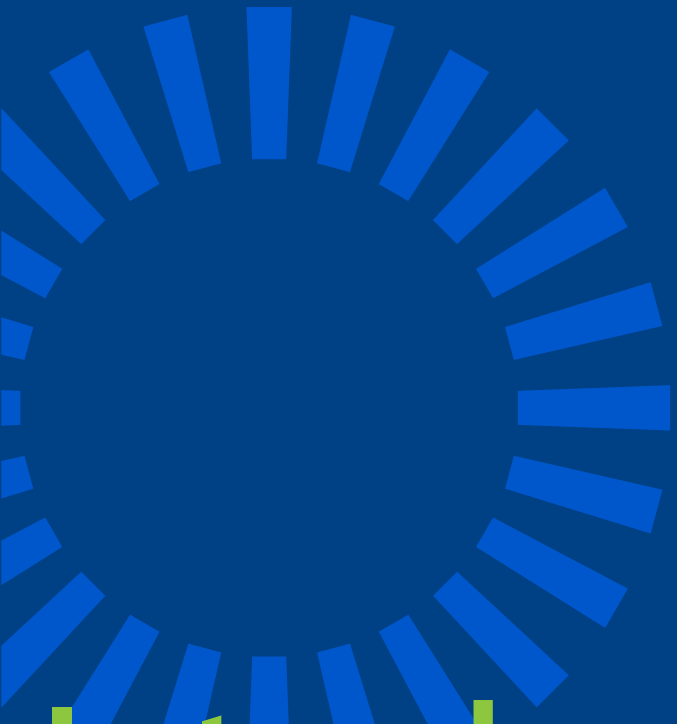

Microsoft

Introducing

Windows 8.1 for IT Professionals

Technical Overview

ED BOTT

PUBLISHED BY
Microsoft Press
A Division of Microsoft Corporation
One Microsoft Way
Redmond, Washington 98052-6399

Library of Congress Control Number: 2013949892
ISBN: 978-0-7356-8427-0

Acquisitions Editor: Anne Hamilton
Developmental Editor: Valerie Woolley
Project Editors: Valerie Woolley and Carol Dillingham
Editorial Production: Christian Holdener, S4Carlisle Publishing Services
Technical Reviewer: Randall Galloway
Copyeditor: Roger LeBlanc

Contents

What do you think of this book? We want to hear from you!

Microsoft is interested in hearing your feedback so we can continually improve our books and learning resources for you. To participate in a brief online survey, please visit:

microsoft.com/learning/booksurvey

Introduction

It's difficult to believe that Windows 8 was introduced only a year ago, and yet today its successor, Windows 8.1, is ready for widespread adoption. By Microsoft's standards, that is warp speed. And it is a tribute to the developers who designed and built Windows 8 and 8.1 that they have been able to sustain that pace and deliver such a polished product.

The Windows 8 product line represents a radical departure for Microsoft. A new user experience. A new app platform. New security features and new management tools. If you're an IT pro, you have the daunting job of helping your users adapt to the newness of Windows 8.1 while you try to stay at least one step ahead.

Although I've written in-depth guides to Windows in the past, this book is not one of those. Nor do I pretend to offer much in the way of opinions or review. Only you can decide whether and how and when to incorporate Windows 8.1 into your enterprise, based on your own organizational requirements.

My goal in this book is to help you on that upgrade path by presenting the facts and features about Windows 8.1 as clearly as I can. If you've been living in an environment built around a previous version of Windows, you have a lot to absorb in the transition to Windows 8.1. I've tried to lay out those facts in as neutral a fashion as possible, starting with an overview of the operating system, explaining the many changes to the user experience, and diving deep into deployment and management tools where it's necessary.

By design, this book focuses on things that are new, with a special emphasis on topics of interest to IT pros. So you might find fewer tips and tricks about the new user experience than your users want but more about management, deployment, and security—which ultimately is what matters to the long-term well-being of the company you work for.

This book is just an introduction, an overview. For more detailed information about the features and capabilities described in this book, I encourage you to become a regular visitor at the Springboard Series on TechNet: *http://www.microsoft.com/springboard*. Tell 'em Ed sent you.

Acknowledgments

I'd like to thank the many folks at Microsoft who contributed their in-depth knowledge of Windows technologies to this book: Craig Ashley, Roger Capriotti, Stella Chernyak, Adam Hall, Chris Hallum, Dustin Ingalls, Michael Niehaus,

and Fred Pullen. I'd also like to thank the good folks at Microsoft Press—Anne Hamilton, Martin DelRe, Carol Dillingham, and especially Valerie Woolley—for their efforts at making this project happen on very short notice.

About the author

Ed Bott is an award-winning technology journalist and author who has been writing about Microsoft technologies for more than two decades. He is the author of more than 25 books on Microsoft Windows and Office. You can find his most recent writing at The Ed Bott Report at ZDNet: *http://www.zdnet.com/blog/bott*.

Errata & book support

We've made every effort to ensure the accuracy of this book and its companion content. Any errors that have been reported since this book was published are listed at:

http://aka.ms/IntroW8pt1/errata

If you find an error that is not already listed, you can report it to us through the same page.

If you need additional support, email Microsoft Press Book Support at *mspinput@microsoft.com*.

Please note that product support for Microsoft software is not offered through the addresses above.

We want to hear from you

At Microsoft Press, your satisfaction is our top priority, and your feedback our most valuable asset. Please tell us what you think of this book at:

http://aka.ms/tellpress

The survey is short, and we read every one of your comments and ideas. Thanks in advance for your input!

