



Upgrade employee PCs faster with Dell ProDeploy Plus

Using Dell ProDeploy Plus minimizes employee downtime, speeds up deployment, and saves IT staff time

For a complicated task like multi-system deployment, the do-it-yourself approach isn't always the quickest or the easiest option. A lot of painstaking work goes into a large deployment. Admins may have to perform a number of time-consuming tasks, from researching hardware requirements and which systems to purchase, to managing the receipt, inventory, and asset tagging of all systems as they arrive, to moving all user data from old to new systems, and more.

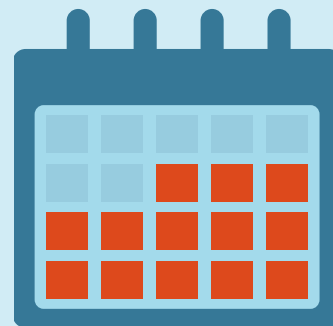
Fortunately, DIY isn't the only option. Dell™ ProDeploy Plus is a deployment service that provides experts who help every step of the way and actually do most of the work for you. Using Dell ProDeploy Plus simplifies the project for IT staff and gets employees back to work on their new systems sooner.

We used Dell ProDeploy Plus to upgrade a mix of 10 laptops and desktops and compared the experience to that of having an in-house administrator carry out the transition. Dell ImageAssist, an imaging tool that's part of ProDeploy Plus, allowed us to create one image for all the systems—instead of one for each system type—to speed the deployment. The PCs arrived with the correct corporate images already installed, configured, and validated. Then, Dell technicians arrived and moved employee data from existing to new systems so our IT staff could continue their other work.

Based on our findings from the 10-system deployment, we project that using Dell ProDeploy Plus for a 500-system deployment could take up to 35.6 percent less time than an in-house upgrade. For a deployment of that size, that's a time savings of over 2 weeks! That could mean a faster deployment experience with fewer hassles for employees and admins alike.

Reduce overall
deployment time by

35%



in a 500-system
deployment

How Dell ProDeploy Plus could reduce time for a 500-system deployment by 35%

We project these numbers from our test findings for a 10-system deployment. Actual numbers for a 500-PC deployment could vary considerably based on a number of factors, including, but not limited to: ratio of laptops to desktops, building layout, number of technicians on site, technician productivity levels, and more. This would be true for system deployments of only 100 or even 1,000.

Dell ProDeploy Plus is a service that can help you complete even your most challenging upgrade projects. Dell offers help with implementation planning and system recommendations. Dell ProDeploy Plus also includes the imaging tool ImageAssist to simplify corporate imaging. Once your systems arrive in-house with the proper images, Dell technicians arrive onsite to do the rollout for you. The Dell technicians unbox and set up the new computers, which includes transferring employee data from existing laptops and desktops onto the new systems. The Dell team's job isn't finished until all the new systems are in employee hands. But even when deployment is over, you're not on your own—for up to 30 days after the deployment ends, IT staff can call for support and maintenance at no extra charge.

Based on our hands-on testing of a 10-system deployment, we estimate that Dell ProDeploy Plus could reduce deployment time for 500 systems by 35.6 percent.

This assumes the following mix of laptops and desktops:

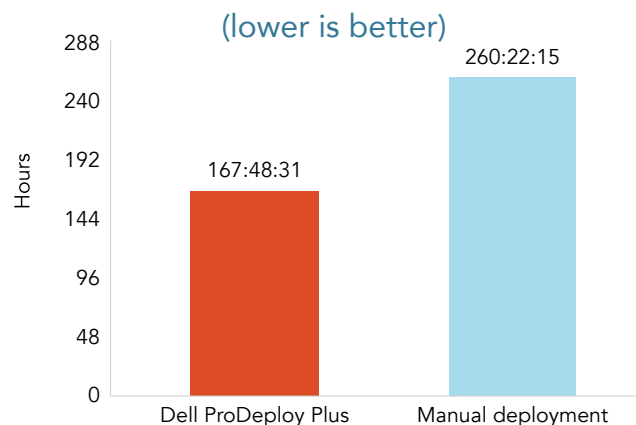
- 150 Dell Latitude™ E7270 laptops
- 150 Dell Latitude E5470 laptops
- 200 Dell OptiPlex™ 7440 AIO desktops

We project that the Dell ProDeploy Plus team could complete the system upgrades in just under 168 person-hours, while it would take in-house administrators over 260 hours to do the job manually. That's a difference of over two business weeks, or 35.6% less time for the Dell ProDeploy Plus team to complete the deployment. (See [Appendix D](#) for a detailed look at our timings, calculations, and assumptions.)

That time savings means employees spend less time waiting for a new system while the technicians set up and transfer their data to their new PCs. Downtime is a killer during the work week, and Dell ProDeploy Plus minimizes it.

One of the biggest benefits of Dell ProDeploy Plus is harder to quantify. Traditionally, large deployments require long days with many dedicated technicians. However, with Dell ProDeploy Plus, our IT staff's involvement during the Dell deployment was minimal. While the Dell technicians work, IT staff can tend to their everyday IT workload. Dell is also able to send more technicians to complete a large deployment faster. Dell can scale their effort to the size of your deployment—this may not be possible for companies handing deployments on their own.

Total deployment time for 500 systems (projected)



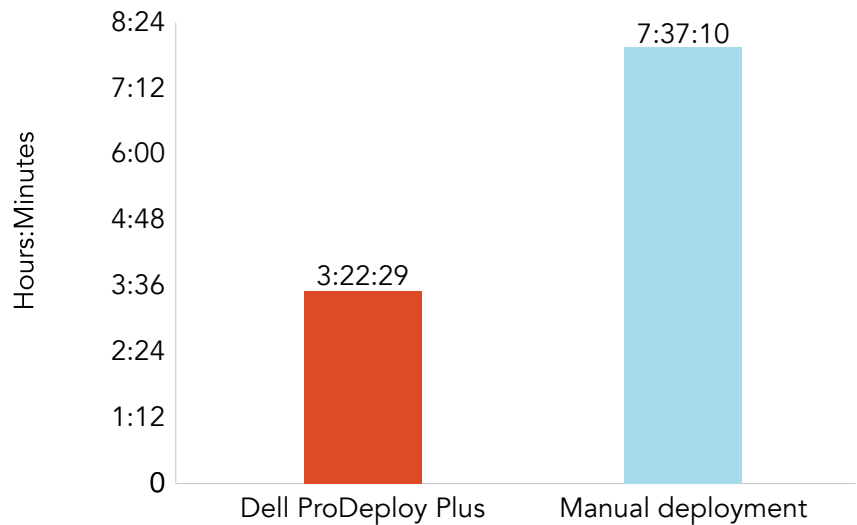
Complete your upgrades faster

Regular support and maintenance work doesn't stop simply because IT staff is completing a large upgrade project. Using Dell ProDeploy Plus to complete your deployment can mean your systems get upgraded more quickly than doing it yourself. In our 10-system deployment, using the Dell ProDeploy team reduced overall deployment time—the time in which all 10 systems were back in employee hands—by four hours. Deploying the 10 systems using ProDeploy Plus took only 3 hours, 22 minutes, while our manual deployment with in-house administrators took 7 hours, 37 minutes.

During the time the Dell technician was working, our IT administrator was able to work on other tasks. This means using Dell ProDeploy Plus can have systems to employees faster with significantly less IT administrator involvement.

Trusting the Dell ProDeploy Plus team with your PC refresh can cut calendar days from the duration of your deployment. This lets your admins and your employees get back to business sooner, with systems in hand that let them be more productive.

Total deployment time for 10 systems
(lower is better)

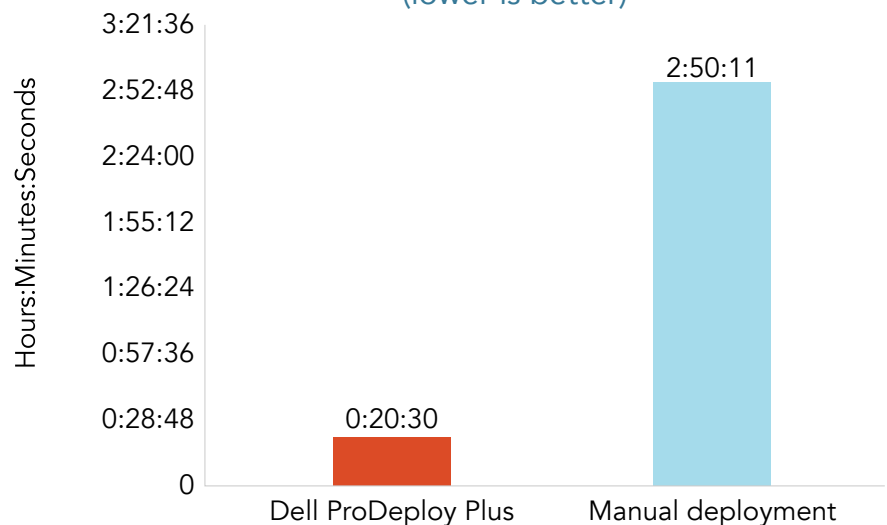


ImageAssist lives up to its name, reduces image creation time by 87.9%

Each new system needs the appropriate corporate image, which comprises an operating system and applications. These must be up to date so that employees have the latest versions with the best features or the version that best fits the company's standards and policies. Creating these images—a different one for each type of system your employees use—can be very time-consuming.

Dell ProDeploy Plus supports the ImageAssist image creation tool, which reduced image creation time by 87.9%. The process took only 20 minutes of admin time, versus the nearly 3 hours our in-house admins needed to create images manually without the tool. That's because the imaging tools available in Dell ProDeploy Plus let us create a single image to deploy to multiple models at the factory. Doing it manually meant we needed to create a separate image for each system type after they arrived from Dell. This further delays systems from getting to users.

Total image creation time for 10 systems
(lower is better)



Dell ProDeploy Plus with ImageAssist for image creation provides a repeatable, easy-to-manage way to get validated images onto your new systems while saving time and hassle for your IT staff. And the systems arrive with images ready to go, which means one less step once the PCs are in the office.



ImageAssist isn't the only option to speed system imaging with ProDeploy Plus

Some organizations may be interested in Dell Connected Configuration Services, which also lets you make real-time updates to images through a portal, so your systems arrive completely up to date. See the report at www.principledtechnologies.com/Dell/Connected_Configuration_deployment_0416.pdf for details.

A refreshing experience for admins

Upgrading employee PCs can take a lot of your IT staff's time. Normal day-to-day work doesn't stop during the deployment process, which means either long hours for IT staff or a deployment that moves at a snail's pace—or both. Dell ProDeploy Plus required limited administrator time, whereas manual deployment required administrator involvement from start to finish. Check out this side-by-side comparison of the tasks ProDeploy Plus and manual deployment require of your admins, respectively.

Admin tasks using Dell ProDeploy:

- Order the systems
- Work with the Engagement Manager to assure the computers arrive configured to your specifications
- Use Dell ImageAssist to create a single corporate image for all system types
- Receive the new systems
- When Dell technicians arrive, help them locate systems and resources and answer questions

Admin tasks for a manual deployment:

- Plan and schedule the rollout
- Order the systems
- Manage the receipt, inventory, and asset tagging of the systems as they arrive
- Manually create and capture hardware-specific corporate images for each system type
- Deploy the images to computers
- Move user data from the legacy computer to the new laptop or desktop

Dell ProDeploy Plus doesn't remove all responsibility for a large upgrade project from your admins, but it can make a daunting task vastly more manageable. Overall, deploying 10 systems with ProDeploy Plus required over four and a half fewer hours of in-house administrator time—or 59.5% less—than a manual deployment. PT's deployment day assistance to ProDeploy Plus only required one hour of admin involvement. We do not expect that this time would increase significantly for more systems. Because our admins needed only to show the Dell team around, direct them to the conference room to which employees would bring their legacy laptops, and answer the occasional question, they were able to keep up with their usual daily tasks.

