Windows Endpoint Image Ideas: Designing and Deploying Operating System Images for Microsoft Windows

One to Many: Network Effects for Endpoint Deployment

SAMPLE

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Preface

There is more than one “way” to get things done in Corporate IT. A small number to a large number of things that get done in Corporate IT are “personal preference” - the preference of the implementer (who may also function as the highest-level decision maker). In other “crafts” or “disciplines”, you might learn different techniques or methods to accomplish the same task, goal or bring about the same result. Exploring the concept of “computer images” based on the Microsoft Windows Operating System, designing images and deploying images is a “tool” for the “tool bag”.

The purpose of this book to pass along or make available useful examples in creating a reproducible process to manage the deployment of computers running Microsoft Windows. Hardware vendors have used “images” for years to consistently deploy computers with an identical configuration. Information Technology (IT) departments (“Corporate IT” or “Organizational IT”) have the ability to deploy images, similar to the process used by hardware vendors. A consistent computer deployment process is part of well-managed IT Operations and IT Support environments.

The contents of this book are oriented around or towards a manual image creation process. A manual image creation process allows the image to be well-documented and well understood.

The use of an image allows the initial Windows computer configuration to be easily referenced and essentially provides documentation for the configuration. Any aspects of the configuration related to security will also be documented. The use of an image enables a “Defense In Depth” approach by implementing specific configuration settings on the computer endpoint. The image configuration can be set up to take security techniques into consideration and allow those techniques to be implemented.

In today’s computing environment, the prevalence of “BYOD” and implementation of smartphones (which usually come with a form of an image - the preloaded apps) may make the need for a Windows image seem unnecessary. However, this is a very pertinent reason for the creation of and use of a Windows image. Each computer deployed with the Windows image starts off from a known point. The initial configuration will change over time as the Windows image does need updating and maintenance. Managing the lifecycle of a Windows image is still much simpler than trying to assess how a non-imaged computer was initially configured or what about the initial configuration led up to the computer being in an usable or degraded state.

Preface expanded - "Let's get some questions answered"

How do you define a "Windows image"?
An "image" is similar to the idea of "taking a picture of a computer configuration". The "image" or "picture" can be used to replicate a configuration to other computers. You can start off with an image creation computer and inspect that configuration as need to achieve the desired goals of using an image. A "Windows image" can be thought of as a "picture" of a "Windows OS configuration with desired programs/applications".

Who should attempt to create an image?
Corporate IT endpoints may or may not be tied to servers in use due to corporate policy. For example, there may be a rule not to upgrade servers until all endpoints are running a minimum level of Windows. A person who is knowledgeable of the version of Windows to be used on endpoints and is knowledgeable of the network environment for the endpoints (on-premises, cloud, etc…) will be best suited for image creation and lifecycle management. The person or people who create an image in your environment

What makes a Windows image most useful?
The ability to install components (programs, settings, etc…) that are applicable to the widest number of endpoints makes a Windows image most useful. Local customizations or requirements (how a computer is configured in one office or one location versus another) are not suitable for a Windows image and make the image less useful.

Who gets to decide what is contained in the image?
The components contained or installed in the image fall within the scope of the knowledge and skill applicable to the image creation. This decision-making may ultimately be shared by people with different roles.

What does this do for computer or data recovery?
Unless the computer needs to be deployed with an initial amount of what might be considered "user data", this image process will not assist with data recovery. The image will assist with re-configuring the computer back to an initial known starting point as long as the computer hardware is functional.

My environment has compliance requirements. Can I use a Windows image? Is a Windows image useful?
You can use a Windows image in an environment that has compliance requirements. The image creation process provides information that can be easily reviewed and that can be shown to be repeatable. Image documentation can be reviewed with the appropriate parties/entities during compliance review.

Why provide a manual image creation process?
A manual image creation process allows the image to be well-documented and well understood. The manual image creation process example contained in this book is mainly tied to the capabilities provided by Microsoft.