Stay in touch

Let's keep the conversation going! We're on Twitter: *http://twitter.com/MicrosoftPress*.

CHAPTER 3

Deploying Windows 8.1

Diving headfirst into a wide-scale deployment of Windows 8.1 without preparation isn't a recipe for success. On the contrary, deploying a new operating system requires careful planning and testing for application compatibility and hardware readiness.

The good news is that IT pros who've mastered the Windows 7 deployment tools have a head start on Windows 8.1, which uses the most recent generation of those proven tools and technologies. Automation and wizard-guided user interfaces reduce the effort and risk of deploying and managing operating systems and applications. This deployment helps prevent configuration errors by reducing manual steps, avoiding human error. Automation also provides a repeatable process that can drive consistency and help you get more done with less time and effort. Also, wizard-guided user interfaces help users customize configurations with less error, and centralized administration helps drive consistency and reduce configuration drift.

This chapter focuses on the most recent updates to those deployment tools and technologies, updated for Windows 8.1. The biggest differences from their Windows 7 predecessors are support for features introduced in Windows 8, including Windows Store apps, changes in security models, and Windows To Go.

Windows 8.1 editions at a glance

With Windows 8, Microsoft simplified the number of editions available to consumers and businesses. Windows 8.1 continues that lineup, with no changes.

On mainstream PCs sold in the retail market to consumers, Windows 8.1 is commonly preinstalled. This edition includes all the core features of Windows 8.1, including the new touch-friendly user experience, improvements in security and reliability, and support for apps delivered through the Windows Store.

For deployment in enterprise environments, you'll want to choose one of the two Windows editions designed expressly for business use. In this book, I assume you deployed one of these editions. Here's what you'll find in each one:

- **Windows 8.1 Pro** This edition is available preinstalled on new PCs, as a retail package, and as an upgrade direct from Microsoft. It is also available via volume licensing.
- **Windows 8.1 Enterprise** This edition is available only to enterprise customers who purchase Software Assurance for Windows as part of a volume-license agreement.

Table 3-1 lists features that are not available in the consumer edition of Windows 8.1. Note that Windows 8.1 Enterprise edition is a complete superset of Windows 8.1 Pro.

TABLE 3-1 Features found only in Windows 8.1 business editions

Feature	Windows 8.1 Pro	Windows 8.1 Enterprise
BitLocker and BitLocker To Go	X	X
Encrypting File System	X	X
Boot from VHD	X	X
Client Hyper-V	X	X
Domain Join	X	X
Group Policy	X	X
Remote Desktop (host)	X	X
Windows To Go		X
DirectAccess		X
BranchCache		X
AppLocker		X
VDI enhancements		X
Windows 8.1 app deployment		X
Start Screen Control		X

NOTE **The newest member of the Windows 8 family is Windows RT. It has a unique place in the product lineup and defies easy categorization. For a full discussion of what Windows RT can and can't do, especially in an enterprise setting, see Chapter 10, "Windows RT."**

Assessing compatibility

The most important step in planning a Windows 8.1 enterprise deployment is testing your business apps for compatibility with the new operating system. That can be a daunting task, because even a well-managed enterprise typically has several thousand apps that need to be tested for compatibility.

In general, you can expect most apps that ran properly under Windows 7 to work under Windows 8 and 8.1. However, some compatibility issues are possible because of changes to the Windows 8.1 feature set and tightened security.

IT pros planning for application-compatibility testing should at least glance through the "Windows and Windows Server Compatibility Cookbook," which is available from the Microsoft Download Center at *http://www.microsoft.com/en-us/download/details.aspx?id=27416*. This document, originally created while Windows 8 was available as a preview, is updated regularly and now covers changes in Windows 8.1 that could cause an application to break. Although this document is targeted primarily at developers working on the compatibility of their apps, it offers a glimpse into potential compatibility issues and mitigation strategies.

You will need empirical data from your environment to assess and mitigate applications that are currently in use. The Application Compatibility Toolkit (ACT) is included with the Windows Assessment and Deployment Kit, which is described later in this chapter. Using the most recent version of the toolkit, ACT 6.3, you can inventory and test applications, devices, and PCs for compatibility with Windows 8.1. You can get compatibility information from Microsoft and independent software vendors (ISVs), identify compatibility issues in your environment, and share compatibility data with other ACT users. ACT provides tools that can help you analyze and mitigate the compatibility issues you discover in your organization.

Additional application-compatibility resources for IT pros include the following:

- Application Compatibility TechCenter on TechNet at *http://technet.microsoft.com/en-us/windows/aa905066*.
- Windows Compatibility Center at *http://www.microsoft.com/en-us/windows/compatibility/en-US/CompatCenter/Home*.

The following list describes common sources of compatibility issues for Windows 8 and 8.1, particularly when using an application originally designed for Windows XP:

- **User Account Control (UAC)** In Windows 8 and 8.1, by default, all interactive users, including members of the Administrators group, run as standard users. UAC is the mechanism through which users can elevate applications to full administrator privileges. Because of UAC, applications that require administrator rights or check for administrator privileges behave differently in Windows 8 and 8.1, even when run by a user as administrator.