After the deployment, Dell won't leave you hanging

Dell understands that with new technology, questions come up even after the service team has packed up and gone home. Dell ProDeploy Plus offers continued support for your IT team after the deployment is finished.

To test Dell support, three weeks after the Dell technician came to deploy our systems, we called into the support line and got help with:

- Plugging in an external monitor and changing settings to extend the display
- Installing a printer driver for a printer from another vendor
- Finding a PowerPoint® file using Windows® search
- Ensuring we had the latest version of Internet Explorer® installed

The Dell support person was knowledgeable and helpful. He was able to resolve our issues with connecting to the printer and followed up to make sure things were working properly. Dell ProDeploy Plus includes 30 days of post-deployment support, so you don't have to worry if there are problems or questions related to your new PC deployment.

Dell ProDeploy Plus: A faster way to upgrade, with less worry

Why put off the productivity benefits you can get by upgrading employee systems? Dell ProDeploy Plus alleviates the burden from IT staff tasked with completing large PC upgrades. The Dell service team arrives at your office and completes the deployment for you, which saves your IT staff time, gets your deployment project done faster, and minimizes downtime for employees while they're waiting for their upgrades. The support we received from the ProDeploy team made our IT admins' jobs easier and relieved the stress of trying to execute a deployment while keeping up with other work. Whether you need to upgrade 10 systems or 500, Dell ProDeploy Plus can simplify the deployment process for IT staff and the employees getting new systems.

On April 5, 2016, we finalized the hardware and software configurations we tested. Updates for current and recently released hardware and software appear often, so unavoidably these configurations may not represent the latest versions available when this report appears. For older systems, we chose configurations representative of typical purchases of those systems. We concluded hands-on testing on May 24, 2016.

Appendix A – Test system configurations

We used a mix of four desktops for legacy systems.

System	Dell OptiPlex 755	Dell OptiPlex 960	Dell OptiPlex 990	HP Compaq 6000 Pro Microtower
Processor				
Vendor	Intel®	Intel	Intel	Intel
Name	Core™ 2 Duo	Core 2 Duo	Core i5	Pentium®
Model number	E4500	E8400	2400	E6300
Core frequency	2.20 MHz	3.00 MHz	3.10 MHz	2.80 GHz
Number of cores	2	2	4	2
Cache	N/A	N/A	6 MB L3	N/A
Memory				
Amount	2 GB	4 GB	8 GB	4 GB
Type	PC2-5300	PC2-6400	PC3-10700	PC3-10700
Speed (MHz)	666	800	1,334	1,333
Integrated graphics				
Vendor	Intel	Intel	Intel	Intel
Model number	GMA 3100	GMA 4500	HD Graphics 2000	GMA 4500
Discrete graphics				
Number of cards	N/A	N/A	1	N/A
Vendor	N/A	N/A	ATI	N/A
Model number	N/A	N/A	Radeon HD 5450	N/A
VRAM	N/A	N/A	1 GB	N/A
Storage				
Amount	80 GB	160 GB	320 GB	320 GB
Type	SATA 3.0 Gb/s, 7,200 RPM, HDD	SATA 3.0 Gb/s, 7,200 RPM, HDD	SATA 3.0 Gb/s, 7,200 RPM, HDD	SATA 3.0 Gb/s, 7,200 RPM, HDD

System	Dell OptiPlex 755	Dell OptiPlex 960	Dell OptiPlex 990	HP Compaq 6000 Pro Microtower
Connectivity/expansion				
Wired internet	Intel 82566DM-2	Intel 82567LM-3	Intel 82579LM	Intel 82567LM-3
Wireless internet	N/A	N/A	N/A	N/A
Bluetooth	N/A	N/A	N/A	N/A
USB	8 x USB 2.0	8 x USB 2.0	10 x USB 2.0	10 x USB 2.0
Thunderbolt	N/A	N/A	N/A	N/A
Video	1 x VGA	1 x VGA	2 x VGA, 1 x DVI, 1 x Display Port	1 x VGA, 1 x Display Port
Operating system				
Vendor	Microsoft®	Microsoft	Microsoft	Microsoft
Name	Windows 7 Professional	Windows 7 Professional	Windows 7 Professional	Windows 7 Professional
Build number or version	7601	7601	7601	7601
BIOS				
BIOS name and version	Dell A21	Dell A14	Dell A06	Hewlett-Packard 786G2 v02.02

We upgraded all older desktops to the Dell OptiPlex 7440 AIO.

System	Dell OptiPlex 7440 AIO
Processor	
Vendor	Intel
Name	Core i5
Model number	6500
Core frequency	3.20 GHz
Number of cores	4
Cache	6 MB
Memory	
Amount	4 GB
Type	PC4-2133
Speed	1,066
Integrated graphics	
Vendor	Intel
Model number	HD Graphics 350

System	Dell OptiPlex 7440 AIO
Storage	
Amount	500 GB
Type	SATA 6.0 Gb/s, 7,200 RPM, HDD
Connectivity/expansion	
Wired internet	Intel I219LM
Wireless internet	Intel Dual Band Wireless-AC 8260
Bluetooth	4.1
USB	2 x USB 2.0, 6 x USB 3.0
Thunderbolt	N/A
Video	1 x Display Port, 1 x HDMI
Operating system	
Vendor	Microsoft
Name	Windows 8.1 Enterprise
Build number or version	9600
BIOS	
BIOS name and version	Dell 1.3.9

We used a mix of six laptops for legacy systems.

System	Lenovo® ThinkPad® L430	Acer® Aspire® 5532	Dell Latitude E6430s
Processor			
Vendor	Intel	AMD	Intel
Name	Core i5	K8 Athlon	Core i7
Model number	3210M	TF-20	3520M
Core frequency (GHz)	2.50	1.60	2.90
Number of cores	2	2	2
Cache	3 MB L3	N/A	4 MB L3
Memory			
Amount (GB)	4	3	8
Type	DDR3-12800	DDR2-6400	DDR3-12800
Speed (MHz)	1,600	800	1,600

System	Lenovo® ThinkPad® L430	Acer® Aspire® 5532	Dell Latitude E6430s
Integrated graphics			
Vendor	Intel	ATI	Intel
Model number	HD Graphics 4000	Radeon HD 3200	HD Graphics 4000
Storage			
Amount (GB)	160	500	500
Type	SATA 3.0 Gb/s, 7,200, HDD	SATA 3.0 Gb/s, 5,400 RPM, HDD	SATA 6.0 Gb/s, 7,200 RPM, HDD
Connectivity/expansion			
Wired internet	Realtek PCIe GBE Family Controller	Atheros AR8132	Intel 82579LM
Wireless internet	802.11b/g/n	802.11 b/g/n	802.11 a/g/n
Bluetooth	4.0	N/A	4.0
USB	3 x USB 2.0, 1 x USB 3.0	2 x USB 2.0	1 x USB 2.0/eSATA, 2 x USB 3.0
Thunderbolt	N/A	N/A	N/A
Video	1 x VGA, 1 x Display Port	1 x VGA	1 x VGA, 1 x HDMI
Display			
Size	14"	15.6"	14"
Type	HD LED WXGA	HD LCD	HD LED WXGA
Resolution	1,366 x 768	1,366 x 768	1,366 x 768
Touchscreen	No	No	No
Operating system			
Vendor	Microsoft	Microsoft	Microsoft
Name	Windows 7 Professional	Windows 7 Professional	Windows 7 Professional
Build number or version	7601	7601	7601
BIOS			
BIOS name and version	Lenovo G3ETA5WW(2.56)	Acer V1.07	Dell A16
Dimensions			
Height	1.2"	1.6"	1.2"
Width	13.9"	14.6"	13.1"
Depth	9.5"	9.7"	8.8"
Weight	5 lbs.	8.4 lbs.	4.6 lbs.

System	Dell Latitude E6400	Dell Latitude E5420	Dell Precision M4600
Processor			
Vendor	Intel	Intel	Intel
Name	Core 2 Duo	Core i5	Core i7
Model number	P8600	2430M	2720QM
Core frequency (GHz)	2.4	2.4	2.2
Number of cores	2	2	4
Cache	N/A	3 MB L3	6 MB L3
Memory			
Amount (GB)	4	2	8
Type	DDR2-6400	DDR3-10700	DDR3-10700
Speed (MHz)	800	1,333	1,333
Integrated graphics			
Vendor	Intel	Intel	ATI
Model number	GMA 4500HD	HD Graphics 3000	FirePro M5950 (FireGL)
Storage			
Amount (GB)	160	250	256
Type	SATA 3.0 Gb/s, 7,200 RPM, HDD	SATA 3.0 Gb/s, 5,400 RPM, HDD	SATA 3.0 Gb/s, SSD
Connectivity/expansion			
Wired internet	Intel 82567LM	Broadcom® NetXtreme® 57xx	Intel 82579LM
Wireless internet	802.11a/b/g	802.11 a/g/n	802.11a/b/g/n
Bluetooth	N/A	3.0	N/A
USB	3 x USB 3.0, 1 x e/SATA/USB 2.0	4 x USB 2.0	3 x USB 2.0, 2 x USB 3.0
Thunderbolt	N/A	N/A	N/A
Video	VGA, Display Port	1 x VGA, 1 x HDMI	VGA, HDMI, Display Port
Display			
Size	14.1"	14"	15.6"
Type	WXGA	Active Matrix TFT Color LCD	LED – backlit
Resolution	1,280 x 800	1,366 x 768	1,366 x 768
Touchscreen	No	No	No

System	Dell Latitude E6400	Dell Latitude E5420	Dell Precision M4600
Operating system			
Vendor	Microsoft	Microsoft	Microsoft
Name	Windows 7 Professional	Windows 7 Professional	Windows 7 Professional
Build number or version	7601	7601	7601
BIOS			
BIOS name and version	Dell A32	Dell A14	Dell A07
Dimensions			
Height	1.0"	1.2"	1.4"
Width	13.2"	13.7"	14.8"
Depth	9.4"	9.4"	10.0"
Weight	5.2 lbs.	5.1 lbs.	6.5 lbs.

We upgraded the older laptops to a mix of Dell Latitude E5470 and Dell Latitude E7270 laptops.

System	Dell Latitude E6400	Dell Latitude E7270
Processor		
Vendor	Intel	Intel
Name	Core i5	Core i5
Model number	6200U	6300U
Core frequency (GHz)	2.30	2.40
Number of cores	2	2
Cache	3 MB L3	3 MB L3
Memory		
Amount (GB)	4	8
Type	DDR4-2133	DDR4-2133
Speed (MHz)	1,066	1,066
Integrated graphics		
Vendor	Intel	Intel
Model number	HD Graphics 520	HD Graphics 520

System	Dell Latitude E6400	Dell Latitude E7270
Storage		
Amount (GB)	500	256
Type	SATA 6.0 Gb/s, 7,200 RPM, HDD	SATA 6.0 Gb/s, SSD
Connectivity/expansion		
Wired internet	Intel I219LM	Intel I219LM
Wireless internet	802.11a/b/g/n/ac	802.11 a/b/g/n/ac
Bluetooth	4.1	4.1
USB	3 x USB 3.0	2 x USB 3.1
Thunderbolt	N/A	N/A
Video	1 x VGA, 1 X HDMI	1 x HDMI, 1 x Display Port
Display		
Size	14.0"	12.5"
Type	Anti Glare LCD	Anti Glare LCD
Resolution	1,366 x 768	1,366 x 768
Touchscreen	No	No
Operating system		
Vendor	Microsoft	Microsoft
Name	Windows 8.1 Enterprise	Windows 8.1 Enterprise
Build number or version	9600	9600
BIOS		
BIOS name and version	Dell 1.3.8	Dell 1.3.0
Dimensions		
Height	0.9"	0.7"
Width	13.2"	12.2"
Depth	9.1"	8.4"
Weight	3.88 lbs.	2.77 lbs.

