TABLETS IN LARGE ENTERPRISES: DELL LATITUDE 10 WITH WINDOWS 8 VS. APPLE IPAD

Dell™ Latitude™ 10

powered by dual core Intel® Atom™ processor Z2760 delivered lower management costs on large enterprise deployments:

17x faster and **94%** cheaper deployment
saving 580 hours in system prep and applications installation

85% cheaper to manage
over the span of three years

99% faster software updates
saving 197 hours

vs. the Apple® iPad®, based on 1,000 tablets.

Enterprises purchasing tablets for use by employees have a wide variety of options available. Choosing a model that is easy and quick to deploy, maintain, update, and restore to deployment state can dramatically reduce the time that the IT department must spend on management, which can save a great deal of money over the lifecycle of the device. A model that does not require additional computers for printing hubs and management tasks also contributes to savings.

We performed an analysis for a hypothetical enterprise that purchases and deploys 1,000 tablets and maintains them over three years. We compared how much time the enterprise IT staff would spend with two different tablets, the Dell Latitude 10 powered by the dual core Intel Atom processor Z2760 and running Microsoft® Windows® 8 and the Apple iPad. To learn more about the job of managing these tablets, we timed a technician performing a subset of typical IT tasks. We also calculated the amount of additional hardware that each solution would require purchasing.

We found that when we considered IT staff time on this subset of tasks and additional expenses, each Latitude 10 tablet would cost the enterprise $215.84 less to manage over the course of three years than the iPad would cost to manage over that same period. That is a savings of 85.1 percent.

MANAGEMENT MATTERS

Acquiring tablets for employees to use is only the beginning. Over the years that an enterprise owns a tablet, IT staff can devote many hours to taking care of it—from the initial configuration and setup process to periodic software updates to fixing any problems that arise. You can reduce this time by selecting a tablet that is easy to incorporate into the existing infrastructure and quick to deploy and update because you can use the same tools and processes to manage tablets that you use to manage desktop and notebook systems.

The Dell Latitude 10, which runs the full-featured Windows 8 Pro operating system, fully supports x86-based applications to ensure employee productivity and can easily join an existing Windows-based management environment. Compared to the Apple iPad, it also requires far less time for IT to set up, maintain, and manage. Because a centralized IT department can manage the Latitude 10 using the enterprise system's network and Microsoft System Center 2012 Configuration Manager (SCCM), it reduces the number of visits required for management and support tasks, saving time and money. The Dell tablet can deliver further savings by allowing enterprises to use existing software licenses of productivity software such as Microsoft Office.

The 32GB iPad, which offers 24.5 GB of space for apps and data, is $599 while the 64GB Latitude 10, which offers 38 GB of space for apps and data, is $649. However, for an enterprise that must pay IT staff to manage the devices, there is far more to the cost of tablets than the initial acquisition price.

While many enterprise IT departments have packages in house to configure and manage Windows devices, fewer have the mobile device management (MDM) tools that can manage iPads. As a result, iPad administration is often a series of time-consuming manual tasks. While adopting an MDM solution could greatly improve manageability of iPads, doing so would have its own costs—not only for the software itself, but also for the time spent researching the many options and training IT staff to use the new solution.

THE DETAILS OF OUR ANALYSIS

Below we discuss the costs in our analysis, both the one-time costs associated with setting up the enterprise's file and print infrastructure to support the tablets and basic device setup, and the ongoing costs concerning device management.

One-time setup costs
Printing infrastructure costs

- **Dell Latitude 10.** Because these tablets can use the printers and printing procedures already in place for notebooks and desktops, we include no additional costs for printing infrastructure.

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- **Apple iPad.** The iPad printing solution we chose requires at least one workstation (either Windows or Macintosh) per building configured with the appropriate software to serve as a printing hub. We assume the 1,000 iPads in this model need 10 such workstations and estimate the costs for each at $500.00. For 1,000 iPads, this comes to $5.00 per tablet.

Printer setup

- **Dell Latitude 10.** Because these tablets can use the printers and printing procedures already in place for notebooks and desktops, we include only the time to print a test page 10 times, or once for each printer workstation.
- **Apple iPad.** We timed setting up the workstations serving as printer hubs and divided this time among the 1,000 iPads. We also timed manually setting up each iPad to print. We also included the time to print a test page once for each printer workstation.

For both, we calculated the cost of staff time to complete this task for all the employee devices. We divided that total time by 1,000 to get a per-device cost for the employee tablets.