NOTE **Windows Store apps require that the User Account Control (UAC) feature be enabled. If you disable UAC, those apps will not run properly.**

- **Windows Resource Protection (WRP)** WRP is designed to protect key system files, folders, and registry keys from being modified or replaced by unauthorized applications or users, potentially affecting the stability of components and applications that ship with the operating system. Updates to protected resources are restricted to trusted installers (members of the TrustedInstaller group), such as Windows Servicing. Custom installations that try to replace files and registry settings covered by WRP will fail.
- **Internet Explorer Enhanced Protected Mode** In Windows 8.1, Internet Explorer 11 processes run in Enhanced Protected Mode, with greatly restricted privileges. This feature significantly reduces the ability of an attack to write, alter, or destroy data on the user's computer, or to install malicious code. This security feature can interfere with ActiveX controls and other script code that tries to modify objects running at a higher integrity level.
- **Deprecation** Any application that uses dynamic-link library (DLL) files, executable files, Component Object Model (COM) objects, registry keys, application programming interfaces (APIs), or other files that are deprecated in Windows 8 and Windows 8.1 might break.
- **Graphical Identification and Authentication (GINA) DLL** Prior to the release of Windows Vista, ISVs were able to modify authentication by installing a GINA DLL. The GINA DLL performed user identification and authentication functions. The authentication model used in Windows 8 and 8.1 does not require the GINA DLL and ignores all previous GINA DLLs. This change affects any application or hardware component that attempts to log on by using customized logon applications, including biometric devices (fingerprint readers), customized user interfaces, and virtual private network (VPN) solutions for remote users with customized logon user interfaces.
- **Session 0 isolation** Running services and user applications together in Session 0 poses a security risk because services run at an elevated privilege and therefore are targets for malicious agents looking for a means to elevate their own privilege level. In earlier versions of the Windows operating system, services and applications ran in the same session as the first user who logged on to the console (Session 0). To help protect against malicious agents in Windows 8 and Windows 8.1 Session 0 has been isolated from other sessions. This could impact services that communicate with applications using window messages.
- **Windows Filtering Platform (WFP)** WFP is an API that enables developers to create code that interacts with the filtering at several layers in the networking stack and throughout the operating system. With previous versions of the WFP API, you might experience failures when running network scanning, antivirus, or firewall applications.

- **Operating system and Internet Explorer versioning** Many applications check the version of the operating system and behave differently or fail to run when an unexpected version number is detected. Windows 8.1 changes this behavior so that calls for a specific version will return the Windows 8 version number (6.2) rather than the Windows 8.1 version number (6.3). For applications that fail, you can resolve this issue by setting appropriate compatibility modes or applying versioning shims (application-compatibility fixes).
- **Windows 64-bit** 64-bit versions of Windows use the Windows on Windows 64 (WOW64) emulator. This emulator enables the 64-bit operating system to run 32-bit applications and can cause an application or a component that uses 16-bit programs or installers, or 32-bit kernel drivers, to break.
- **New folder locations** User folders, My Documents folders, and folders with localization have changed since Windows XP. Applications that use hard-coded paths based on those older paths might fail. You can mitigate these failures by using directory junctions or by replacing hard-coded paths with appropriate API calls to get folder locations.

Choosing a deployment strategy

Microsoft recommends a few targeted strategies for deploying Windows 8.1. These strategies range from manually configuring Windows 8.1 on a few computers to using automation tools and technologies to deploy the operating system to thousands of computers.

For client PCs that are already running Windows 8, an in-place upgrade is the fastest, simplest, and most reliable alternative, accomplished either by installing the Windows 8.1 update package or by refreshing the operating system. In either case, there's little worry about drivers or update states. Although this upgrade path requires some app compatibility testing, it should be a significantly more manageable project than a traditional operating system deployment.

For enterprises that want to deploy Windows 8.1 on new or existing hardware that isn't already running Windows 8, the following list describes the four recommended deployment strategies:

- **High Touch with retail media** This is a hands-on, manual deployment, where you install Windows 8.1 on each client PC by using retail installation media and then manually configure each PC. This strategy is most appropriate for organizations with fewer than 100 client computers, no dedicated IT staff, and a small, unmanaged network.
- **High Touch with standard image** This strategy is similar to the High Touch with retail media strategy, but it uses an operating system image that includes your customizations and application configurations. Organizations that choose this strategy should have at least one IT pro (with or without prior deployment experience) on staff, and a small or distributed network with 100–200 client PCs.

- **Lite Touch, high-volume deployment** This strategy requires limited interaction during deployment. Interaction occurs at the beginning of the installation, but the remainder of the process is automated. Microsoft recommends this strategy for organizations that have a dedicated IT staff (ideally with prior deployment experience) and a managed network with 200–500 client computers.
- **Zero Touch, high-volume deployment** This strategy requires no interaction during deployment. The process is fully automated by using System Center Configuration Manager. Microsoft recommends this strategy if your IT organization includes experts in deployment, networking, and System Center Configuration Manager, and it has a managed network with 500 or more client computers.

Table 3-2 shows guidelines for choosing a strategy based on many factors, including the following:

- The skill level of your organization's IT staff members
- Your organization's license agreement
- The number of client computers
- Your infrastructure

To use the table, choose the column that best matches your organization's network scenario. In cases where you identify with multiple columns, start with the leftmost column. As you move to the right, the solutions require more skills and investment to implement, and they provide for quicker, more thorough and more automated deployments.

As you plan to deploy more computers, consider improving your scenario to enable you to move to the right in the table. For example, if the only thing preventing you from performing a Lite Touch, high-volume deployment is that you are using retail media, consider purchasing a volume license.