Appendix B – How we tested

At Principled Technologies, we pride ourselves on the rigor and relevance of our testing. To that end, we followed scientific testing procedures to compare the process of upgrading a mix of ten systems manually vs. using Dell ProDeploy Plus. Because we want you to be able to recreate our results, in this section, we provide all of the steps we followed—our complete testing methodologies.

We captured the time it took to create images, the administrator time required for both upgrade processes, and the total time it took to upgrade the ten systems. At some points during the upgrade process, systems require time to complete tasks, but without administrator intervention. Thus, we include both administrator time (the time the administrator must spend completing the tasks) and total system time (the time the system takes to complete the task). While waiting on systems to complete tasks, administrators can begin tasks on other systems.

Creating the Windows 7 legacy images

We created ten legacy systems to emulate employee legacy systems. We prepared four desktops and six laptops. We used these systems for both the ProDeploy Plus data migration and the manual data migration.

1. Insert the Windows 7 installation DVD, and turn on the test system.
2. Press any key to boot from the DVD.
3. Go through the system setup:
 - a. At the Install Windows screen, accept the default (English) options, and click Next.
 - b. Click Install now.
 - c. Enter the Windows Product Key, and click Next.
 - d. Accept the Microsoft EULA, and click Next.
 - e. Click Custom (advanced).
 - f. Select any partitions, and click Delete.
 - g. Click OK.
 - h. When all of the partitions have been deleted, select the unallocated space, and click Next.
 - i. At the Let's get connected screen, click Skip this step.
 - j. At the Get going fast screen, click Use Express Settings.
 - k. Fill in the User name and password fields, and click Finish.
4. Run Windows Update, and download all available updates:
 - a. Click the Windows Start button, and type `windows update`
 - b. Click Windows Update.
 - c. Click Check for Updates.
5. Download and install any missing drivers (yellow bangs) from the vendor's website.
6. Copy a 691 MB .MOV and a 219 MB .MP4 video file to the Videos directory.
7. Copy a 643 MB corpus of various document types to the Documents directory.
8. Copy a 383 MB corpus of 150 .JPEG files to the Pictures directory.
9. Copy a 503 MB corpus of 77 .MP3 files to the Music directory.
10. Set the Internet Explorer home page to the corporate website, www.principledtechnologies.com.
11. Repeat steps 1 through 10 on all legacy desktops and laptops.

Using Dell ProDeploy Plus

Overview

Dell ProDeploy Plus operates in two separate phases: configuration and deployment. During the configuration phase, we collaborated with the Dell team to set up our order and prepare our image for deployment. This included multiple email and phone conversations, submitting forms, and creating a Windows 8.1 company image, which we captured and submitted using the Dell ImageAssist tool. During the deployment phase, we needed only to help the Dell technician become acclimated to the environment. Thus, deployment times could vary considerably from company to company based on the layout of the building, availability of tools, and the technician completing the deployment. Our results are specific only to our experience.

Collaboration

We timed and recorded the following tasks, which reflect communication and project setup prior to deployment day. We expect that these tasks would vary largely based on the person completing the tasks and the complexity of the deployment.

- After completing the order, the PT admin received a call from the Dell Engagement Manager.
- The PT technician completed the Export compliance form.
- The PT admin created and submitted the deployment image.
- The PT admin discussed technical details with the Engagement Manager via phone.
- The PT admin completed the Dell Migration Tool form.
- The PT admin completed the Technical Specifications form.
- The PT admin completed the Online First Article.
- The PT admin discussed how the file transfers would be completed via email.
- The Dell Engagement Manager called the PT admin to discuss technical details of the submitted image.
- The PT admin called the Dell Engagement Manager to verify that the systems had arrived.

While not explicitly described in the steps below, our timed results include communication pertaining to form submission and image creation.

Creating the Dynamic Image

The following section details the creation of the image to be submitted to Dell for the Dynamic Imaging Deployment. We built the VM using an existing Windows Hyper-V environment.

Dell suggests that you create a VM to create the base image, because it results in an image with fewer driver conflicts when you capture the image using ImageAssist.

Creating a VM

1. Open Hyper-V Manager.
2. Prepare the stopwatch.
3. In the New Virtual Machine Wizard, on the Before You Begin screen, click Next.
4. On the Specify Name and Location screen, for Name: write Win8.1EntImageAssist. Click Next.
5. On the Specify Generation screen, select Generation 2, and click Next.
6. On the Assign Memory screen, for Startup memory: type 8192, and click Next.
7. On the Configure Networking screen, click Next.
8. On the Connect Virtual Hard Disk screen, click Next.
9. On the Installation Options screen, click Next.
10. On the Summary screen, simultaneously click Finish and stop the stopwatch.
11. Record this time as Create VM admin time.

Installing the OS (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and power on the VM.
3. Attach the Windows 8.1 Installation media, and boot to the installation media.
4. On the Windows 8 setup screen, click Install Now.
5. Accept the EULA, and click Next.
6. On the Which type of installation do you want? screen, click Custom Install Windows only (advanced).
7. On the Where do you want to install Windows? screen, delete all previously created partitions, create a new partition for installation, and simultaneously click Next and stop the stopwatch.
8. Record this time as Install OS Admin Time.

Installing the OS (total system time)

1. Prepare the stopwatch.
2. On the Where do you want to install Windows? screen, click Next, and start the stopwatch.
3. Allow Windows to install.
4. Once the installation reaches the Personalize OS screen, stop the stopwatch.
5. Record the time as Install OS System Time.

Personalizing the OS (admin time)

1. Prepare the stopwatch.
2. Once the installation completes, the system will load into the Personalize OS screen. Start the timer when user interaction is allowed.
3. Select a color for your system. Type a name for the system under PC name (we named ours PTAdmin). Click Next.
4. On the Settings screen, click Use express settings.
5. On the Your account screen, enter a User Name, Password, and a Password hint. Then, simultaneously stop the stopwatch and click Next.
6. Record the time as Personalize OS Admin Time.

Personalizing the OS (total system time)

1. Prepare the stopwatch.
2. On the Your account screen, click Next, and start the timer.
3. Allow Windows to finish personalizing your account.
4. Once the system allows user interaction at the desktop, stop the timer.
5. Record the time as Personalize OS System Time.

Updating Windows

1. Run Windows update, and install all important and optional updates available up to April 5, 2016.

Note: Do not install Windows 10. To simulate a corporate laptop, we also set our corporate logo as the desktop background.

2. Capture total administrator time each time user action is required to continue updates. Record this as Windows Updates admin time.
3. While the system is downloading, installing updates, and restarting, record this as Windows Updates system time.

Turning off User Account Control (UAC)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and click the Windows Start button. Type `User Account Control`
3. Select Change User Account Control settings.
4. Move the slider bar down to Never notify, and click OK.
5. Click Yes.
6. Stop the timer.
7. Record the time as Turn off UAC Admin Time.

Disabling the screen saver and setting power options

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and click the Windows Start button. Type `screen saver`
3. Select Turn screen saver on or off.
4. From the drop-down menu, select None, and click Apply.
5. Click Change power settings.
6. Click Change plan settings.
7. Select Never Turn off the display.
8. Stop the timer.
9. Record the time as Set Screen Saver and Power Options Admin Time.

Configuring Windows Update

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and click the Windows Start button. Type `Windows Update`
3. In the main frame, next to Windows Update, click Not configured.
4. In the Windows Update main pane, click Let me choose my settings.
5. Under Important updates, select Check for updates but let me choose whether or not to download and install them, and click OK.
6. In the left pane, click Check for updates, and install all available updates.
7. Close Windows Update.
8. Stop the timer.
9. Record the time as Configure Windows Updates Admin Time.

Configuring Windows Firewall

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and click the Windows Start button. Type `Windows Firewall`
3. In the Overview section, click Windows Firewall Properties.
4. In the Domain Profile tab, for Firewall state, click Off.
5. In the Private Profile tab, for Firewall state, click Off.
6. In the Public Profile tab, for Firewall state, click Off.
7. Click OK.

8. Close the Windows Firewall Properties window.
9. Stop the timer.
10. Record the time as Configure Windows Firewall Admin Time.

Setting up Remote Desktop

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and click the Windows Start button. Type **Allow Remote Access to your computer**
3. Next to Remote Desktop, click Disabled.
4. In the System Properties window, in the Remote Desktop section, select the Allow remote connections to this computer radio button, and when the warning message appears, click OK.
5. Uncheck Allow connections only from computers running Remote Desktop with Network Level Authentication (recommended), and click OK.
6. Stop the timer.
7. Record the time as Setting Up Remote Desktop Admin Time.

Adding corporate file servers

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and open File Explorer.
3. In File Explorer, right-click This PC, and select Map network drive...
4. On the Map Network Drive window, type the address for the shared Folder. Enter credentials as needed, and click Finish.
5. In File Explorer, in the left panel, click and drag the mapped network drives to create shortcuts on the desktop. Also add these locations to Start.
6. Repeat steps 3 through 5 for a second location.
7. Stop the timer.
8. Record the time as Configure Windows Updates Admin Time.

Installing Office 2013 (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and open Internet Explorer.
3. Navigate to <https://mail.office365.com>.
4. Log in, and navigate to the Microsoft Office 365 Pro download page.
5. Download Setup.X64.en-us_O365ProPlusRetail.exe for version 15.0.4753.1003.
6. Run the Office 2013 installation file.
7. In the Microsoft Office 2013 Window, at the Welcome screen, click Next.
8. At the First things first. screen, select Use recommended settings, and click Accept.
9. At the Sign in and get the most out of Office screen, click No thanks, maybe later.
10. At the Meet OneDrive screen, click Next.
11. At the We're getting things ready screen, click No, thanks.
12. Stop the timer.
13. Record the time as Configure Windows Updates Admin Time.

Installing Office 2013 (total system time)

1. Prepare the stopwatch.
2. When you click No, thanks on the We're getting things ready screen, start the stopwatch.
3. Once the installation completes, stop the timer.
4. Record the time as Installing Office 2013 System Time.

Installing Google Chrome (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and open Internet Explorer.
3. Navigate to <https://www.google.com/chrome/index.html>.
4. Click Download, then click Accept, then click Install.
5. At the bottom of the browser, click Run.
6. On the User Account Control Window, click Yes.
7. Wait while Chrome finishes downloading and installing.
8. On the Chrome is almost ready window, click Next.
9. Stop the timer.
10. Record the time as Installing Google Chrome Admin Time.

Installing Google Chrome (total system time)

1. Prepare the stopwatch.
2. On the Chrome is almost ready window, click Next, and start the stopwatch.

3. Once the installation completes, stop the timer.
4. Record the time as Installing Office 2013 Admin Time.

Installing Java (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and open Internet Explorer.
3. Navigate to <http://www.java.com/en/download/win8.jsp>
4. Click Agree and Start Free Download.
5. At the bottom of the browser, click Run.
6. On the User Account Control Window, click Yes.
7. In the Java Setup window, click Install.
8. Wait while Java downloads and installs.
9. On the Java Setup – Complete screen, click Close.
10. Stop the timer.
11. Record the time as Installing Java Admin Time.