Are these any limitations with using a Windows image?
Microsoft has requirements on the version of Microsoft Windows used in order to use a Windows image. You will need 1) the “Enterprise” edition or SKU of the current OS version and 2) the ability to use “Volume Licensing” media. Hardware vendors may have agreements in place that allow other versions besides the Enterprise version of Windows to be used for imaging. These may requirements may be subject to change.

What other benefits can come from using a Windows image?
You can more easily send computers to remote users and have them start from a known, preferred configuration. You can replicate endpoint configurations between test, development and production environments. You may be able to use an image to triage problems and be able to reproduce errors faster. You may be able to print the configuration of the image or the information used in image creation out to paper for physical safekeeping - think disaster recovery.

How do I determine what to start off with for the Windows image?
You can either use an existing computer software inventory to identify programs/applications that are most widely installed OR you can start with desired programs/applications assuming an understanding that other programs/applications will be installed, after the image is deployed, on an as-needed basis.

How long does the Windows image creation process take?
There are multiple phases to the overall Windows image creation process contained in this book. Once the “image creation components” for the Windows image process are in place, the image creation process should take 2-3 hours. Once you get very familiar with the image creation/update process, the time necessary for this process can drop to close to an hour. This investment of time can then be leveraged to ensure multiple computers easily start off from a known configuration.

Do I have to maintain an “infrastructure” for the Windows image?
All of the components related to a Windows image can be kept in the most convenience place possible. For example, the image creation components (or copies of the components) can be kept on an individual USB flash drive or uploaded to a version control repository.

How will I deploy the image?
In this book, you will create a USB flash drive that holds the image and is used to deploy the image. More customized methods of image deployment are available. The use of USB flash drives allows the image to be deployed in environments that have inconsistent or poor Internet connection.

Does the use of a Windows image require "powerful" computers?
A Windows image can be deployed on a computer that meets the minimum requirements for running Microsoft Windows.

Microsoft makes changes to the OS between versions. How does that affect the image?
The manual image creation process can be modified to account for changes between OS versions.

What other benefits can come from using a Windows image?
You can more easily send computers to remote users and have them start from a known, preferred configuration. You can replicate endpoint configurations between test, development and production environments. You may be able to use an image to triage problems and be able to reproduce errors faster. You may be able to print the configuration of the image or the information used in image creation out to paper for physical safekeeping - think disaster recovery.

What if Microsoft stops providing the initial or basic components for image creation?
If this happens, it seems likely that a new method for computer configuration will become available. While the current Microsoft technologies/components are available, you can take advantage of using a Windows image and better understand how to "port" your desired configuration to a new configuration method if or when necessary. The author makes no claims regarding future software created by Microsoft.

Can the image creation process fail?
The image creation process is more likely to fail due to hardware failure of the "image creation computer", a USB flash drive involved in the process or the target test computer.

Does a Windows image get "stale" or become "outdated"?
The exact image files that are distributed at any point may become somewhat outdated. However, this or can be addressed by the individual "autoupdate" functionality in the software installed.

I don't want one person to have knowledge of the image creation process to reduce single points of failure for the process. What can I do?
You can make the necessary documents and files available to your team as widely as desirable.

Do I need to have an ongoing feedback process for the image?
This is up to you for your environment. It is advisable to recognize that all feedback is not applicable and that all feedback will not be actionable. It is recommended to have an "integrity" to the image, to what configurations and programs/applications, get installed on the image.

What is the "elevator pitch" for using a Windows image?
"Make your people productive Day One in as little time as is necessary. A user can press the power button and have the resources of our organization available."

What if I have an existing Windows image solution?
This book can serve as an additional point of reference, an additional point of perspective and a backup to your existing solution.

Is the image creation process modifiable or customizable?
You can add or remove steps/tasks from the image creation process as you see fit. The entirety of the image creation process that is included in this book is presented as a whole. There are some steps that cannot be skipped or modified.

I don't like too much typing. Can I just download and run something to do the whole image process?
Parts of the image process require "bootstrapping" and include manual steps/tasks.

Can I start the image creation process, stop the process and then restart or come back to the process?
As parts of the process require manual steps/tasks, you can stop and restart at appropriate times in the process.