TABLE 3-2 Choosing a deployment strategy

	High Touch with Retail Media	High Touch with Standard Image	Lite Touch, High-Volume Deployment	Zero Touch, High-Volume Deployment
IT skill level	IT generalist	IT pro with optional deployment experience	IT pro with deployment experience recommended	IT pro with deployment and Configuration Manager experience
Windows license agreement	Retail	Retail or Software Assurance	Software Assurance	Enterprise Agreement
Number of client computers	<100	100–200	200–500	>500

	High Touch with Retail Media	High Touch with Standard Image	Lite Touch, High-Volume Deployment	Zero Touch, High-Volume Deployment
Infrastructure	Distributed locations Small, unmanaged networks Manual client computer configuration	Distributed locations Small networks Standardized configurations, including applications	Managed network At least one office with more than 25 users Windows Server products Configuration Manager (optional)	Managed network At least one office with more than 25 users Windows Server products Configuration Manager
Application support	Manually installed commercial applications	Manually installed commercial or line-of-business (LOB) applications	Automatically installed commercial or LOB applications	Automatically installed commercial or LOB applications
User interaction	Manual, hands-on deployment	Manual, hands-on deployment	Limited interaction at the beginning of installation	Fully automated deployment
Windows 8.1 Tools	Retail media Windows Assessment And Deployment Kit (ADK)	Retail or volume-licensed (VL) media Windows ADK Microsoft Deployment Toolkit (MDT) 2013	VL media Windows ADK MDT 2013 Windows Deployment Services	VL media Windows ADK MDT 2013 Windows Deployment Services Configuration Manager

NOTE **The deployment strategies described involve traditional installations on a physical PC. An attractive alternative for some scenarios is desktop virtualization, which provides a way to deliver a working environment that users can access from any device. Desktop virtualization is powered by Remote Desktop Services (RDS), which is a server role in Windows Server 2012 and later. It provides a single platform to deliver any type of hosted desktop, and RemoteFX provides a consistently rich user experience. You can read more about these options in Chapter 9, "Virtualization in Windows 8.1."**

Windows Assessment and Deployment Kit

The Windows Assessment and Deployment Kit (Windows ADK) is a comprehensive collection of tools designed for use by original equipment manufacturers (OEMs) and IT pros. Depending on the task at hand, you can mix and match tools to accomplish specific goals ranging from identifying potential hardware and software issues to customizing and automating a large-scale Windows deployment.

The Windows ADK includes deployment tools that were previously available in the OEM Preinstallation Kit (OPK) and the Windows Automated Installation Kit (AIK). It also consolidates deployment tools that were previously available as separate downloads, such as the User State Migration Tool. You can download the Windows ADK from *http://www.microsoft.com/en-us/download/details.aspx?id=39982*.

In the remainder of this section, I discuss the individual tools that are part of the Windows ADK.

Application Compatibility Toolkit (ACT)

ACT 6.3, the most recent version of the toolkit, adds support for Windows 8.1 and is otherwise essentially unchanged from its predecessor, ACT 6.0. Its purpose is to provide compatibility information for deployment scenarios; unlike previous versions, ACT 6.x does not provide update information. The only way to get the most recent ACT version is to install it as part of the Windows ADK.

The runtime-analysis package gathers compatibility information. You install it on PCs running Windows 8.1 for compatibility testing. Application reports appear in Application Compatibility Manager (ACM). If multiple versions of an application are detected, the reports for that application are grouped together under a single parent entry.

Deployment and Imaging

The Deployment and Imaging component of the Windows ADK contains the tools you need to customize, deploy, and service Windows images. These tools can stand alone but are recommended for use with the Microsoft Deployment Toolkit 2013 and System Center Configuration Manager 2012 R2. The tools in the Deployment and Imaging component of the Windows ADK are required by both.

The Deployment and Imaging component includes the following components:

- **Deployment Image Servicing and Management (DISM)** DISM is a command-line tool that mounts and services Windows images before deployment. You can use DISM image-management commands and PowerShell cmdlets to mount, and get information about, Windows image (.wim) files or virtual hard disk (VHD) files and to capture, split, and otherwise manage .wim files. DISM replaces the ImageX tool for image management.
- **Windows System Image Manager (Windows SIM)** Windows SIM creates unattended Windows Setup answer files. You can create an answer file by using information from a .wim file and a catalog (.clg) file. Component settings are added to appropriate configuration settings in the answer file. You can also add packages to be installed during Windows Setup.

Two tools that were previously part of this group are now included in the operating system: The System Preparation (Sysprep) tool prepares a computer for delivery by configuring it to create a new computer security identifier (SID) when the computer is

restarted, removing user-specific and computer-specific settings and data that must not be copied to a destination computer. Windows Recovery Environment (Windows RE) is a recovery environment that can repair common causes of unbootable operating systems and is discussed in more detail in Chapter 7, "Recovery options in Windows 8.1."

The Deployment and Imaging tools include many other command-line tools that assist in the deployment and imaging of Windows, boot configuration, and Windows Preinstallation Environment configuration.

Windows Preinstallation Environment

The Windows Preinstallation Environment (Windows PE) is a minimal operating system designed to prepare a computer for Windows installation by starting a computer that has no operating system. During Windows deployment, you can use Windows PE to partition and format hard drives, copy disk images to a computer, and start Windows Setup from a network share.

Windows PE 5.0 is based on the Windows 8.1 operating system, and it is available as a standalone product to customers who have the appropriate licensing agreement. It is an integrated component of many Windows technologies, including Windows Setup and Windows Deployment Services. Both MDT 2013 and System Center Configuration Manager rely on it.