Installing Java (total system time)

1. Prepare the stopwatch.
2. Click install on the Java Setup Window and start the stopwatch.
3. Once the installation completes, stop the timer.
4. Record the time as Installing Java System Time.

Installing Adobe Reader (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and open Internet Explorer.
3. Navigate to <https://get.adobe.com/reader/>
4. Deselect the Optional Offers, and click Install now.
5. At the bottom of the browser, click Run.
6. On the User Account Control Window, click Yes.
7. On Adobe Acrobat Reader DC Install, once complete, click Finish.
8. Stop the timer.
9. Record the time as Installing Adobe Reader Admin time.

Installing Adobe Reader (total system time)

1. Prepare the stopwatch
2. Click Finish on the Adobe Acrobat Reader DC Install screen, and start the stopwatch.
3. Once the installation completes, stop the timer.
4. Record the time as Installing Adobe Reader System Time.

Installing Dell ImageAssist (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and open the link at <http://en.community.dell.com/techcenter/enterprise-client/w/wiki/7429>.
3. Download Dell ImageAssist.
4. Unzip and extract the Dell IA.zip file.
5. Launch the Installer.exe.
6. At the ImageAssist EULA, select I agree, and click Next.
7. Click Install.
8. Stop the timer.
9. Record the time as Installing Dell ImageAssist Admin Time.

Installing Dell ImageAssist (total system time)

1. Prepare the stopwatch.
2. When you click Install in the Dell ImageAssist Installer, start the stopwatch.
3. Once the Installation completes, stop the timer.
4. Record the time as Installing Dell ImageAssist System Time.

Creating an image using ImageAssist (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the timer and open Dell ImageAssist.
3. At the Welcome screen, select Defaults.
4. Simultaneously start the auto capture prep tool and stop the timer.
5. Record the time as Image Creation Using ImageAssist – Admin Time.

The ImageAssist tool will prepare your machine for capture. Once complete, the system will reboot and capture the image and save it to the disk.

Creating an image using ImageAssist (total system time)

1. Prepare the stopwatch.
2. When you start the Auto Capture Prep Tool in the ImageAssist tool, start the stopwatch.
3. Once the image capture completes, stop the timer.
4. Record the time as Image Creation Using ImageAssist – System Time.

Using the Dell File Transfer application (admin time)

After we created our image, we submitted it to Dell through the Dell File Transfer application.

1. Open the email from Dell containing the link to access the Dell File Transfer tool.
2. Prepare the stopwatch.
3. Simultaneously start the stopwatch and click the link to go to Dell.com.
4. Log onto Dell.com, and create an account.
5. Using the provided link, download the Dell File Transfer Installation application.
6. Install the Dell File Transfer Installation.
7. Once the installation is complete, navigate to the installation folder, and open FileTransfer.exe.
8. In the Dell File Transfer Window, enter the user information created in step 1, and click login.
9. Select the project.
10. On the Image Source Window, give the file a Friendly Name, and add the image that you would like to upload.
11. On the Summary Page, simultaneously stop the timer and click Scan to start the file transfer.
12. Record the time as Upload the image using Dell File Transfer – Admin Time.

Using the Dell File Transfer application (total system time)

1. Prepare the stopwatch.
2. On the Summary page, when you click Scan, start the stopwatch.
3. When the file transfer completes, stop the timer.
4. Record the time as Upload the image using Dell File Transfer – System Time.

Completing the Image Export Compliance Certification form

Dell required our company to complete the export compliance form where we stated that our image contained no illegal information.

1. Open the email from Dell containing the link to access the Image Export Compliance Certification form.
2. Prepare the stopwatch.
3. Simultaneously start the stopwatch and, from the email instructions sent by Dell, browse to <http://www.dell.com/learn/us/en/555/services/export-compliance-customer-image?c=us&l=en&s=biz&preview=true>, and download the Export Compliance Certification form.
4. Print the form.
5. Fill out the information on the form.
6. Scan the form and save as a PDF.
7. Once the certification form has been completed, send an email to the Global Trade Management Office via US_ConfigurationServices_Export_Compliance@dell.com with the Configuration Services (CFI) project number (SIxxx) in the subject line and the Export Compliance Form PDF attached.
8. Stop the stopwatch, and record this time as Complete Image Export Compliance form Admin Time.

Completing the Dell Migration Tool form (admin time)

The migration tool specified which files, based on file extensions, the Dell Migration Tool would transfer. In order to determine which types of files extensions to include, we reviewed the files added during the legacy system image creation.

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and open the Dell Migration Tool spreadsheet.
3. Review the files added to the Windows 7 legacy image to determine the types of extensions to add to the spreadsheet.
4. Add the following extensions to the cell next to the "Add Additional extensions" cell.
*.pdf, *.abc, *.xyz, *.jpg, *.mp3, *.mov
5. Save the file as DMT [project number].xlsx.
6. Send the file to the Dell project manager.
7. Stop the timer.
8. Record the time as Complete Dell Migration Tool form Admin Time.

Completing the Image Specifications form (admin time)

The Image Specifications form provided details about the submitted image for the Dell engineering team.

1. Open the email from Dell containing the link to access the Dell Imaging Service Image Specifications form.
2. Prepare the stopwatch.
3. Simultaneously start the stopwatch and click the link.
4. We filled out the form as follows.
 - Customer Contact email: N/A
 - Name: N/A
 - Phone number: N/A
 - Will you be the person who will be creating and submitting your image? Yes
 - Do you have a previous image you have already submitted to Dell that you would like to reuse for this particular order? No
 - Please indicate whether your image contains administrator account information. Yes
 - Admin Login: PTadmin
 - Admin Password: Password
 - What OS License have you purchased? Windows 8.1
 - Does your image contain: Volume License Agreement (VLA)
 - Is it an Academic VLA? No
 - Specify format of the image: WIM
 - Is this a GUID Partition Table (GPT) formatted image? Yes
 - Please complete an entry below for each partition on your hard drive. When you have finished adding partitions, please click the link that you have completed entering all your information.

Partition #	Size	File System Type	Partition Type	Partition Function	Image Index Name	Volume Label	Bootable?	Size Adjust?
1	101 MB	NTFS	Primary	ESP/System Reser.		EFI System Partit	<input type="radio"/>	<input type="radio"/>
2	238.08 GB	NTFS	Primary	OS	05	05	<input checked="" type="radio"/>	<input checked="" type="radio"/>
3	300 MB	NTFS	Primary	Recovery			<input type="radio"/>	<input type="radio"/>

5. Stop the timer.
6. Record the time as Complete Image Specifications form Admin Time.

We then received an email confirming the submission of our Image Specifications form. Over the next few days, we also received calls from our Project Manager requesting image submission and resubmission.

Completing the Online First Article (admin time)

For the Online First Article, PT was required to connect via a KVM session and approve the image, which the Dell engineers then uploaded.

1. Open the email from Dell with the subject Dell Online First Article.
2. Prepare the stopwatch.
3. Simultaneously click the download link to install the Viewer Software and start the stopwatch.
4. Select a location to save the file to your computer.
5. Once the download is complete, double-click the file.
6. In the Avocent DSView 4 Session Viewers Window, click Next.
7. On the Select Installation Folder screen, click Next.
8. On the Confirm Installation screen, click Next.
9. On the Installation Complete Screen, click Close.
10. Close all open web browsers.
11. Using a supported web browser, browse to <https://onlinecsaudit.us.dell.com/>. We used Internet Explorer 11.
12. Log in using the credentials in the email.
13. In the DSView 4 Management software, for the provided computer, select KVM Session.
14. When requested, we allowed the plugin to run the browser.
15. In the Avocent Session Viewer, complete the Out-of-Box experience, and verify that your WIM has correctly installed. To do this we double-checked that our desktop had the custom image and our installed applications were available.
16. Respond to the email confirming that the Online First Article meets expectations and can be deployed.
17. Stop the timer.
18. Record the time as Complete Online First Article Admin Time.

After we finished submitting the image and appropriate forms, Dell customized our images to match each model in the deployment. They then deployed the image to each system. After this, they used Next Business Day shipping to send us the laptops. Once the systems arrived, our IT administrator confirmed their arrival with the engineer and scheduled the arrival of the Dell deployment technician.

Deployment using Dell ProDeploy Plus

PT involvement in the deployment phase

The PT admin's involvement in the deployment phase was minimal, though some tasks did require the administrator's assistance. The administrator completed the following tasks during the deployment:

- Introduced Dell technician to environment
- Retrieved longer cables when they were needed
- Retrieved mouse pads
- Retrieved power strips
- Verified deployment completion and escorted the Dell technician to exit

Overview

The following times describe the time required of the Dell technician. During this time the PT administrator did not need to assist the Dell technician in any way. Here is a high level overview of the tasks.

- The Dell technician first deployed three Latitude E7270 laptops.
- While he was finishing deploying the three E7270 laptops, he began deploying the three Latitude E5470 laptops.
- The Dell technician took a break between the Latitude E5470 laptops and the OptiPlex 7440 desktops.
- After the break, the technician completed the deployment of the four OptiPlex 7440 desktops.

Notes on PT timers

PT timer actions are in italic.

Deployment timer

- This timer ran for the entire deployment. It captured the time from the first step of the first system of the first system group, until the final step of the final system of the final system group.

System group timer

- We recorded the deployment time for each model separately. Therefore, we ran three system group timers.
- This timer ran from the first step of the first system until the Dell technician completed the deployment of the final system.

Initial system timer

- We ran a timer for the first system deployed from each system group.
- This measured the time from the first step on the first system of each group until the final step on the first system of each group.
- This timer is equal to the sum of the task timers.

Tasks timers

- We ran several task timers for the first system of each system group. The tasks were completed in the following order:
 - Unbox, plug in, and boot
 - Log in and start transfer
 - Transfer
 - Final tasks and shutdown

Process to deploy each system

The PT observer started all timers when he told the Dell tech to start the deployment.

1. The Dell tech unboxed the new system and removed all components from the box.
2. The Dell tech placed the new system next to the legacy system.
 - If the system was an OptiPlex, he also assembled the new desktop and moved it from the deployment room to the office where the legacy system was located.
3. The Dell tech plugged in the power cord.
4. The Dell tech pressed the power button.
 - The initial system went through the first time boot procedure. This took at least 5 minutes but varied by system.
5. The Dell tech put all extra packaging materials back into the box and put the box in a designated location.
6. The Dell tech booted the legacy system, installed the DMT transfer tool, and connected the transfer cable between the new and old systems.
 - With any remaining time while waiting on the initial new system to finish its first time boot, the Dell tech began to work on the next system.

When the new system allowed user interaction at the "Out of box experience screen", the PT observer stopped the timer for Unbox, plug in, boot and started the timer for Login and start transfer.

7. When the system finished setup and allowed user interaction, the Dell tech completed the out of box experience and the set time zone screens.
 - The system took several minutes to complete the account setup procedure.
8. The Dell tech then installed the DMT transfer tool and started it on both the new and old systems.

When the system showed the transfer progress bar, the PT observer stopped the Log in and start transfer timer, and started the Transfer timer.

9. After the transfer started, the Dell technician didn't have to take further action on the initial system. He worked on the next system slated for deployment until he was able to interact with the initial system again.
 - The time required to process the transfer varied across systems.

When the system showed that the transfer was complete, the PT observer stopped the Transfer timer, and started the Final tasks and shutdown timer.

