WLAN Mini-Card	NA	Dell Wireless 1395 WLAN Mini-Card
Driver	Broadcom 4.170.25.12 (09/20/2007)	NA	Broadcom 4.170.25.12 (09/20/2007)
<b>Modem</b>			
Vendor and model number	Conexant HDA D330 MDC V.92	NA	Conexant HDA D330 MDC V.92
Driver	Conexant 7.59.0.50 (11/22/2006)	NA	Conexant 7.68.0.0 (09/06/2007)
<b>Optical drive(s)</b>			
Vendor and model number	TSSTcorp GSA-T21N	TSSTcorp TS-H353B	TEAC DV28EV
Type	DVD-RW	DVD-ROM	DVD-ROM
<b>USB ports</b>			
Number	2	6	4
Type	2.0	2.0	2.0
<b>IEEE 1394 ports</b>			
Number	1	0	1
<b>Monitor</b>			
LCD type	WXGA	ViewSonic Optiquest Q7 monitor	WXGA
Screen size	14.1"	17"	14.1"
Refresh rate	60 Hz	60 Hz	60 Hz
<b>Battery</b>			
Type	Dell PC764 Lithium-Ion	NA	Dell PC764 Lithium-Ion
Size (length x width x height)	7-3/8" x 2-5/8" x 7/8"	NA	7-3/8" x 2-5/8" x 7/8"
Rated capacity	5,000 mAh / 11.1V (56Wh)	NA	5,000 mAh / 11.1V (56Wh)
Weight	12 oz.	NA	12 oz.

Figure 3. Detailed system configuration information for the three test systems.



## Appendix B – Detailed results

This appendix provides more details on the test times of the individual tasks and activities for each of the systems with ImageDirect and with Symantec Ghost 11.0.

Timed activities	Latitude D630		OptiPlex 755		Precision M2300	
	Image-Direct	Ghost	Image-Direct	Ghost	Image-Direct	Ghost
<b>Total one-time setup</b>	0:00:00	0:00:00	0:00:00	1:06:28	0:22:17	1:38:44
Install Windows XP	NA	NA	NA	0:23:06	NA	0:30:33
Upload new applications/edit image/audit image	NA	NA	NA	NA	0:22:17	NA
Download and install drivers	NA	NA	NA	0:22:14	NA	0:39:35
Install applications	NA	NA	NA	0:20:12	NA	0:27:20
Customize image	NA	NA	NA	0:00:56	NA	0:01:16
<b>Total deployment</b>	0:08:15	0:36:00	0:07:16	0:25:20	0:06:46	0:38:19
Unbox system	0:02:26	0:02:26	0:04:22	0:04:22	0:03:27	0:03:27
Power on/deploy Ghost image	0:05:49	0:12:49	0:02:54	0:09:58	0:03:19	0:17:31
Install additional applications	NA	0:20:45	NA	0:11:00	NA	0:17:21
<b>Total remote site additional deployment</b>	0:00:00	0:09:46	0:00:00	0:11:42	0:00:00	0:10:47
Repack system (average for all systems)	NA	0:07:20	NA	0:07:20	NA	0:07:20
Unpack and set up	NA	0:02:26	NA	0:04:22	NA	0:03:27

Figure 4. The small organization's tested times for setting up images and deploying systems using them both to a single site and to a remote site. The times are in hours:minutes:seconds.

	Latitude D630		OptiPlex 755		Precision M2300	
Timed activities	Image-Direct	Ghost	Image-Direct	Ghost	Image-Direct	Ghost
<b>Total one-time setup</b>	0:00:00	0:00:00	0:00:00	1:04:15	0:22:17	1:38:07
Install Windows XP	NA	NA	NA	0:23:06	NA	0:30:33
Upload new applications/edit image/audit image	NA	NA	NA	NA	0:22:17	NA
Download and install drivers	NA	NA	NA	0:22:14	NA	0:39:35
Install applications	NA	NA	NA	0:17:59	NA	0:26:43
Customize image	NA	NA	NA	0:00:56	NA	0:01:16
<b>Total deployment</b>	0:08:15	0:21:49	0:07:16	0:17:58	0:06:46	0:25:51
Unbox system	0:02:26	0:02:26	0:04:22	0:04:22	0:03:27	0:03:27
Power on/deploy Ghost image	0:05:49	0:12:49	0:02:54	0:09:58	0:03:19	0:17:31
Install additional applications	NA	0:20:45	NA	0:11:00	NA	0:17:21
<b>Total remote site additional deployment</b>	0:00:00	0:09:46	0:00:00	0:11:42	0:00:00	0:10:47
Repack system (average for all systems)	NA	0:07:20	NA	0:07:20	NA	0:07:20
Unpack and set up	NA	0:02:26	NA	0:04:22	NA	0:03:27

Figure 5. The medium or larger organization's tested times for setting up images and deploying systems using them both to a single site and to a remote site. The times are in hours:minutes:seconds.



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