Customized Windows PE images can be created using the tools provided with Windows PE. MDT 2013 and System Center Configuration Manager can also create customized Windows PE images.

User State Migration Tool

The User State Migration Tool (USMT) migrates user profiles and files from existing Windows operating systems to Windows 8.1. It captures the user state from the existing operating system and restores the user state to Windows 8.1. USMT can perform complex, repeatable migrations of user state data between a source and target installation of Windows. USMT is flexible enough to support migrations from a 32-bit Windows source to a 64-bit target. (The opposite path, from 64-bit to 32-bit, is not supported.)

If you're planning to use USMT as part of a Windows 8.1 deployment, you should be aware of one significant change. Earlier versions of USMT supported migrations with Windows 8 as the target and Windows XP or later running on the source computer. USMT version 6.3, which is included in the Windows ADK and is required for Windows 8.1 migrations, supports only Windows 7, 8, and 8.1 as both target and host operating systems. Windows XP and Windows Vista are not supported. As a workaround, Microsoft recommends using USMT version 5 to capture the user state from Windows XP and Vista; that state can then be restored to Windows 8.1 using USMT 6.3.

NOTE **An alternative to using USMT to migrate user state, especially if moving from Windows XP or Windows Vista to Windows 8.1, is to implement user state virtualization prior to deployment of the new operating system. Part of the Microsoft Desktop Optimization Pack (MDOP) for Software Assurance customers, User Experience Virtualization (UE-V) synchronizes Windows and application settings in a settings store (a simple but secure file share). The most recent version of UE-V 2 for Windows 8.1 allows storage of settings for Windows Store apps—a major change from the corresponding feature in Windows 8, which supported only desktop programs. Folder Redirection moves users' documents off the endpoint to a central location on the network. The combination of the two features allows users to move between devices while maintaining access to all apps and documents. For more information about user state virtualization, see the Microsoft Desktop Virtualization website at *http://www.microsoft.com/dv*.**

The USMT includes three command-line tools:

- **ScanState.exe** The ScanState.exe tool captures user state from the existing operating system (Windows 7, 8, or 8.1). You can store the captured user state on a removable drive or on a network shared folder. The ScanState.exe tool also can estimate the amount of disk storage required by the migrated user state.
- **LoadState.exe** The LoadState.exe tool restores the captured user state from the location where it was saved by the ScanState.exe tool.
- **UsmtUtils.exe** The UsmtUtils.exe tool performs functions related to user-state migration, such as extracting files from a compressed migration store or removing hard-link stores that cannot be otherwise deleted because of a sharing lock.

USMT includes three .xml files that configure the user-state capture and restore process (MigApp.xml, MigDocs.xml, and MigUser.xml). In addition, the Config.xml file specifies files or configuration settings to exclude from the migration. You can create custom .xml files to support specialized migration needs.

Both MDT 2013 and SCCM rely on USMT to migrate user states. At the appropriate time during the deployment process, the ScanState.exe and LoadState.exe command-line tools automatically run to migrate user state. You can customize the process in both deployment tools.

NOTE **Although USMT is the most appropriate choice for enterprise migrations, some businesses might opt for the simpler alternative of Windows Easy Transfer, a feature of Windows 8.1. It is particularly useful in one-off scenarios for individual users. Windows Easy Transfer can move user accounts, files and folders, program settings, Internet settings and favorites, and email settings between computers running Windows 7, 8, or 8.1. Note that the version of Windows Easy Transfer in Windows 8.1 does not support migrations from Windows XP or Windows Vista.**

Volume Activation Management Tool

The Volume Activation Management Tool (VAMT) enables you to automate and centrally manage the volume and retail-activation processes of Windows, Microsoft Office, and select other Microsoft products. The VAMT can manage volume activation using Multiple Activation Keys (MAKs) or Key Management Service (KMS) and is typically deployed in enterprise environments. The VAMT is a standard Microsoft Management Console (MMC) snap-in that requires MMC 3.0. You can install it on any computer running Windows 7, 8, or 8.1; Windows Server 2012; Windows Server 2012 R2; or Windows Server 2008 R2.

Windows Performance Toolkit

The Windows Performance Toolkit (WPT) contains performance-monitoring tools that produce in-depth performance profiles of Windows operating systems and applications. It is a powerful recording tool that creates Event Tracing for Windows (ETW) recordings. You can run the WPT from the WPT user interface or from the command line. It provides built-in profiles you can use to select the events to be recorded. Alternatively, you can author custom profiles in XML. The WPT is a powerful analysis tool that combines a very flexible user interface with extensive graphing capabilities and data tables that can be pivoted and that have full text-search capabilities. It allows you to explore the root cause of any identified performance issues.

Windows Assessment Toolkit

The Windows Assessment Toolkit helps you determine the quality of a running operating system or a set of components with regard to performance, reliability, and functionality. The toolkit includes the tools you need to assess a local computer, review the results, diagnose problems, and determine how to make improvements. Assessments can be performed using the Windows Assessment Console or command-line tools.

Windows Assessment Services

The final component in the Windows ADK is the Windows Assessment Services component (Windows ASC). Windows Assessment Services is a test framework used to automate running assessments that measure performance, reliability, and functionality on multiple computers in a lab environment. It helps you eliminate fragmented, error-prone, expensive, pre-deployment test processes, and it enables you to replace multiple steps and inconsistent tools with just one tool.