10. Once the transfer was complete, the Dell tech shut down the new system.
11. The Dell tech unplugged all cords from the new system, wrapped up the cords, and left the system at a designated point.
 - If the system was a laptop, the Dell tech placed the system at the designated drop off point.
 - If the system was an OptiPlex, the Dell tech left the new desktop in its current location and disassembled the old desktop. He placed it onto a cart and returned it to the deployment room at a designated drop off point.

When the Dell tech finished with those steps, the PT observer stopped the Initial system and Final tasks and shutdown timers. The PT observer did not run task timers for subsequent systems after the initial system of each system group.

Process for all systems

The Dell tech repeated the previous tasks on each system to be deployed.

- The Dell tech deployed all laptops without a break. This means that while he was finishing the E7270 group, he had already started working on the E5470 group.
- There was a break between the laptop groups and the OptiPlex groups.

Manual deployment process

Creating Windows 8.1 deployment image

All systems started in their arrival state with all packaging material. Before deploying to other systems, PT created deployment images on the first system of each model. We captured the time for each of these.

Unbox, plug in, and boot (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch, and start unboxing the initial image system.
3. Unbox the system, and place all unnecessary plastic and components back in the box.
4. Plug in the power and Ethernet cables.
5. Simultaneously start the system and stop the stopwatch.
6. Record this time as Unbox, Plug In, Boot Admin time.

Unbox, plug in, and boot (total system time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and boot the system.
3. Stop the stopwatch when the system reaches the Set Up Windows screen.
4. Record this time as Unbox, Plug In, Boot System time.

Setting up Windows 7 (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and click Next on the Set Up Windows screen.
3. Enter a username, and click Next.
4. Leave the password fields empty, and click Next.
5. Enter the Windows product key, and click Next.
6. Accept the license terms, and click Next.
7. Select Ask me later.
8. Set the time zone, date, and time, and click Next.
9. At the Join a wireless network screen, click Skip.
10. When the User Login screen appears, click Log in, and stop the stopwatch.
11. Record this time as Windows 7 Initial Setup Admin Time.

Setting up Windows 7 (total system time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and log in.
3. Stop the stopwatch when the taskbar appears.
4. Record this time as Windows 7 Initial Setup System Time.

Updating Windows 8.1 (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and insert the Windows 8.1 Upgrade DVD.
3. In the AutoPlay pop-up window, click the Run setup.exe button.
4. At the License Terms screen, accept the license terms, and click Accept.
5. At the Choose what to keep screen, check the Keep personal files only checkbox, and click Next.
6. At the Ready to Install screen, click Install, and stop the stopwatch.
7. Record this time as Update to Windows 8.1 Admin Time.

Updating Windows 8.1 (total system time)

1. Prepare the stopwatch.
2. Start the stopwatch when you come to the Installing Windows 8.1 screen.
3. Stop the stopwatch when the Personalize screen appears.
4. Record this time as Update to Windows 8.1 System Time.

Personalizing the OS (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and click Next.
3. Select Skip this step.
4. Select Use express settings.
5. Stop the stopwatch when the taskbar appears.
6. Record this time as Personalize OS Admin Time.

Downloading and installing drivers (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and insert an empty USB key into the administrator's work laptop.
3. Navigate to www.dell.com/support/home/us/en/04.
4. Enter the service tag in the Service Tag field, and click Submit.
5. From the left-hand column, select Drivers and downloads.
6. Select the correct Operating System (Windows 8.1 64 bit).
7. Download Audio, Chipset, Network, Serial ATA, and Video drivers to the USB Key.
8. Once all downloads complete, remove the USB key from the laptop, and insert it into the initial test system.
9. Install the drivers in the following order:
 - a. INF chipset
 - b. Video
 - c. Management Engine
 - d. Network (LAN & WLAN)
 - e. Audio
 - f. Serial ATA
 - g. Anything else that remains
10. When the last driver has been installed, stop the stopwatch.

Updating Windows (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and press the Windows Start button.
3. Type Windows Update.
4. Select the Windows Update button.
5. Click Check for Updates.
6. When updates are found, click Install updates, and stop the stopwatch.
7. Record this time as Windows Updates (Part 1) Admin Time.
8. Repeat steps 1 through 7 two more times to finish installing all updates. Name these timings as Windows Updates (Part 2) Admin Time and Windows Updates (Part 3) Admin Time.

Updating Windows (total system time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and click Install Updates.
3. Stop the stopwatch when the updates have completed and the system has rebooted.
4. Record this time as Windows Updates (Part 1) System Time.
5. Repeat steps 1 through 4 two more times to finish installing all updates. Name these timings as Windows Updates (Part 2) System Time and Windows Updates (Part 3) System Time.

Turning off User Account Control (UAC) (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and click the Windows Start button.
3. Type User Account Control
4. Select Change User Account Control settings.
5. Move the slider bar down to Never notify, and click OK.
6. Click Yes, and stop the stopwatch.
7. Record this time as Turn Off UAC Admin Time.

Disabling the screen saver and setting power options (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and click the Windows Start button.
3. Type Screen Saver
4. Select Turn screen saver on or off.
5. From the drop-down menu, select None, and click Apply.
6. Click Change power settings.
7. Click Change plan settings.
8. Select Never Turn Off the Display, and stop the stopwatch.
9. Record this time as Disable Screen Saver and Set Power Options Admin Time.

Configuring Windows Update (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and click the Windows Start button.
3. Type Windows Update
4. Select Windows Update.
5. Click Change settings.
6. Under Important Updates, select Check for updates but let me choose whether to download and install them, and click OK.
7. Close the Windows Update window, and stop the stopwatch.
8. Record this time as Configuring Windows Update Admin Time.

Configuring Windows Firewall (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and click the Windows Start button.
3. Type Tools
4. Select Administrative Tools.
5. Double-click Windows Firewall with Advanced Security.
6. Click Windows Firewall Properties.
7. In the Domain Profile tab, from the Firewall state drop-down menu, select Off.
8. Select the Private profile tab.
9. From the Firewall state drop-down menu, select Off.
10. Select Public Profile.

11. From the Firewall state drop-down menu, select Off.
12. Click Apply.
13. Click OK, and stop the stopwatch.
14. Record this time as Configuring Windows Firewall Admin Time.

Setting up Remote Desktop (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and click the Windows Start button.
3. Type **Remote Desktop**
4. Select Allow remote access to your computer.
5. In the System Properties window that appears, in the Remote Desktop section, select the Allow remote connections to this computer radio button.
6. When the warning message appears, click OK.
7. Uncheck Allow connections only from computers running Remote Desktop with Network Level Authentication (recommended).
8. Click OK, and stop the stopwatch.
9. Record this time as Setting up Remote Desktop Admin Time.

Adding corporate file servers (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and open File Explorer.
3. Right-click This PC, and select Map Network Drive...
4. In the Map Network Drive window, type the address for the shared folder.
5. Enter Username and Password as needed.
6. Click Finish.
7. Repeat steps 3 through 6 to create another mapped network drive.
8. In File Explorer, in the left panel, click and drag the mapped network drives to the desktop, and stop the stopwatch when the second drive is in place on the desktop.
9. Record this time as Adding Corporate File Servers Admin Time.

Installing Office 2013 x64 (admin time)

1. Prepare the stopwatch.
2. Simultaneously insert the en_office_professional_plus_2013_with_sp1_x64_dvd_3928183 DVD and start the stopwatch.
3. From the autoplay window, click Run setup.exe.
4. At the Read the Microsoft Software License Terms screen, accept the agreement, and click Continue.
5. Click Install Now, and stop the stopwatch.
6. Record this time as Installing Office 2013 x64 Admin Time.

Installing Office 2013 x64 (total system time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and click Install Now.
3. Stop the stopwatch when the installation is complete.
4. Record this time as Installing Office 2013 x64 System Time.

Installing Google Chrome (admin time)

1. Prepare the stopwatch
2. Simultaneously start the stopwatch and open Internet Explorer.
3. Navigate to <https://www.google.com/chrome/index.html>.
4. Click Download Now.
5. Click Accept and Install.
6. At the bottom of the browser, click Run.
7. At the Chrome is almost ready window, click Next, and stop the stopwatch.
8. Record this time as Installing Google Chrome Admin Time.

Installing the latest version of Java (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and open Internet Explorer.
3. Navigate to http://www.java.com/en/download/ie_manual.jsp?locale=en.
4. Click Agree and Start Free Download.
5. At the bottom of the browser, click Run.
6. In the Java Setup window, click Install.
7. On the Get the best of the web with Yahoo screen, uncheck the box for Set Yahoo as your homepage and default search engine on Chrome and Internet Explorer, plus get Yahoo as your new tab page on Chrome, and click Next.
8. On the Java Setup – Complete screen, click Close, and stop the stopwatch.
9. Record this time as Installing Java Admin Time.

Installing the latest version of Adobe Reader (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and open Internet Explorer.
3. Navigate to <https://get.adobe.com/reader/>.
4. Deselect the Optional Offers, and click Install Now.
5. At the bottom of the browser, click Run.
6. When the install completes, click Finish, and stop the stopwatch.
7. Record this time as Installing Adobe Reader Admin Time.

Creating Symantec Ghost 12.0.0.8006 image of the system (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and insert the Ghost 12.0.0.8006 USB Key.
3. Connect an external USB drive to store the image.
4. Boot the PC, and to open the Boot Menu, press F12.
5. In the boot menu, select the Ghost USB Key, and press Enter.
6. In the command window, navigate to the Ghost USB key, and to launch Ghost, type Ghost64.exe.
7. Click OK.
8. Navigate to the Ghost menu via Local→Disk→To Image, and press Enter.
9. Select the local source drive, and click OK.
10. Select the external drive from the drop-down menu.
11. Enter the File Name for the image and an Image File description.
12. Click Save.
13. Select Fast Compression.
14. In the Proceed with Image File Creation window, click Yes, and stop the stopwatch.
15. Record this time as Creating a Ghost Image Admin Time.

Creating a Symantec Ghost 12.0.0.8006 image of the system (total system time)

1. Prepare the stopwatch.
2. Start the stopwatch, and in the Proceed with Image File Creation window, select Yes.
3. Stop the stopwatch when the image creation has completed.
4. Record this time as Creating a Ghost Image System Time.

Note: We completed the following sections on subsequent systems only, but not the initial system, because it was the source of the image.

Unboxing and plugging in the laptop system (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and start unboxing the system.
3. Unbox the system, and place all unnecessary plastic and components back in the box.
4. Plug in the power and Ethernet cables.
5. Open the lid of the system, and stop the stopwatch.
6. Record this time as Unbox, Plug In System time.

Unboxing and assembling the desktop system (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and start unboxing the desktop.
3. Unbox the system, and place all unnecessary plastic and components back in the box.
4. Assemble the new OptiPlex All-in-One desktop.
5. Place the OptiPlex All-in-One desktop and peripherals on a cart, and stop the stopwatch.
6. Record this time as Unbox, Assemble Desktops time.

Moving desktops to offices (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and move the cart to the correct office.
3. Stop the stopwatch when you've reached the designated office.
4. Record this time as Moving Desktops to Offices time.

Setting up desktops in offices (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and start unloading the desktop and peripherals from the cart.
3. Set up the desktop on the office table, and plug in the peripherals.

4. Plug in the power cable.
5. Plug in the Ethernet cable, and stop the stopwatch.
6. Record this time as Setup Desktops in Offices time.

Copying the Symantec Ghost image to additional external drives (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and connect the external USB drive with the Ghost image to a PC.
3. Connect another external USB drive to the PC.
4. Copy the Ghost image from the first external USB drive to the second external USB drive.
5. Stop the stopwatch when the file transfer is complete.
6. Record this time as Copy Symantec Ghost Image to Additional External Drive Admin Time.