Device setup

- **Dell Latitude 10.** We timed the creation of a base image with Windows updates, applications such as Microsoft Office and the SCCM client. We then created a snapshot that would allow users to retain their applications after an OS refresh. Once the base image was created, we used Windows Assessment and Deployment Kit to capture the image via USB drives. We then deployed the image onto our Latitude 10. We assumed that IT could image 10 Latitude 10 tablets at a time using multiple USB devices.
- **Apple iPad.** We timed the manual steps of turning on the device, going through the initial system menus, and installing apps on the device. We chose a sample of popular enterprise and productivity apps.

For both, we calculated the staff cost of this time to carry out this task for all the employee devices. We divided that total time by 1,000 to get a per-device cost for the employee tablets.

Ongoing costs
Battery replacement

We estimate that 50 percent of batteries require replacement as they come to the end of their three-year lifecycle.

- **Dell Latitude 10.** The Latitude 10 allows IT departments to quickly and easily replace batteries in house for minimal downtime.

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- **Apple iPad.** IT staff cannot replace the battery on site, but must send the device to Apple. Prior to doing so, they must wipe all enterprise data and configure a replacement device for the employee to use.

Management computers

- **Dell Latitude 10.** The Dell tablets need no additional management computers. We assume they use the ones already in place for managing notebooks and desktops.
- **Apple iPad.** We include the cost of five computers to help with iPad deployment. These computers would have iTunes installed to assist in backups, restores, device syncs, and other iPad-related tasks. We priced these computers at $500.00 each, the same as the computers serving as printer hubs.

Figure 1 summarizes our analysis.

	Dell Latitude 10	Apple iPad	Notes
Management costs per device			
Deploying the tablet	$1.16	$19.47	
Setting up printing	N/A	$0.40	
Updating software	$0.12	$145.74	
Replacing the battery	$5.34	$20.26	
Restoring the device	$3.60	$4.86	
Total management costs	**$10.22**	**$190.73**	Savings with Dell is 94.6%.
Additional hardware costs per device			
Setting up printing	N/A	$5.00	10 printer workstations at $500 each are required. For 1,000 devices, average cost per device is $5.
Replacing the battery	$27.65	$52.98	50% of the cost of a replacement battery for each device (assumes 50% of batteries are replaced)
Restoring the device	N/A	$5.00	10 management computers with iTunes at $500 each are required. For 1,000 devices, average cost per device is $5.
Total additional costs	**$27.65**	**$62.98**	Savings with Dell is 56.1%.
Total costs per device when managing 1,000 devices	**$37.87**	**$253.70**	Savings with Dell is 85.1%.

Figure 1: Additional hardware costs and setup and management costs for the two tablets over three years.

Additional considerations

The costs we discuss above, which would apply to any large deployment of tablets, form a baseline for the cost savings an enterprise could enjoy by selecting the Windows 8-based Dell Latitude 10. In this section, we discuss several additional issues that could boost the cost savings of this solution enormously. We exclude them from our analysis because they are challenging to quantify and will not apply to all situations. However, their importance should not be overlooked.

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- Mobile-device-management solutions could solve many iPad management issues, but come with many costs of their own, including initial purchase price, monthly fees per device, time to find the right MDM solution, time and cost of implementing the new MDM and any additional hardware purchases, and the time and cost of training to use the MDM solution.
- Existing software and software licenses for Windows machines may be able to be applied to the Latitude 10s if the tablets are replacing existing laptops or desktops, or if the licenses are user-based and allow multiple installations. Regardless of how the licenses work, the software would be unusable on the iPads.
- Because iPads lack many basic functionality ports such as USB or mHDMI, companies would have to spend money on adapters and dongles to supply the iPads with the same functionality the Latitude 10 has by default.

FROM OUR LABS: MANAGING A THOUSAND DELL LATITUDE 10 TABLETS WOULD TAKE LESS TIME

We identified a set of basic management tasks—deploying the tablets, setting them up for printing, updating software, replacing the batteries, and restoring devices to deployment state—and timed a technician performing them on both the Dell Latitude 10 and the Apple iPad. We then extrapolated that data to 1,000 devices to show the kind of time savings an enterprise is likely to realize in a large deployment.

We found that while performing some of our sample management tasks on a single Dell tablet took longer than on a single Apple iPad, the Latitude 10 delivered an economy of scale such that performing tasks on all 1,000 tablets would require dramatically less time than on doing so on 1,000 iPads. The reason for this is that the Windows 8-based Dell tablet supports Active Directory®-based management tools such as SCCM. Whatever tools or management software an enterprise already uses to manage Windows desktops and notebooks would allow IT departments to deploy applications and updates and perform other tasks simultaneously on all managed devices.