Windows ASC is the graphical user interface that interacts with Windows Assessment Services. This enables you to manage settings and assets, such as which lab computers to test, which images should be applied to those computers, and which assessments should be run on the test computers. You can use Windows ASC to monitor the progress of a running job and to view and compare the results that were produced. Additional benefits include the ability to import results into a central database for consolidated report generation.

Microsoft Deployment Toolkit

As described in the previous section, the Windows ADK is the fundamental collection of tools for configuring and deploying Windows 8.1. For the most part, these tools are rarely used directly on an individual basis. Instead, Microsoft provides various deployment options that are built on top of the Windows ADK.

The Microsoft Deployment Toolkit 2013 (MDT 2013) is the most recent version of one of the most popular toolsets built on top of the Windows ADK. It's more of a deployment framework. MDT 2013 helps manage deployment content in preparation for deployment, and then it collects and applies deployment information through wizards at the time of deployment. You can use MDT 2013 to control the level of information required at deployment time. You also can use MDT 2013 to perform fully automated deployments that require no deployment information at the time of deployment.

You can use MDT 2013 by itself or in conjunction with Configuration Manager. Although Configuration Manager is capable of deploying Windows 8.1 without using MDT 2013, Microsoft recommends that you use MDT 2013 with Configuration Manager to extend its capabilities with a well-tested deployment framework built to simplify this otherwise complicated set of tasks.

Microsoft Deployment Toolkit 2013

MDT 2013 helps automate the deployment and ongoing management of Windows 8.1 deployment content. It leverages and automates the tools in the Windows ADK to deploy Windows 8.1 and applications along with it. MDT 2013 provides wizards that help in the initial creation of deployment content.

MDT 2013 also reduces the effort and complexity of performing deployments. It performs highly automated deployments that allow you to control the type of information you want to provide at the time of deployment. It provides different deployment methods:

- **Lite Touch installation (LTI)** LTI can perform partially and fully automated deployments for environments without Configuration Manager. This allows you to determine the deployment configuration settings you want to provide prior to deployment and at the time of deployment.
- **User-Driven installation (UDI)** UDI can perform partially and fully automated deployments for environments with Configuration Manager. This also allows you to determine the type of deployment configuration settings you want to provide prior to deployment and at the time of deployment.
- **Zero Touch installation (ZTI)** ZTI performs fully automated deployments for environments with Configuration Manager. This allows you to provide all the configuration settings in advance and eliminate the need for any user or deployment technician interaction at the time of deployment.

The deployment process and guidance provided by MDT 2013 are based on industry best-practice recommendations for operating-system and application deployment. This helps ensure that deployments are performed efficiently and with minimal risk.

On the whole, if you're already familiar with previous MDT versions, you should feel comfortable with MDT 2013. It adds support for the Windows ADK, Windows 8.1, and new features like UDI. Basic tasks remain largely unchanged, however, including stocking deployment shares with applications, operating systems, packages, and device drivers; creating task sequences; and running the Windows Deployment Wizard. You can learn more about MDT 2013 on TechNet at *http://www.microsoft.com/deployment*.

System Center 2012 R2 Configuration Manager

As with MDT 2013, if you're familiar with operating-system deployment in earlier versions of System Center Configuration Manager, you should be comfortable with System Center 2012 R2 Configuration Manager. This release adds support for deploying and managing Windows 8.1 and Windows Server 2012 R2. It also adds the capability to create prestaged content files for task sequence content as well as virtual hard-disk management. See *http://technet.microsoft.com/en-us/library/gg682108.aspx#BKMK_OSDIntroWhatsNewR2* for a complete list of changes in this release.

As previously mentioned, Configuration Manager is more than capable of deploying Windows 8.1 without using MDT 2013. However, MDT 2013 adds an additional framework to Configuration Manager that helps you build a more flexible and intelligent deployment process for your organization. (With the latest updates, System 2012 Configuration Manager SP1 will also be able to deploy Windows 8.1, by using a Windows PE 5.0 boot image for deployment.)

Learn more about operating-system deployment with Configuration Manager on TechNet at *http://technet.microsoft.com/en-us/library/gg682018.aspx*.

Windows To Go

What if you could sit down at any PC, plug in a USB flash drive, and access a secure version of your desktop, complete with apps and files? That's the idea behind Windows To Go, a feature first made available with Windows 8 Enterprise. In Windows 8.1, it allows an administrator to create a portable Windows 8.1 Enterprise workspace on a high-performance flash drive. You can slip that bootable Windows To Go USB drive into your pocket and boot to it from any PC, completely bypassing the operating system installed on that PC. What you see when you sign in is your personal Windows account, exactly as you left it.

When creating the bootable Windows To Go workspace, you can use the default Windows 8.1 Enterprise image, or you can choose one of the custom images you created for deployment on desktops and laptops in the enterprise. The most important new Windows To Go feature in Windows 8.1 is support for the Windows Store, which allows you to roam to any number of machines, access the Windows Store, and use Windows Store apps in a Windows To Go workspace.

You're expected to shut down a Windows To Go session completely before removing the USB drive. If the drive is inadvertently disconnected, though, don't panic: You have a 60-second window to reinsert the drive and resume where you left off.