Deploying Symantec Ghost 12.0.0.8006 images (admin time)

Note: We did not complete this action on the initial system because it was the source of the image.

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and insert the Ghost 12.0.0.8006 USB Key.
3. Connect the external USB drive with the image created earlier.
4. Boot the PC, and to open the Boot Menu, press F12.
5. In the boot menu, select the Ghost USB Key, and press Enter.
6. In the command window, navigate to the Ghost USB key, and to launch Ghost, type `Ghost64.exe`.
7. Click OK.
8. Navigate to the Ghost menu via Local→Disk→From Image.
9. In the Image file name to restore from window, select the external drive from the drop-down window, and navigate to the image file.
10. Select the image file, and click Open.
11. Select the local destination drive, and click OK.
12. At the Destination Drive Details screen, click OK.
13. In the Proceed with disk restore window, simultaneously click Yes and stop the stopwatch.
14. Record this time as Deploy Ghost Image Admin Time.

Deploying Ghost 12.0.0.8006 images (total system time)

1. Prepare the stopwatch.
2. Start the stopwatch, and in the Proceed with Image File Restoration window, select Yes.
3. Stop the stopwatch when the image restoration has completed.
4. Record this time as Deploying a Ghost Image System Time.

Booting the system and changing the PC name (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and boot the system.
3. When the system has booted, open File Explorer.
4. Right-click This PC, and select Properties.
5. Click Change Settings.
6. Click Change.
7. Enter a new computer name, and click OK.
8. In the Computer Name/Domain Changes pop-up window, click OK.
9. Click Close.
10. At the Restart your computer pop-up, click Restart Now.
11. Stop the stopwatch when the taskbar appears.
12. Record this time as Boot, Change PC Name Admin Time.

Complete the following sections on all systems.

Installing Laplink PCmover Express (admin time)

1. Prepare the stopwatch.
2. Insert the USB key with the Laplink setup.exe into the new system.
3. Double-click the pcmoverupdater.exe to launch the install.
4. On the Welcome screen, select English, and click Next.
5. On the Transferring Programs Saves You Time and Money screen, click No Thanks.
6. On the Welcome to the InstallShield Wizard screen, click Next.
7. At the License Agreement screen, select I accept, and click Next.

8. On the Customer Information screen, enter your email address, and click Next.
9. At the Destination Folder screen, click Next.
10. Click Install.
11. Click Finish.
12. Move to the old system.
13. Repeat steps 2 through 11 on the old system.
14. Stop the stopwatch when you click Finish.
15. Record this time as Install Laplink PCmover Express On Both Systems Admin Time.

Configuring Laplink PCmover Express and starting transfer (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch, and, on the old system in PCmover, click Launch.
3. At the PCmover Tips screen, click Next.
4. At the Welcome to PCmover screen, click Next.
5. At the Preparing Computers for Transfer screen, select Old, and click Next.
6. At the Connection Method screen, select WiFi or Wired Network, and click Next.
7. Switch to the new system, and click Launch in PCmover.
8. At the PCmover Tips screen, click Next.
9. At the Welcome to PCmover screen, click Next.
10. At the Preparing Computers for Transfer screen, select Windows 8.1 or later, and click Next.
11. At the Customize the Transfer screen, choose the User Accounts, Drive Selections, File Filters and Folder Filters that are to be transferred.
12. Click User Account Selections.
13. Click Exclude All Regular Users, and click Done.
14. Click Drive Selections.
15. Highlight any drive that does not have files to transfer, and click Edit Drive.
16. Select the Do Not Transfer This Drive radio button, and click OK.
17. Repeat steps 15 and 16 for every drive listed that does not have files to transfer.
18. Click Done.
19. Click Folder Filters.
20. Expand the menus, deselect any folder that is not to be transferred, and click Done.
21. Click Next.
22. At the Ready to Transfer Screen, click Next, and stop the stopwatch.
23. Record this time as Configure PCmover and Start Transfer Admin Time.

Transferring (total system time)

1. Prepare the stopwatch.
2. Start the stopwatch when the Laplink PCmover Express transfer begins.
3. Stop the stopwatch when the transfer is complete.
4. Record this time as PCmover Transfer System Time.

Shutting down and completing final tasks on laptops (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and shut down the system.
3. When the system completely shuts down, close the lid.
4. Unplug the Ethernet and power cables.
5. Unplug the power brick, and neatly wrap the cord.
6. Place the power brick on the laptop, and stop the stopwatch.
7. Record this time as Shutdown and Final Tasks Admin Time.

Shutting down and completing final tasks on desktops (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and shut down the system.
3. When the system completely shuts down, unplug the peripherals.
4. Unplug the Ethernet cables and power cord.
5. Load the peripherals and cables onto a movable cart.
6. Load the desktop onto the cart, and stop the stopwatch.
7. Record this time as Shutdown and Final Tasks (Desktops) Admin Time.

Completing the inventory process and labeling (admin time)

1. Prepare the stopwatch.
2. Simultaneously boot the system and start the stopwatch.

3. Open the project inventory spreadsheet on the administrator's PC.
4. Enter the project or owner info in the project inventory spreadsheet (project, label, project number).
5. Enter the system information in the project inventory spreadsheet (vendor, model).
6. When the system boots, insert a USB key with CPU-Z 1.76.
7. Launch CPU-Z by double-clicking the cpuz_x64.exe.
8. Record the processor information in the project inventory spreadsheet (QTY, vendor, model, GHz).
9. Click the SPD tab.
10. Record the memory information in the project inventory spreadsheet (QTY, size, type, vendor, model).
11. Close CPU-Z.
12. Click the Windows Start button.
13. Type `Device Manager`, and select Device Manager.
14. Expand the Disk drives entry.
15. Record the drive information in the project inventory spreadsheet (QTY, vendor, model).
16. Launch Internet Explorer, and navigate to the drive manufacturer's website.
17. Locate the manufacturer's specifications sheet on the drive found in Device Manager.
18. Record the rest of the drive information in the project inventory spreadsheet (size, type, speed).
19. Enter the date of arrival and the owner of the system in the project inventory spreadsheet.
20. Open the Master Inventory spreadsheet.
21. Copy all of the information in the project inventory spreadsheet to the master inventory spreadsheet.
22. Close both spreadsheets.
23. Power on the label maker.
24. Enter the project code for the current system being processed.
25. Repeat entering the project code for the current system as many times as there are loose parts of the system (system, power cord, power brick, mouse, keyboard, etc.).
26. Print the labels.
27. Cut the labels.
28. Apply the labels to the system and each loose part, and stop the stopwatch.
29. Record this time as Inventory Process and Labeling Admin Time.

Moving the new AIO desktops to the office space (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and start to move the cart with the new AIO desktops to the office space.
3. Upon arriving at the office space, stop the stopwatch.
4. Record this time as Move AIO to Office Space Admin Time.

Placing the new AIO desktop in an office (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and start moving the AIO and peripherals onto the desk in the office space.
3. Set up the AIO on the desk, and attach the peripherals.
4. Connect the Ethernet cable from the Ethernet port to the system.
5. Plug the power cord into the system and power outlet, and stop the stopwatch.
6. Record this time as Placing the New AIO desktop in an Office Admin Time.

Packing up and remove old desktops (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and start unplugging the desktops.
3. Disconnect all cables, power cords, and peripherals, and place them on a cart.
4. When the last piece of the system is placed on the cart, stop the stopwatch.
5. Record this time as Pack Up and Remove Old Desktops Admin Time.

Moving old desktops to storage (admin time)

1. Prepare the stopwatch.
2. Simultaneously start the stopwatch and start to move the cart with the old desktops to storage.
3. Upon arriving at the storage room, stop the stopwatch.
4. Record this time as Move Old Desktops to Storage Admin Time.

Appendix C – Definitions and assumptions related to our testing

Admin time refers to time the PT admin spent actively involved in a task. Therefore, the admin cannot make progress on other activities during that time.

System time refers to time where the PT admin is waiting for the computer to complete a task. During this time, the admin is unable to work on the relevant system and is free to work on other tasks, such as tasks related to other systems in the deployment. Our test assumes that the admin perfectly utilizes this time to complete other deployment tasks.

Elapsed time refers to combined admin time and system time.

Dell technician time refers to the captured time between when the Dell technician begins and completes a task. During this time the PT admin does not need to be involved and can work on other tasks, even unrelated ones. During deployment the Dell technician was often working on multiple systems at once, so these times do not imply that the technician was working exclusively on the relevant system. Therefore, we use the first system time and the entire group time to calculate average time per additional system.

The following equations apply to Dell technician time, admin time, and elapsed time for each model, when applicable.

Equations

Time to deploy 1 additional system = (total time to deploy entire system group – time to deploy 1 system) / (the number of systems in the group – 1)

Large deployment time estimate = time to deploy 1 system + (time to deploy 1 additional system * the number of additional systems)

Total customer admin time to create the initial image for all three models:

- For ProDeploy Plus: the sum of the admin time to build the base image, create the WIM, and submission using ImageAssist. This includes the following tasks:
 - Create VM
 - Install OS
 - Personalize OS
 - Windows updates
 - Windows updates (part 2)
 - Windows updates (part 3 - no restart required)
 - Turn Off UAC
 - Set screen saver and power options
 - Configure Windows update
 - Configure Windows firewall
 - Set up remote desktop
 - Add corporate file servers
 - Install Office 2013
 - Install Google Chrome™
 - Install Java®
 - Install Adobe® Reader
 - Download Dell ImageAssist
 - Install Dell ImageAssist
 - Create image using ImageAssist
 - Upload the image using Dell File Transfer

- For manual deployment: the sum of the admin times for initial image creation for all three models. Read about initial image creation below.

Total customer admin time to complete deployment project after ordering 10 systems

- For ProDeploy:
 - PT's interaction with Engagement Manager and Dell tech
 - Image creation using ImageAssist
 - PT's interaction with Dell tech onsite
- For Manual Deployment: The sum admin time to complete the entire deployment
- See [Appendix E](#) for more details.

Total time to deploy 10 systems after arrival (3 x E7270s, 3 x E5470s, 4 x 7440s)

- This metric compares the Dell technician's time to the PT admin's time to deploy the systems.
- For ProDeploy: the sum of all Dell technician time during the deployment
- For manual deployment: The sum of all PT admin time during the deployment
- See [Appendix E](#) for more details.

Large deployment time estimate = Time to deploy 1 system of each model + (time to deploy 1 additional system of each model * (the number of additional systems of each model))

For manual deployment

Initial image creation time is the sum time to complete the following tasks

- Unbox, plug in, boot
- Set up Windows 7
- Update to Windows 8.1
- Personalize OS
- Download and install driver
- Update Windows
- Update Windows (part 2)
- Update Windows (part 3 – no restart required)
- Turn off UAC
- Set SS and power options
- Configure Windows update
- Configuring Windows firewall
- Setting up RDP
- Adding corporate file servers
- Install Office 2013
- Install Google Chrome
- Install Java
- Install Adobe Reader
- Capture ghost image

Appendix D – Our claims

Deployment summary

Figure 1 shows the time it took to deploy the systems, broken down by model.