Figures 2 and 3 summarize our findings. As Figure 2 shows, when performing the workflows on a single tablet, the technician spent more time overall with the Dell Latitude 10.

However, when we extrapolated our findings to 1,000 tablets, the picture was very different. As Figure 3 shows, the workflow that took much longer on a single Latitude 10 tablet—deploying the tablet—took a small fraction of the time when looking at the full 1,000-tablet picture.
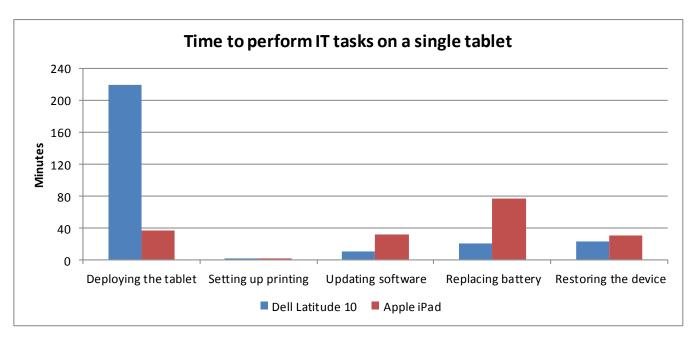
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Time to perform IT tasks on a single tablet

Figure 2: Time in minutes our test technicians needed to complete management tasks on a single device.

Time to perform IT tasks on 1,000 tablets

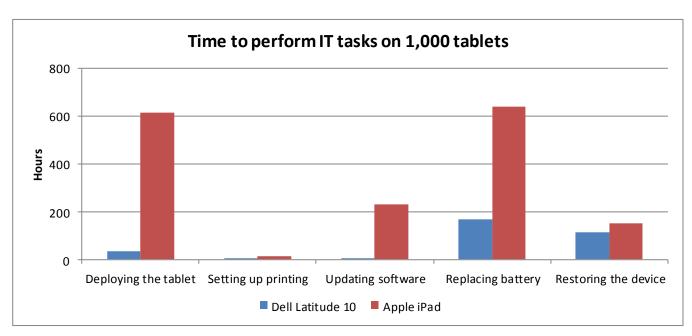
Figure 3: Time in hours that IT staff would need to complete the tasks on 1,000 tablets, extrapolated from our single-tablet results.

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WHAT WE FOUND

Figure 4 summarizes the time and expense that the IT staff of our hypothetical enterprise would spend taking care of 1,000 tablets over three years.[1] As it shows, the management and support costs of the Dell Latitude 10 are dramatically lower than those for the Apple iPad.

	Dell Latitude 10		Apple iPad		Savings with Dell Latitude 10
	Hours	Cost	Hours	Cost	
Deploying the tablet	36.57	$1,155.25	616.33	$19,469.86	94.07%
Setting up printing	0.15	$4.74	12.58	$397.40	98.81%
Updating software	3.68	$116.25	4,613.33	$145,735.09	99.92%
Replacing the battery	169.06	$5,340.61	641.5	$20,264.99	73.65%
Restoring the device	113.95	$3,599.68	153.85	$4,860.12	25.93%
Total for 1,000 devices	323.41	$10,216.52	6,037.59	$190,727.47	94.64%
Total per device when managing 1,000 devices	**0.32**	**$10.22**	**6.04**	**$190.73**	**94.64%**

Figure 4: Summary of management time in hours for 1,000 devices over three years. Costs are based on an hourly IT technician rate of $31.59.

Deploying the tablets

Before a tablet can be of use to an employee, IT staff must prepare the device with the approved applications and software. Figure 5 presents the time it took for us to perform initial deployment on the tablets, along with the time it would take to complete the same task on 1,000 tablets. Because the Latitude uses Microsoft SCCM, the task of deploying 1,000 Dell Latitude 10 tablets would take IT staff about a week, versus 3 or 4 months for Apple iPads.

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[1] We estimate staff time cost using an hourly rate of $31.59 for a technician receiving a salary of $40,992 ($60,658 with benefits) based on 48 40-hour workweeks. We base this on a December 2012 average salary from Salary.com for a PC Maintenance Technician.