If the Windows image needs to be updated, when do the image updates need to occur?
Depending on the desired image update frequency, image updates are best performed after the 2nd Tuesday of each month (also known as "Patch Tuesday").

What if I make a mistake building the image?
You have the option to start over in order to ensure you have the necessary understanding of the process and to evaluate any "tweaks" (changes or modifications) you may want to make to the process.

About this book

Who is the book for?
- IT “Operations” personnel (including Network, Server or Systems, Support)
- Those responsible for Windows computer deployment within a corporate or organizational environment
- Those managing Windows computer endpoints attached to “on-premises” domain networks
- Those managing Windows computer endpoints attached to cloud networks
- Those managing sets or fleets of kiosk computers, single-function computers

Who is the book not optimized for?
- “Home network administrators” (This is you managing your stuff at home)
- Environments that simply deploy computers “out of the box” (open the computer box and sit the computer box on a desk) - although it is possible that an image was put on a computer by the hardware vendor before shipping
- Embedded computing environments

Does this book incorporate information regarding solutions that can configure computers upon initial deployment?
No, this book does not incorporate information regarding solutions that can configure computers upon initial deployment. This book provides example information built around a manual image creation process and does not depend upon a network-based solution.

I know about Windows images. What will this book do for me?
The Windows image process contained in this book is oriented towards have a repeatable process that is streamlined for manual image creation. Manual image creation allows the most basic elements of the image to be captured and documented. While there may be “sophisticated”, “complex” or “powerful” tools available for image creation and deployment, manual image creation allows the entire process to be more portable between Windows versions (no waiting on support from from a software or hardware vendor, etc…) and allows manual, customized configurations to be implemented that aren’t provided by a software of hardware vendor. For example, you can have a desired configuration that is portable between Windows 10 and Windows 11. You can apply the same process used to implement a Windows 10 image to create a Windows 11 image using the example information contained in this book.

Is there anything hardware specific with the image creation process in this book?
The image creation process example in this book is built around core Microsoft technologies (for creating and deploying the image although not for all components that may be installed on the image). This book does not cover installing components for hardware or software vendors such as drivers or diagnostic programs.

Can this imaging process be used in environments with a small number of computers or endpoints?
Ideas or actions that are part of the imaging process in this book may be adaptable to small numbers of computers or endpoints. Specific aspects of using a Windows image in a small environment are technically beyond the scope of this book.

Why write this book versus upload the any applicable code or specific steps to a resource that is publicly accessible such as GitHub?
This book exists to provide context directly applicable to the image creation process. The context provided in this book will be aligned with the image creation process specified in this book.

Section 1: Requirements

S1.1 Hardware

1. 1-3 USB 3.0 flash drives. Any USB flash drives compatible with your computer(s) can be used. The fastest transfer speeds will happen using USB 3.0 (or faster) flash drives.
    1. Drive #1: This USB flash drive will be used to hold the Microsoft Windows Operating System install.
    2. Drive #2: This USB flash drive will hold the files used to create the image.
    3. Drive #3: This USB flash drive will be used to hold the finished image and also to deploy the image for testing.

2. 1-3 laptops to use.
    1. Laptop #1: This laptop will likely be your normal or “daily driver” laptop. You will use this laptop to download software and use it to research information.
    2. Laptop #2: This laptop will be used to install the Microsoft Windows Operating System and perform the steps to create the image.
    3. Laptop #3: This laptop will be used to test the image. You will deploy the image to this laptop to ensure the image meets the desired configuration.

S1.2 Software

1. Windows 11 Enterprise (latest version available); also see Microsoft Evaluation Center
2. Software to write the Windows 11 Enterprise ISO to a USB drive
3. Windows Assessment and Deployment Kit (Windows ADK)
4. Windows PE add-on for the Windows ADK
5. Microsoft Deployment Toolkit (MDT)
6. Microsoft Office or Microsoft 365 Apps for Business
7. Additional software to install on the image

S1.3 Miscellaneous

1. Labeling machine (optional). You may use the labeling machine to label the USB flash drives and laptops to ensure everything is clearly identified for it’s intended use.