Time to deploy three Dell Latitude E7270 laptops				
	Dell technician	PT admin		
		Admin time	System time	Elapsed time
Deploy 1 system (initial system 1) (hrs:min:sec)	0:23:17	1:12:57	1:41:58	2:54:55
Deploy 1 additional system (hrs:min:sec)	0:16:56	0:28:27	0:08:48	0:37:14
Total time to deploy the entire E7270 group (systems 1-3) (hrs:min:sec)	0:57:08	2:09:51	1:59:33	4:09:24
Time to deploy three Dell Latitude E5470 laptops				
	Dell technician	PT admin		
		Admin time	System time	Elapsed time
Deploy 1 system (initial system 1) (hrs:min:sec)	0:33:01	1:21:16	2:33:10	3:54:26
Deploy 1 additional system (hrs:min:sec)	0:11:09	0:26:30	0:11:10	0:37:39
Total time to deploy the entire E5470 group (systems 1-3) (hrs:min:sec)	0:55:20	2:14:15	2:55:30	5:09:45
Time to deploy four Dell OptiPlex 7440 AIO desktops				
	Dell technician	PT admin		
		Admin time	System time	Elapsed time
Deploy 1 system (initial system 1) (hrs:min:sec)	0:29:10	1:24:34	2:26:37	3:51:11
Deploy 1 additional system (hrs:min:sec)	0:29:08	0:36:10	0:10:01	0:46:11
Total time to deploy the entire 7440 group (systems 1-4) (hrs:min:sec)	1:56:35	3:13:04	2:56:39	6:09:43

Figure 1: Deployment time for the systems, by model.

Figure 2 shows the time it took to the Dell technician to deploy the 6 laptops. These total times are not directly derived from the times in Figure 1, because the technician worked on multiple systems at once when deploying all six laptops. Note: We do not use this time for our 500-system deployment extrapolation calculations, and instead use individual times found in Figure 1.

Time to deploy all six laptops with Dell ProDeploy Plus	
	Dell technician
Deploy 1 system (initial system 1) (hrs:min:sec)	0:33:01
Deploy 1 additional system (hrs:min:sec)	0:12:31
Total time to deploy both E5470s and E7270s (systems 1-6) (hrs:min:sec)	1:25:54

Figure 2: Time to deploy six laptops with Dell ProDeploy Plus.

Figure 3 shows the total deployment time for all 10 systems, both for the Dell technician and the PT admin. Dell technician times use the calculations in Figure 2, reflecting the technician's ability to complete tasks on multiple systems at once.

Total deployment time for 10 systems				
	Dell technician	PT admin		
		Admin time	System time	Elapsed time
Total time to deploy 10 systems (hrs:min:sec)	3:22:29	7:37:10	7:51:42	15:28:52

Figure 3: Total time to deploy ten systems.

Administrator time

Figure 4 presents the in-house administrator time required during the Dell ProDeploy Plus deployment. These tasks need to be completed only once for the entire project. These do not notably increase as the number of systems increases.

In-house admin time during Dell ProDeploy Plus deployment	Admin time (hrs:min:sec)
Task 1 - PT's interaction with Engagement Manager and Dell tech	1:40:58
Task 2 - Image creation using ImageAssist	0:20:30
Task 3 - PT's interaction with Dell tech onsite	1:03:27
Total customer time to complete ProDeploy project after placing the order	3:04:55

Figure 4: Administrator time during Dell ProDeploy Plus engagement.

Figure 5 compares the total in-house administrator time needed to deploy the 10 systems. For further explanation for the manual deployment times, see the Deployment summary in Figures 1 through 3.

Total administrator time for 10-system deployment	
Dell ProDeploy Plus	3:04:55
Manual deployment	7:37:10

Figure 5: In-house administrator time for a 10-system deployment.

Image creation comparison

Figure 6 presents the time it took the PT administrators to create system images for all three models with and without the Dell ProDeploy Plus ImageAssist tool. For the manual image creation, we had to create three separate images in order to customize drivers.

Time to create images with both solutions			
	Admin time	System time	Elapsed time
Dell ProDeploy Plus with ImageAssist	0:20:30	5:05:18	5:25:48
Manual image creation	2:50:11	6:36:11	9:26:22

Figure 6: Image creation times.

Calculations for 500-system deployment

Figure 7 shows the times we estimate for a 500-system deployment of:

- 150 Dell Latitude E7270 laptops
- 150 Dell Latitude E5470 laptops
- 200 Dell OptiPlex 7440 AIO desktops

Estimated times for 500-system deployment			
	Dell ProDeploy Plus	PT admin	
	Dell technician	Admin time	Elapsed time
Deploy 1 E7270 (initial system 1) (hrs:min:sec)	0:23:17	1:12:57	2:54:55
Deploy 149 additional E7270s (estimate) (hrs:min:sec)	42:01:50	70:39:03	92:29:00
Deploy 1 E5470 (initial system 1) (hrs:min:sec)	0:33:01	1:21:16	3:54:26
Deploy 149 additional E5470s (estimate) (hrs:min:sec)	27:42:35	65:47:16	93:31:06
Deploy 1 7440 (initial system 1) (hrs:min:sec)	0:29:10	1:24:34	3:51:11
Deploy 199 additional 7440s (estimate) (hrs:min:sec)	96:38:38	119:57:10	153:09:23
Total time to deploy 500 systems (estimate) (hrs:min:sec)	167:48:31	260:22:15	349:50:01

Figure 7: Time estimates for a 500-system deployment.

Appendix E - Detailed test results

PT's part in ProDeploy Plus

This section describes tasks that the administrator needed to complete for Dell ProDeploy Plus.

Task 1 - PT's interaction with Engagement Manager and Dell tech

Communication and project setup prior to deployment day	Admin time	System time	Elapsed time
First call with Engagement Manager	0:07:11	0:00:00	0:07:11
Complete Image Export Compliance form	0:11:23	0:00:00	0:11:23
Second Call with Engagement Manager	0:08:30	0:00:00	0:08:30
Complete Dell Migration Tool form	0:11:13	0:00:00	0:11:13
Complete Technical Specifications form	0:37:04	0:00:00	0:37:04
Complete Online First Article	0:05:30	0:00:00	0:05:30
Discuss data migration method with engagement manager via email	0:05:27	0:00:00	0:05:27
Discuss image details with Engagement Manager via call	0:07:33	0:00:00	0:07:33
Verify system arrival with Dell technician via call	0:07:07	0:00:00	0:07:07
Total time to set up project	1:40:58	0:00:00	1:40:58

Task 2 - Image creation using ImageAssist

One-time image creation and submission process using ImageAssist	Admin time	System time	Elapsed time
Create VM	0:01:25	0:00:00	0:01:25
Install OS	0:01:19	0:05:42	0:07:01
Personalize OS	0:00:20	0:10:45	0:11:05
Update Windows	0:00:15	2:49:42	2:49:57
Update Windows (part 2)	0:00:16	0:05:21	0:05:37
Update Windows (part 3 - no restart required)	0:00:14	0:00:40	0:00:54
Turn Off UAC	0:00:16	0:00:00	0:00:16
Set screen saver and power options	0:00:22	0:00:00	0:00:22
Configure Windows Update	0:00:21	0:00:00	0:00:21
Configure Windows Firewall	0:00:27	0:00:00	0:00:27
Set up Remote Desktop	0:00:12	0:00:00	0:00:12
Add corporate file servers	0:00:49	0:00:00	0:00:49
Install Office 2013	0:00:43	0:03:36	0:04:19

Install Google Chrome	0:00:59	0:01:46	0:02:45
Install Java	0:02:33	0:00:00	0:02:33
Install Adobe Reader	0:00:49	0:01:12	0:02:01
Download Dell ImageAssist	0:00:45	0:07:26	0:08:11
Install Dell ImageAssist	0:02:01	0:00:28	0:02:29
Create image using ImageAssist	0:02:15	1:25:14	1:27:29
Upload the image using Dell File Transfer	0:04:09	0:13:26	0:17:35
Total time to create and submit image using ImageAssist (one-time process)	0:20:30	5:05:18	5:25:48

Task 3 - PT's interaction with Dell tech onsite

Deployment day assistance to Dell tech	Admin time	System time	Elapsed time
SysAdmin introduces Dell technician to environment	0:35:00	0:00:00	0:35:00
IT admin retrieves longer cables	0:08:22	0:00:00	0:08:22
IT admin retrieves mouse pads	0:06:25	0:00:00	0:06:25
IT admin retrieves power strips	0:03:40	0:00:00	0:03:40
SysAdmin verifies deployment completion and escorts the Dell technician to exit	0:10:00	0:00:00	0:10:00
Total time required on day of deployment	1:03:27	0:00:00	1:03:27

Dell Latitude E7270

This section shows all tasks we completed to deploy each of the 3 Latitude E7270s.

Dell ProDeploy Plus

Time to deploy 1 system (initial system 1)	System 1 (hrs:min:sec)
Unbox, plug in, boot	0:08:02
Log in and start transfer	0:09:13
Transfer	0:04:17
Complete final tasks and shut down	0:01:45
Total time	0:23:17

Additional E7270 details	(hrs:min:sec)
Total time to deploy the entire E7270 group (systems 1-3)	0:57:08
Time to deploy 1 additional system	0:16:56

Total time to deploy both E5470s and E7270s (systems 1-6)	1:25:54
Time to deploy 1 additional system based on Latitude E7270 and Latitude E5470 time, starting with the initial E7270	0:12:31
Time during which the Dell technician was working on both E7270s and E5470s	0:28:46

PT Deployment

Time to deploy one system (initial system 1)	System 1 (hrs:min:sec)		
	Admin time	System time	Elapsed time
Unbox, plug in, boot	0:03:09	0:01:53	0:05:02
Set up Windows 7	0:00:24	0:00:59	0:01:23
Update to Windows 8.1	0:02:35	0:14:21	0:16:56
Personalize OS	0:00:38	0:00:00	0:00:38
Download and install driver	0:36:59	0:00:00	0:36:59
Update Windows	0:00:16	0:49:40	0:49:56
Update Windows (part 2)	0:00:16	0:03:29	0:03:45
Update Windows (part 3 - no restart required)	0:00:17	0:05:17	0:05:34
Turn off UAC	0:00:14	0:00:00	0:00:14
Set SS and power options	0:00:22	0:00:00	0:00:22
Configure Windows Update	0:00:24	0:00:00	0:00:24
Configuring Windows Firewall	0:00:28	0:00:00	0:00:28
Set up RDP	0:00:14	0:00:00	0:00:14
Add corporate file servers	0:00:45	0:00:00	0:00:45
Install Office 2013	0:01:00	0:04:45	0:05:45
Install Google Chrome	0:00:48	0:00:00	0:00:48
Install Java	0:01:08	0:00:00	0:01:08
Install Adobe Reader	0:01:27	0:00:00	0:01:27
Capture ghost image	0:01:40	0:20:26	0:22:06
Install Laplink PCmover on old and new systems	0:05:35	0:00:00	0:05:35
Configure PCmover and start transfer	0:03:25	0:00:00	0:03:25
Transfer	0:00:00	0:01:08	0:01:08
Complete final tasks and shut down	0:01:07	0:00:00	0:01:07
Complete inventory process and labeling	0:09:46	0:00:00	0:09:46
Total time	1:12:57	1:41:58	2:54:55

Time to deploy the remaining two E7270 group	System 2 (hrs:min:sec)			System 3		
	Admin time	System time	Elapsed time	Admin time	System time	Elapsed time
Unbox, plug in, boot	0:02:00	0:00:00	0:02:00	0:01:40	0:00:00	0:01:40
Copy system 1 company ghost image to additional external drives	0:02:09	0:00:00	0:02:09	0:02:09	0:00:00	0:02:09
Deploy system 1 company ghost image to other systems	0:01:45	0:06:11	0:07:56	0:01:44	0:06:04	0:07:48
Boot, change PC name	0:00:59	0:00:00	0:00:59	0:01:03	0:00:00	0:01:03
Install Laplink PCmover on old and new systems	0:06:29	0:00:00	0:06:29	0:08:12	0:00:00	0:08:12
Configure PCmover and start transfer	0:04:00	0:00:00	0:04:00	0:02:52	0:00:00	0:02:52
Transfer	0:00:00	0:04:18	0:04:18	0:00:00	0:01:02	0:01:02
Complete final tasks and shut down	0:01:17	0:00:00	0:01:17	0:01:03	0:00:00	0:01:03
Complete inventory process and labeling	0:09:46	0:00:00	0:09:46	0:09:46	0:00:00	0:09:46
Total time	0:28:25	0:10:29	0:38:54	0:28:29	0:07:06	0:35:35

Summary by system	Admin time	System time	Elapsed time
System 1	1:12:57	1:41:58	2:54:55
System 2	0:28:25	0:10:29	0:38:54
System 3	0:28:29	0:07:06	0:35:35
Total times for the entire group	2:09:51	1:59:33	4:09:24

Calculations based on above numbers	Admin time	System time	Elapsed time
Initial image creation	0:53:04	1:40:50	2:33:54
Combined deployment time for systems 2 & 3	0:56:54	0:17:35	1:14:29
Time to deploy 1 additional system	0:28:27	0:08:48	0:37:14
Total admin time to deploy the entire E7270 group (Systems 1-3)	2:09:51	1:59:33	4:09:24

Dell Latitude E5470

This section shows all tasks we completed to deploy each of the 3 Latitude E5470s.