	One device		1,000 devices			Notes
	Latitude 10 (minutes)	iPad (minutes)	Latitude 10 (hours)	iPad (hours)	Latitude % faster	
Configuring the device	131.36	36.98	2.19	616.33	99.64%	Running through the initial sysprep, installing applications, etc. Performed manually on each iPad; performed once on the Latitude 10.
Capturing the image	67.66	N/A	1.13	N/A	N/A	Performed once on the Latitude, and consists of using USB devices created with Windows ADK to capture the base IT image.
Deploying the image	19.95	N/A	33.25	N/A	N/A	Using USB devices, we deployed the base IT image to the Latitude 10. We extrapolated that one IT administrator could image 10 Latitudes at a time via this process
Workflow total	**218.97**	**36.98**	**36.57**	**616.33**	**94.07%**	

Figure 5: Initial deployment times for the tablets.

Setting up printing

When IT staff deploy tablets, they must ensure that each employee can connect and print to the appropriate printer. Because the iPad needs a workstation to act as a print server, it requires several additional steps for IT—not to mention the cost of the print servers. Because the Latitude can print directly, these expenses are unnecessary.

Figure 6 presents the time it took for us to set up the tablets for printing, along with the time it would take to complete the same task on 1,000 tablets. Because IT staff would only need to print a test page for each of the 10 printer hubs, setting up printing would be a matter of minutes rather than hours.

	One device		1,000 devices			Notes
	Latitude 10 (minutes)	iPad (minutes)	Latitude 10 (hours)	iPad (hours)	Latitude % faster	
Time to set up workstation	N/A	0.56	N/A	0.09	N/A	Required as a go-between for iPads and wireless printers. Assumes 10 printer hubs in the enterprise
Time to set up device	N/A	0.74	N/A	12.33	N/A	Performed manually on each iPad.
Time to print a test page	0.87	0.92	0.15	0.15	5.25%	Performed manually once on each printer, iPads and Latitudes alike (we assume 10 printer hubs)
Workflow total	**0.87**	**2.22**	**0.15**	**12.58**	**98.85%**	

Figure 6: Printer setup times for the tablets.

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Performing software updates

Throughout a tablet's life, IT staff must apply software updates to keep applications running as they should and take advantage of the newest features. The Dell Latitude 10's use of SCCM makes this an 11-minute task for IT, whereas the manual process on the Apple iPad would take many weeks to complete.

Figure 7 presents the time it took for us to perform software updates on the tablets, along with the time it would take to complete the same task on 1,000 tablets.

	One device		1,000 devices			Notes
	Latitude 10 (minutes)	iPad (minutes)	Latitude 10 (hours)	iPad (hours)	Latitude % faster	
Time to travel to the tablet	N/A	20.00	N/A	33.33	N/A	We calculated 10 tablets per site with travel time between sites for the iPad.
Time to install the update	11.03	11.84	0.18	197.33	99.91%	Performed manually on each iPad. Can be performed simultaneously through SCCM on the Latitude 10 tablets.
Workflow total	11.03	31.84	**0.18**	**230.7**	**99.53%**	

Figure 7: Software update times for the tablets.*It should take the same amount of time to update 1,000 Latitude tablets as it does one Latitude 10, as administrators update them simultaneously with the touch of a button.

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Replacing the battery

We estimate that 50 percent of batteries will require replacement as they come to the end of their three-year lifecycle. Due to the swappable batteries, Staff can simply replace the Dell Latitude 10 battery on site while they must send iPads to Apple, which necessitates extra time and steps.

Figure 8 presents the time it took for us to replace the tablet battery, along with the time it would take to complete the same task on 500 tablets (half of the 1,000 tablets in in our analysis).

	One device		500 devices			Notes
	Latitude 10 (minutes)	iPad (minutes)	Latitude 10 (hours)	iPad (hours)	Latitude % faster	
Time to travel to the tablet	20.00	20.00	166.67	166.67	0.00%	
Time to replace the battery	0.29	N/A	2.39	N/A	N/A	The Latitude 10 allows IT departments to replace batteries on site for minimal downtime.
Time to wipe device and mail it	N/A	20.00	N/A	166.67	N/A	Staff must wipe iPad of all enterprise data before sending to Apple.
Time to set up a new device	N/A	36.98	N/A	308.17	N/A	Staff cannot physically repair iPads on site, and must configure new iPads to replace broken ones.
Workflow total	**20.29**	**76.98**	**169.06**	**641.50**	**73.65%**	

Figure 8: Battery replacement times for the tablets.

Restoring the device to its original deployment state

Restoring tablets to their original, enterprise-approved states is a quick way to fix a number of problems or to prepare a tablet for a new user.