Who should use Windows To Go

Windows To Go is not suited for every organization and user. Choosing whether and when to provide users with Windows To Go workspaces should be based on your organization's needs. Following are some sample scenarios in which using Windows To Go could benefit an organization:

- **Continuance of operations (COO)** Continuance of operations employees often require work desktop environments at home. In this scenario, you provide selected COO employees with a Windows To Go USB drive. This drive can be preconfigured with their Group Policies and provisioned using standard provisioning tools, such as Configuration Manager. For users requiring network access, Windows To Go supports VPN and DirectAccess.
- **Temporary workers** If temporary workers require specific programs or just a work environment, you could provide a Windows To Go workspace. This gives the user access to company programs while not requiring the user to have company hardware. The device then can be returned at the end of the specified contract or assignment. With Windows To Go, no software installation is ever required on the host machine, so it remains completely unaffected.
- **Ability to travel lighter** This situation involves employees who frequently travel or move between remote offices. Instead of requiring those employees to have a laptop, they can simply take their Windows To Go USB drive and boot to it from any PC at the new location.
- **Telecommuting** Many professionals either fully or partially telecommute. In this scenario, Windows To Go drives can be provisioned using standard tools and then provided to employees. The initial boot to Windows To Go needs to be on-site for it to cache the employee's credentials for later access. After they are on their home computer, employees can access their Windows To Go drive with or without enterprise network connectivity.
- **Free seating** This scenario includes organizations that provide temporary offices for off-site or roaming employees. Providing a Windows To Go drive to these roaming employees allows them to maintain the same user experience at whatever site they are currently located.

NOTE **If DirectAccess is not enabled, employees using Windows To Go should connect to the enterprise network frequently using VPN. This minimizes the risk of the drive's deletion from Active Directory and retains its access privileges.**

Preparation and requirements

Properly preparing for a deployment such as Windows To Go increases its overall success. There are few preliminary requirements for Windows To Go, because it is intended to seamlessly integrate with existing hardware. Aside from the following few exceptions, the Windows To Go workspace operates exactly like any other Windows platform:

- **Offline internal disks** When a user boots into a Windows To Go workspace, internal hard disks are disabled by default. The Windows To Go workspace completely disassociates itself from the other drives in a machine. This minimizes the risk of unwanted manipulation of either device, as well as data leakage.
- **Absence of Trusted Platform Module (TPM)** Traditionally, BitLocker is implemented using the TPM-integrated hardware. Because the TPM is linked with a specific computer, it cannot be used with Windows To Go. This is because Windows To Go can be used on multiple computers. To replace TPM for a Windows To Go workspace, a preoperating-system boot password is used for security.
- **Disabled hibernation** Hibernation is disabled by default to maximize a workspace's ability to move between machines. If a machine is in hibernation, a user might remove the USB media, thinking the computer is turned off.
- **Removed Windows Recovery Environment** In a Windows To Go workspace, the Windows Recovery Environment is not available. In the event that a recovery is needed, re-image the drive.
- **Disabled Push Button Reset** This feature is disabled because of the nonsensical nature of resetting to the manufacturer's standard for a computer while running Windows To Go.
- **Absence of Multiple Activation Key (MAK) method** The MAK activation method is not supported for Windows To Go. This is because each host PC would require a separate activation.

Hardware requirements

Windows To Go does not require any software to be installed on the host machine to run. However, the host machine does have to meet several basic hardware requirements. In general, hardware that is certified for use with Windows 7 or Windows 8.1 works well with Windows To Go. Table 3-3 describes the basic hardware requirements for Windows To Go.

NOTE **Windows To Go is not supported when booting from a Mac computer or Windows RT device.**

TABLE 3-3 Hardware requirements for Windows To Go

Item Required	Description
USB port	Must have a USB 2.0 port or greater. A USB 3.0 port offers improved performance. ***NOTE*** **External USB hubs are not supported. The Windows To Go USB drive must be directly inserted into the host machine.**
USB boot	Must be capable of booting from a USB drive. Ensure that USB booting is enabled in the BIOS.
RAM	2 GBs or greater is required.
Processor	1 GHz or faster is required.
Graphics	DirectX 9 compatible device with Windows Display Driver Model (WDDM) 1.2 or greater.

NOTE **USB drives must be certified for use with Windows To Go. If a USB drive is not certified, it is not supported.**

In addition to the requirements listed in Table 3-3, corresponding Windows To Go architectures must be matched with the host PC firmware type and processor architecture. Table 3-3 describes the requirements for each.

TABLE 3-4 BIOS compatibility for Windows To Go

Host PC Firmware	Host PC Architecture	CompatIble Windows To Go Architecture
Legacy BIOS	32-bit	32-bit only
Legacy BIOS	64-bit	32-bit or 64-bit
UEFI BIOS	32-bit	32-bit only
UEFI BIOS	64-bit	64-bit only

Management and security

Because a Windows To Go workspace, from a user aspect, is identical to a standard Windows 8.1 installation, there are many security and management features available. Windows To Go provides a standard user interface regardless of which PC a user decides to use, while still providing the same access management and security as a physical machine. Using advanced features found in Windows 8.1, that standardization can be taken a step further. An example of this is Microsoft User Experience Virtualization (UE-V), which can be used to cache user settings and implement them on physical systems as well as Windows To Go.