Dell ProDeploy Plus

Time to deploy one system (initial system 1)	System 1 (hrs:min:sec)
Unbox, plug in, boot	0:09:07
Log in and start transfer	0:09:11
Transfer	0:13:10
Complete final tasks and shut down	0:01:33
Total time	0:33:01

Additional E5470 details	(hrs:min:sec)
Total time to deploy the entire E5470 group (Systems 1-3)	0:55:20
Time to deploy 1 additional system	0:11:09

PT Deployment

Time to deploy one system (initial system 1)	System 1 (hrs:min:sec)		
	Admin time	System time	Elapsed time
Unbox, plug in, boot	0:01:52	0:06:22	0:08:14
Set up Windows 7	0:00:37	0:01:26	0:02:03
Update to Windows 8.1	0:03:41	0:27:08	0:30:49
Personalize OS	0:01:38	0:00:00	0:01:38
Download and install driver	0:41:00	0:00:00	0:41:00
Update Windows	0:00:17	1:25:02	1:25:19
Update Windows (part 2)	0:00:19	0:03:59	0:04:18
Update Windows (part 3 - no restart required)	0:00:19	0:07:27	0:07:46
Turn off UAC	0:00:13	0:00:00	0:00:13
Set SS and power options	0:00:24	0:00:00	0:00:24
Configure Windows Update	0:00:20	0:00:00	0:00:20
Configure Windows Firewall	0:00:31	0:00:00	0:00:31
Set up RDP	0:00:15	0:00:00	0:00:15
Add corporate file servers	0:00:43	0:00:00	0:00:43

Install Office 2013	0:00:59	0:07:59	0:08:58
Install Google Chrome	0:01:32	0:00:00	0:01:32
Install Java	0:01:33	0:00:00	0:01:33
Install Adobe Reader	0:01:55	0:00:00	0:01:55
Capture ghost image	0:01:53	0:11:04	0:12:57
Install Laplink PCmover on old and new systems	0:07:06	0:00:00	0:07:06
Configure PCmover and start transfer	0:02:31	0:00:00	0:02:31
Transfer	0:00:00	0:02:43	0:02:43
Complete final tasks and shut down	0:01:42	0:00:00	0:01:42
Complete inventory process and labeling	0:09:56	0:00:00	0:09:56
Total time	1:21:16	2:33:10	3:54:26

Time to deploy the remaining two E5470 group	System 2 (hrs:min:sec)			System 3		
	Admin time	System time	Elapsed time	Admin time	System time	Elapsed time
Unbox, plug in, boot	0:01:55	0:00:00	0:01:55	0:01:41	0:00:00	0:01:41
Copy system 1 company ghost image to additional external drives	0:02:17	0:00:00	0:02:17	0:02:17	0:00:00	0:02:17
Deploy system 1 company ghost image to other systems	0:02:11	0:09:48	0:11:59	0:02:02	0:10:06	0:12:08
Boot, change PC name	0:01:55	0:00:00	0:01:55	0:01:55	0:00:00	0:01:55
Install Laplink PCmover on old and new systems	0:03:59	0:00:00	0:03:59	0:04:21	0:00:00	0:04:21
Configure PCmover and start transfer	0:02:17	0:00:00	0:02:17	0:02:11	0:00:00	0:02:11
Transfer	0:00:00	0:01:13	0:01:13	0:00:00	0:01:13	0:01:13
Complete final tasks and shut down	0:02:08	0:00:00	0:02:08	0:01:58	0:00:00	0:01:58
Complete inventory process and labeling	0:09:56	0:00:00	0:09:56	0:09:56	0:00:00	0:09:56
Total time	0:26:38	0:11:01	0:37:39	0:26:21	0:11:19	0:37:40

Summary by system	Admin time	System time	Elapsed time
System 1	1:21:16	2:33:10	3:54:26
System 2	0:26:38	0:11:01	0:37:39
System 3	0:26:21	0:11:19	0:37:40
Total times for the entire group	2:14:15	2:55:30	5:09:45

Calculations based on above numbers	Admin time	System time	Elapsed time
Initial image creation	1:00:01	2:30:27	3:30:28
Combined deployment time for system 2 & 3	0:52:59	0:22:20	1:15:19
Time to deploy 1 additional system	0:26:30	0:11:10	0:37:39
Total time to deploy the entire E5470 group (Systems 1-3)	2:14:15	2:55:30	5:09:45

Dell OptiPlex 7440

This section shows all tasks we completed to deploy each of the 4 Optiplex 7440s.

ProDeploy Plus

Time to deploy one system (initial system 1)	System 1 (hrs:min:sec)
Unbox, plug in, boot	0:12:48
Log in and start transfer	0:04:28
Transfer	0:06:06
Complete final tasks & shut down	0:05:48
Total time	0:29:10

Additional 7440 details	(hrs:min:sec)
Total time to deploy the entire 7440 group (Systems 1-4)	1:56:35
Time to deploy 1 additional system	0:29:08

PT Deployment

Time to deploy one system (initial system 1)	System 1 (hrs:min:sec)		
	Admin time	System time	Elapsed time
Unbox, plug in, boot	0:06:06	0:06:09	0:12:15
Set up Windows 7	0:00:36	0:02:01	0:02:37
Update to Windows 8.1	0:03:47	0:25:08	0:28:55
Personalize OS	0:01:42	0:00:00	0:01:42
Download and install driver	0:33:58	0:00:00	0:33:58
Update Windows	0:00:14	1:16:16	1:16:30
Update Windows (part 2)	0:00:19	0:04:12	0:04:31
Update Windows (part 3 - no restart required)	0:00:20	0:07:19	0:07:39
Turn off UAC	0:00:15	0:00:00	0:00:15

Set SS and power options	0:00:21	0:00:00	0:00:21
Configure Windows Update	0:00:18	0:00:00	0:00:18
Configure Windows Firewall	0:00:32	0:00:00	0:00:32
Set up RDP	0:00:14	0:00:00	0:00:14
Add corporate file servers	0:00:42	0:00:00	0:00:42
Install Office 2013	0:01:15	0:06:53	0:08:08
Install Google Chrome	0:01:35	0:00:00	0:01:35
Install Java	0:01:10	0:00:00	0:01:10
Install Adobe Reader	0:02:00	0:00:00	0:02:00
Capture ghost Image	0:01:42	0:16:56	0:18:38
Install Laplink PCmover on old and new systems	0:06:47	0:00:00	0:06:47
Configure PCmover and start transfer	0:02:48	0:00:00	0:02:48
Transfer	0:00:00	0:01:43	0:01:43
Complete final tasks and shut down	0:01:49	0:00:00	0:01:49
Complete inventory process and labeling	0:10:32	0:00:00	0:10:32
Move the new AIO to the office space	0:01:03	0:00:00	0:01:03
Place the new AIO on the desk and connect all cables and cords	0:01:32	0:00:00	0:01:32
Remove old desktop computer from office space	0:01:59	0:00:00	0:01:59
Transfer old desktop computer to storage room	0:00:58	0:00:00	0:00:58
Total time	1:24:34	2:26:37	3:51:11

Time to deploy the remaining three 7440 group	System 2 (hrs:min:sec)			System 3			System 4		
	Admin time	System time	Elapsed time	Admin time	System time	Elapsed time	Admin time	System time	Elapsed time
Unbox, plug in, boot	0:04:16	0:00:00	0:04:16	0:04:52	0:00:00	0:04:52	0:04:02	0:00:00	0:04:02
Time to copy system 1 company ghost image to additional external drives	0:02:04	0:00:00	0:02:04	0:02:04	0:00:00	0:02:04	0:02:04	0:00:00	0:02:04
Deploy system 1 company ghost image to other systems	0:01:49	0:09:08	0:09:08	0:01:38	0:08:01	0:09:39	0:01:40	0:09:02	0:10:42
Boot, change PC name	0:01:54	0:00:00	0:01:54	0:01:50	0:00:00	0:01:50	0:02:14	0:00:00	0:02:14
Install Laplink PCmover on old and new systems	0:06:31	0:00:00	0:06:31	0:05:22	0:00:00	0:05:22	0:06:13	0:00:00	0:06:13
Configure PCmover and start transfer	0:04:04	0:00:00	0:04:04	0:02:23	0:00:00	0:02:23	0:02:23	0:00:00	0:02:23

Transfer	0:00:00	0:01:27	0:01:27	0:00:00	0:01:08	0:01:08	0:00:00	0:01:16	0:01:16
Complete final tasks and shut down	0:01:20	0:00:00	0:01:20	0:01:20	0:00:00	0:01:20	0:01:47	0:00:00	0:01:47
Complete Inventory process and labeling	0:10:32	0:00:00	0:10:32	0:10:32	0:00:00	0:10:32	0:10:32	0:00:00	0:10:32
Move the new AIO to the office space	0:01:03	0:00:00	0:01:03	0:01:03	0:00:00	0:01:03	0:01:03	0:00:00	0:01:03
Place the new AIO on the desk and connect all cables and cords	0:01:36	0:00:00	0:01:36	0:02:01	0:00:00	0:02:01	0:01:34	0:00:00	0:01:34
Remove old desktop computer from office space	0:02:05	0:00:00	0:02:05	0:01:43	0:00:00	0:01:43	0:01:51	0:00:00	0:01:51
Transfer old desktop computer to storage room	0:00:58	0:00:00	0:00:58	0:00:58	0:00:00	0:00:58	0:00:58	0:00:00	0:00:58
Total ime	0:36:23	0:10:35	0:46:58	0:35:46	0:09:09	0:44:55	0:36:21	0:10:18	0:46:39

Summary by system	Admin time	System time	Elapsed time
System 1	1:24:34	2:26:37	3:51:11
System 2	0:36:23	0:10:35	0:46:58
System 3	0:35:46	0:09:09	0:44:55
System 4	0:36:21	0:10:18	0:46:39
Total times for the entire group	3:13:04	2:56:39	6:09:43

Calculations based on above numbers	Admin time	System time	Elapsed time
Initial image creation	0:57:06	2:24:54	3:22:00
Combined deployment time for Systems 2, 3, & 4	1:48:30	0:30:02	2:18:32
Time to deploy 1 additional system	0:36:10	0:10:01	0:46:11
Total time to deploy the entire 7440 group (Systems 1-4)	3:13:04	2:56:39	6:09:43

This project was commissioned by Dell.



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