Figure 9 presents the time it took for us to restore the tablets to their original states, along with the time it would take to complete the same task on 300 tablets. We chose that number—30 percent overall or 10 percent per year—because we would only expect to perform that scenario when an employee leaves the company or in the event of an error that requires a complete reboot. The Dell Latitude 10 was roughly 26 percent faster than the iPad.

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	One device		300 devices		Latitude % faster	Notes
	Latitude 10 (minutes)	iPad (minutes)	Latitude 10 (hours)	iPad (hours)	All devices	
Time to travel to the device	N/A	20.00	N/A	100.00	N/A	
Time to refresh the device	22.79	N/A	113.95	N/A	N/A	Windows 8 allows users to refresh their OS without losing their applications and data, which they can do remotely via RDP.
Time to create a backup	N/A	0.38	N/A	1.90	N/A	We created the backup locally on the iTunes workstation with the encryption option checked.
Time to restore to restore from backup	N/A	10.39	N/A	51.95	N/A	We timed the process of restoring the iPad to the backup, and the app sync to restore the apps we had initially installed on the iPad
Workflow total	**22.79**	**30.77**	**113.95**	**153.85**	**25.93%**	

Figure 9: Device restoration times for the tablets.

CONCLUSION

When deciding which tablet your enterprise will invest in, it is essential to view the entire picture—including how much it will cost to manage over the years. As our analysis and IT task testing demonstrates, the Windows 8-based Dell Latitude 10 tablet can provide an enterprise with great savings thanks to its ability to integrate into an existing enterprise environment. Because this tablet supports the SCCM management tool that lets IT staff manage devices simultaneously, installing and updating software on a fleet of these tablets can take minutes rather than weeks. Selecting a tablet that can cut management time in half can result in significant savings for the enterprise.

APPENDIX A – DETAILED SYSTEM CONFIGURATION

Figure 10 presents the configuration information for the tablets we tested.

System	Apple iPad (4th generation)	Dell Latitude 10
General		
Number of processor packages	1	1
Number of cores per processor	2	2
Number of hardware threads per core	1	2
Total number of threads	2	4
System dimensions (width x depth x height)	9.50" x 7.31" x 0.37"	10.75" x 7.00" x 0.38"
System weight (pounds)	1.44	1.55
CPU		
Vendor	Apple	Intel®
Name	N/A	Atom™
Model number	A6X	Z2760
Core frequency (GHz)	1.40	1.80
L1 cache	32 KB + 32 KB	24 KB + 32 KB (per core)
L2 cache	1 MB	1 MB (512 KB per core)
Memory module(s)		
Type	DDR2-533	DDR2 SDRAM
Speed (MHz)	533	800
Size (MB)	1,024	2,048
Hard disk		
Vendor and model number	Integrated Flash storage	Integrated Flash storage
Size (GB)	64	64
Operating system		
Name	Apple iOS 6.0.1	Windows 8
Graphics		
Vendor and model number	PowerVR SGX543MP4	Intel Graphics Media Accelerator
Resolution	2,048 x 1,536	1,366 x 768
Wireless		
Vendor and model number	802.11a/b/g/n	Broadcom® 802.11abgn
Ports		
USB Type	0	1 x Micro USB 2.0
Other	Headphone jack	Micro HDMI, Micro SD, headphone jack
Monitor		
LCD type	LED-backlit glossy widescreen Multi-Touch display with IPS technology	Wide view angle LCD
Screen size	9.7"	10.1"
Battery		
Type	Apple A1389 integrated Li-polymer	Dell FWRM8
Rated capacity	11560 mAh 42.5 Wh	3850 mAh

Figure 10: System configuration information for the test systems.

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APPENDIX B – TEST METHODOLOGY

Provisioning the devices

Apple iPad

Without a Mobile Device Manager solution, IT will have to manually provision each iPad. This includes the initial sysprep, which sets the Apple account, IP, and other basic settings; and the installation of the required applications for each tablet. We've chosen a sample of apps that we think an enterprise would provide for their employees As a note: due to Apple's 15 minute app store log-in, we were not prompted to enter our credentials every time.