User state virtualization

Windows To Go offers the same user-state virtualization opportunities as a traditional installation of Windows 8.1. The following features describe the profile data-management options for user profiles and data files when using Windows To Go:

- **Folder redirection** Enables you to redirect the known path of a folder to a new location. Even though the folder is being redirected, from a user's perspective, the folder is still local. Implementing folder redirection also allows users to access their files from anywhere on the network, whether it is on their Windows To Go drive or a local machine. For example, Windows To Go users would save to their documents folder while the path would be redirected to a file server on the enterprise network. This scenario requires DirectAccess to be enabled.
- **Offline Files** Makes network files available to users when DirectAccess is not configured or the enterprise network is not accessible. After computers using the Offline Files feature are reconnected to the enterprise network, they are automatically synced with the file server.
- **User Experience Virtualization (UE-V)** Allows administrators to provide an optimum user experience by saving user settings for specified programs. This can be used in conjunction with Windows To Go configured with DirectAccess.

These user-state virtualization features can be easily implemented with either DirectAccess or a VPN. Windows To Go allows users to take advantage of these advanced Windows 8.1 features on any machine booting their Windows To Go drive. Consider your organization's available bandwidth and resources before implementing these advanced features. For more information, see Chapter 9.

Active Directory integration

Just like a standard Windows installation, Windows To Go will not be joined to your domain upon creation. However, Windows To Go can be joined easily to a domain in one of two ways:

- **Traditional method** The traditional way to join a computer to the domain is through the computer properties.
- **Offline domain join** Offline domain join is a process that allows Windows To Go to join a domain without contacting a domain controller. This makes it possible to join computers to a domain in locations where there is no connection to the network.

NOTE **For more information about offline domain join, see the article "Offline Domain Join (Djoin.exe) Step-by-Step Guide" at *http://technet.microsoft.com/en-us/library/jj574150.aspx*.**

Group Policy management

Group Policy management of Windows To Go is nearly identical to what is available for typical machine installations of Windows 8.1. In addition to the Windows 8.1 policies, there is added functionality specifically for Windows To Go. The unique Windows To Go Group Policy settings can be found in \Computer Configuration\Policies\Administrative Templates\ Windows Components\Portable Operating System\ in the Group Policy Management Editor.

Enabling BitLocker security

Because most Windows To Go users will be using their USB drives off-premises, it is recommended to secure them using BitLocker. Enabling BitLocker security on a Windows To Go drive ensures the safety of your organization's programs, network resources, and user data if the drive is lost or stolen. Unlike the BitLocker available on standard devices that provide the Trusted Platform Module (TPM), BitLocker for Windows To Go is secured with a boot password to unlock the drive and boot into Windows. The password requirements for BitLocker can be defined by your domain controller. You can encrypt a Windows To Go workspace when you create it by using the Windows To Go Creator Wizard or Windows PowerShell, or you can encrypt it later by using the BitLocker user interface.

Windows To Go workspace creation

When creating a Windows To Go workspace, you can use any existing Windows 8.1 installation image, including the generic image available with volume-licensed media or a custom image that has been generalized using the Sysprep tool and is in Windows Imaging Format (WIM). If an image does not exist, one needs to be created before a Windows To Go drive can be created. After a WIM file is created, a Windows To Go workspace can be provisioned two ways:

- **Windows To Go Creator Wizard** The Windows To Go Creator Wizard (shown in Figure 3-1) is a GUI application that provisions a Windows To Go drive. Available only in Windows 8.1 Enterprise, this wizard automates most of the creation process by prompting only for a few pieces of information. To access the Windows To Go Creator wizard, press Windows key+W and type **Windows To Go** in the search box.
- **PowerShell** You can automate the creation of a Windows To Go workspace by using Windows PowerShell. PowerShell must be run with administrative privileges in order to create a Windows To Go drive.

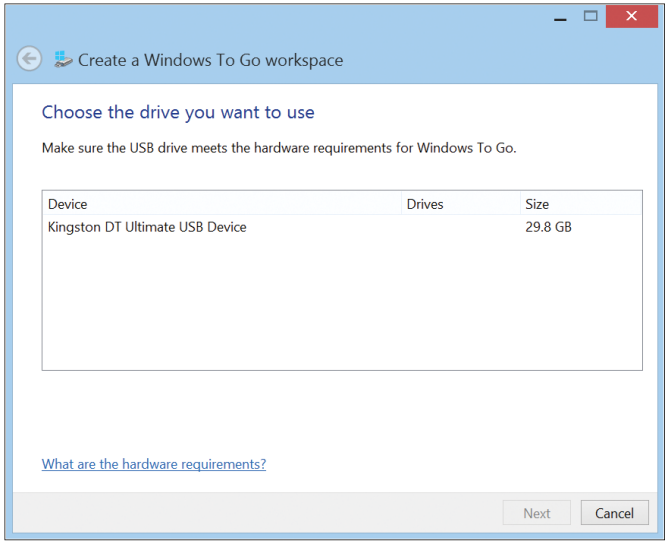

FIGURE 3-1 Windows To Go Creator Wizard.

NOTE **For detailed step-by-step instructions for creating a Windows To Go workspace by using either method, see *http://social.technet.microsoft.com/wiki/contents/articles/6991.windows-to-go-step-by-step.aspx*.**

NOTE **The initial boot of Windows To Go should be on a work machine. This approach allows the drive to join the domain, download any security policies, and enable BitLocker security. If the drive cannot be booted first from work, an offline domain join can be run.**

After the Windows To Go workspace is created and configured, you are ready to boot from the USB drive on any computer that meets the minimum hardware requirements. A computer can be enabled to always boot from the USB, to allow but not prioritize USB boots, or to set boot options in Windows 7 or later.

TIP **Group Policy can be used to enable Windows To Go booting on a domain level for Windows 8 machines.**