1. Perform the initial sysprep steps assigning a computer name, user name, password, etc.
2. Download, install, and configure WePrint.
3. Download, install, and configure Print Central Pro.
    a. Tap App Store to open the store.
    b. Search for Print Central Pro, and tap Install.
    c. Enter your credentials, and tap Enter.
    d. Open the app when the installation is finished to verify completion.
4. Download, install, and configure FileBrowser.
    a. Tap App Store to open the store.
    b. Search for FileBrowser, and click Install.
    c. Enter your credentials, and tap Enter.
    d. Open the app when the installation is finished to verify completion.
    e. Tap the + button next to Locations to add your file server.
    f. Choose PC, and type the IP or FQDN of your fileserver in the Address field.
    g. Enter the AD user name and password in the relevant fields.
    h. Tap Save.
    i. Tap Done.
    j. Tap on the server you just added to verify connection.
    k. Open the app when the installation is finished to verify completion.
5. Download, install, and configure Dropbox.
    a. Tap App Store to open the store.
    b. Search for Dropbox, and tap Install.
    c. Enter your credentials, and tap Enter.
    d. Open the app when the installation is finished to verify completion.
    e. Enter your login information to populate the app.
6. Download, install, and configure GoodReader.
    a. Tap App Store to open the store.
    b. Search for GoodReader, and tap Install.
    c. Enter your credentials, and tap Enter.
    d. Open the app when the installation is finished to verify completion.
7. Download, install, and configure WebEx.
    a. Tap App Store to open the store.
    b. Search for WebEx, and tap Install.
    c. Enter your credentials, and tap Enter.

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        d.   Open the app when the installation is finished to verify completion.

8. Download, install, and configure iSSH.
    a. Tap App Store to open the store.
    b. Search for iSSH, and tap Install.
    c. Enter your credentials, and tap Enter.
    d. Open the app when the installation is finished to verify completion.
9. Download, install, and configure Time Master.
    a. Tap App Store to open the store.
    b. Search for Time Master, and tap Install.
    c. Enter your credentials, and tap Enter.
    d. Open the app when the installation is finished to verify completion.
10. Download, install, and configure iWork (Keynote, Numbers and Pages).
    a. Tap App Store to open the store.
    b. Search for Keynote, and tap Install.
    c. Enter your credentials, and tap Enter.
    d. Open the app when the installation is finished to verify completion.
    e. Repeat steps a through d for Numbers and Pages.
11. Download, install, and configure IM+ Pro.
    a. Tap App Store to open the store.
    b. Search for IM+ Pro, and tap Install.
    c. Enter your credentials, and tap Enter.
    d. Open the app when the installation is finished to verify completion.
12. Download, install, and configure Wyse PocketCloud Pro.
    a. Tap App Store to open the store.
    b. Search for PocketCloud Pro, and tap Install.
    c. Enter your credentials, and tap Enter.
    d. Open the app when the installation is finished to verify completion.

Dell Latitude 10

We used Windows Assessment and Deployment Kit (ADK) to capture an image we built as a base IT image. We then used USB devices to deploy the image to the Latitude 10s.

Create the base image
1. Start with a clean Windows 8 Pro install.
2. Run through the initial Windows 8 sys prep to create the user, join the wireless, etc.
3. Check for updates, and install any Windows Updates necessary.
4. Install the following applications with default settings
    a. Dropbox
    b. Firefox
    c. Office 2013 Professional Plus
    d. Adobe Reader
5. Create a snapshot for reserving desktop applications during a refresh
    a. Open a command window with administrator privileges.

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      b.   Type `mkdir C:\RefreshImage`, and tap Enter.

      c.   In the command window, type `recimg /CreateImage C:\RefreshImage`, and tap Enter.

      d.   Wait for the image to be written.

Generalize Latitude 10 Windows 8 image

1. Boot the Latitude 10 to Windows 8.
2. Open the command prompt as Administrator.
3. Type C:\Windows\System32\Sysprep\Sysprep.exe /generalize /oobe /shutdown
4. The tablet will shut down when finished running Sysprep.

Capture base Latitude 10 Windows 8 image

1. Using a USB hub, plug your WinPE bootable USB flash drive, an empty USB HDD, and a USB keyboard into the Latitude 10.
2. Hold down the volume up button while pressing the power button to get boot into the boot menu.
3. Select the USB flash drive in the boot menu to boot to Windows PE.
4. In the command window in WinPE, type `diskpart` and press Enter.
5. At the Diskpart prompt, type `list volume`, and press Enter.
6. Take note of the drive letters for the Windows partition and the external USB hard disk drive.
7. Type `exit` and press Enter to leave Diskpart.
8. Type `dism /Capture-Image /CaptureDir:C:\ /ImageFile:D:\ThinImage.wim /Name:"Filename"` where *C* is the drive letter for the Windows partition and *D* is the drive letter for the external USB hard disk drive.
9. The capture image process will take some time.

Deploy base Latitude 10 Windows 8 image

1. Using a USB hub, plug your WinPE bootable USB flash drive, the USB HDD storing your image, and a USB keyboard into the Latitude 10.
2. Hold down the volume up button while pressing the power button to get into the boot menu.
3. Select the USB flash drive in the boot menu to boot to Windows PE.
4. Type `diskpart /s D:\CreatePartitions.txt` where *D* is the drive letter for the external USB hard disk drive and *CreatePartitions.txt* is a script to create the new partitions. See Appendix C.
5. Simultaneously start the stopwatch timer and press Enter.
6. When the Latitude 10 completes the command, type `D:\ApplyImage D:\ThinImage.wim` where *D* is the drive letter for the external USB hard disk drive and *ApplyImage* is a batch file created for this purpose. See Appendix C.
7. Press Enter.
8. When the Latitude 10 completes the command, type `exit` and press Enter to reboot the system.
9. At the Region and Language screen, tap Next.
10. Tap the checkbox to agree to the license terms for Windows and this PC, and tap Accept.
11. Tap Skip.
12. At the Personalize screen, enter a name for this PC, and tap Next.
13. At the Wireless screen, tap the appropriate wireless network, and tap Connect.
14. Enter the password for the wireless network, and press Enter to connect.

15. At the Settings screen, tap Use express settings.
16. At the Sign in to your PC screen, tap Sign in without a Microsoft account.
17. At the second Sign in to your PC screen, tap Local account.
18. Enter the user name, password, and password hint, and tap Finish.

Setting up printing

Apple iPad

If an enterprise does not already own AirPrint capable printers, the following steps are required to allow users to print from their iPads to the wireless printers already in place across the enterprise.

1. Configure the PC:
   a. On a pre-existing Windows computer that has access to the network printer, go to http://mobile.eurosmartz.com and download the WePrint software.
   b. Install the WePrint software onto the Windows machine by double-cllicking the WePrint executable.
   c. Click Install.
   d. At the license agreement, click Agree.
   e. Click OK, to launch WePrint.
   f. When WePrint launches, accept the default settings, and click OK.
   g. Choose a folder to use for file sharing, and click OK.
2. Configure the iPad:
   h. Tap on the Appstore, and search for PrintCentral Pro.
   i. Purchase the app ($9.99), and install it.
   j. Open the application, and tap Getting Started – Printing.txt
   k. Tap the Print icon in the top right corner.
   l. Wait until the printer discovery has found your printer, and close the application.
   m. Tap FileBrowser to open the application.
   n. In My Files, tap the arrow on the right hand side of the Test Merge.docx file, and tap Open In…
   o. Choose Open in PrintCentral.
   p. Tap Print.
   q. Repeat on each device.

Dell Latitude 10

There is no methodology for setting up the Dell Latitude tablet. We have assumed an existing infrastructure for Windows devices, including a GPO for printer installation. As such, as soon as a user logs into the Windows tablet on the domain, the printer will automatically be installed and ready for use. The following methodology is for the Time to Print results.

1. Tap on the Word icon.
2. Tap Open→Computer→Documents.
3. Tap the test.docx file to open it.
4. Double-tap the test.docx file
5. Click File→Print→Print.

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Updating software

Apple iPad

Apple has released an OS update that needs to be installed on each device. As Apple does not provide a way to manage these releases, the updates have to be installed by the user when the device notifies whoever is logged in at the time. This means that IT will have to manually check each iPad for the update, and install it when it hasn't already been installed.

1. Tap on Settings→General→Software Update
2. Tap on the update, and tap Install.

Dell Latitude 10

As Windows has not released a large update for Windows 8, we used Office 2010 SP1 as our sample update. Once Office 2010 has been installed, the existing Office 2010 SP1 update (already in place for use on desktops and servers) will become available via the SCCM client on the tablet. Although no user involvement is necessary for required updates, we opted to manually install this update in order to time how long it took to install.

1. Open the SCCM client manager on the tablet.
2. Tap on the Office 2010 SP1 update, and tap Install.
3. Tap Restart to restart the tablet when the install completes.

Updating hardware

Apple iPad

The iPad has quit holding a charge, rendering the device useless. Since Apple does not offer batteries a la carte, IT must send the iPad in to be repaired or replaced. In the meantime, they must configure a new iPad to replace the broken one.

1. Perform the initial sysprep steps setting IPs, etc.
2. Choose restore from backup, and find the latest cloud backup created with the user account you applied to the iPad.
3. Restore from the backup file.
4. Wait for applications to reinstall.

Dell Latitude 10

The Latitude 10 has quit holding a charge, and needs a battery replacement. IT has bought a few batteries to hold in reserve, and is able to quickly replace the battery allowing the tablet to enter circulation again in minutes.

1. Turn the tablet off.
2. Pop the battery out of the back of the tablet.
3. Insert the new battery.
4. Power the tablet back on.

Restoring to the original deployment image

Apple iPad

An employee has run into a problem with their iPad which IT has determined will require a restore to a previous backup. We time the process of creating the backup that IT would have taken in the past, as well as the time it takes to restore the backup.

1. Creating the backup:
    a. Plug the iPad into a workstation that has iTunes installed.
    b. In iTunes, click the iPad Summary tab.
    c. In the Backups section, choose This computer, and place a check mark in the Encrypt local backup box.
    d. Click Back Up Now.
2. Restore to backup:
    a. Plug the iPad into a workstation that has iTunes installed.
    b. In iTunes, click the iPad Summary tab.
    c. Choose Restore Backup…in the Backups section.
    d. Choose your backup file, and click Restore.
3. When the restore is finished, let iTunes sync your apps back to your iPad.

Dell Latitude 10

An employee has caused some file corruption on the tablet causing the OS to become unstable. IT has determined that a reinstall of the OS would stabilize the tablet, and take advantage of the Windows 8 Refresh feature that allows them to fix the issues while maintaining the user's data.

1. Refreshing the OS:
    a. Swipe to open the Charms bar, and tap Settings→Change PC settings.
    b. Tap General, and scroll down to Refresh your PC without affecting your files.
    c. Tap Get Started.
    d. Tap Refresh.

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APPENDIX C – DEPLOYMENT SCRIPTS

The following scripts were used to create partitions on, and to deploy a captured image to the Dell Latitude 10s.

CreatePartitions.bat

This script erases the current volumes and creates and configures five partitions (Windows RE tools, System, Windows, Microsoft Reserved (MSR), and Recovery Image).

```
rem These commands are used with DiskPart to
rem erase the drive and create five partitions
rem for a UEFI/GPT-based computer.
rem Adjust the partition sizes to fill the drive as necessary.
select disk 0
clean
convert gpt
rem === 1. Windows RE tools partition ===========
create partition primary size=300
format quick fs=ntfs label="Windows RE tools"
set id="de94bba4-06d1-4d40-a16a-bfd50179d6ac"
assign letter="T"
rem === 2. System partition ====================
create partition efi size=100
format quick fs=fat32 label="System"
assign letter="S"
rem === 3. Microsoft Reserved (MSR) partition ===
create partition msr size=128
rem === 4. Windows partition ===================
rem ==    a. Create Windows partition ==========
create partition primary
rem ==    b. Create space for recovery image ====
shrink minimum=15000
rem ==    c. Prepare the Windows partition ======
format quick fs=ntfs label="Windows"
assign letter="W"
rem === 5. Recovery image partition ============
create partition primary
format quick fs=ntfs label="Recovery image"
gpt attributes=0x8000000000000001
assign letter="R"
```

ApplyImage.bat

This batch file applies the base image to the Windows partition, copies the Windows RE tools from the Windows partition to the Windows RE tools partition, copies boot files from the Windows partition to the System partition, and configures the System partition by setting the locations of the Windows partition and the Windows RE tools.

```
rem These commands use the specified Windows image file
rem to deploy Windows, system, and recovery tools
rem to a UEFI-based computer.

rem Usage:   ApplyImage WimFileName
```

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```
rem Example: ApplyImage E:\Images\ThinImage.wim

rem === Apply the image to the Windows partition ========
dism /Apply-Image /ImageFile:D:\thinimage.wim /Index:1 /ApplyDir:W:\

rem === Copy tools to the Windows RE Tools partition ====
md T:\Recovery\WindowsRE
copy W:\windows\system32\recovery\winre.wim T:\Recovery\WindowsRE\winre.wim

rem === Copy boot files to the System partition =========
W:\Windows\System32\bcdboot W:\Windows /s S:


rem === Set the location of the WinRE tools =============
W:\Windows\System32\reagentc /setreimage /path T:\Recovery\WindowsRE /target
W:\Windows

rem === Create the recovery image =======================
Mkdir R:\RecoveryImage
Copy %1 R:\RecoveryImage
W:\Windows\System32\reagentc /setosimage /path T:\RecoveryImage /target
W:\Windows /index 1
```

ABOUT PRINCIPLED TECHNOLOGIES

Principled Technologies®

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