Best practices

for OS imaging and deployment

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Introduction

Any organization with an IT infrastructure has to deal with imaging and deploying operating systems to its workforce. Frequent onboarding of employees can cost huge amounts of time and effort for the IT team.

Depending on the number of machines, the effort involved in migrating and upgrading operating systems can also be significant. This can be streamlined with the help of a comprehensive OS imaging and deployment solution allowing the IT team to focus on other productive tasks.

To get the most out of your OS imaging and deployment, let's discuss the best practices to be followed.

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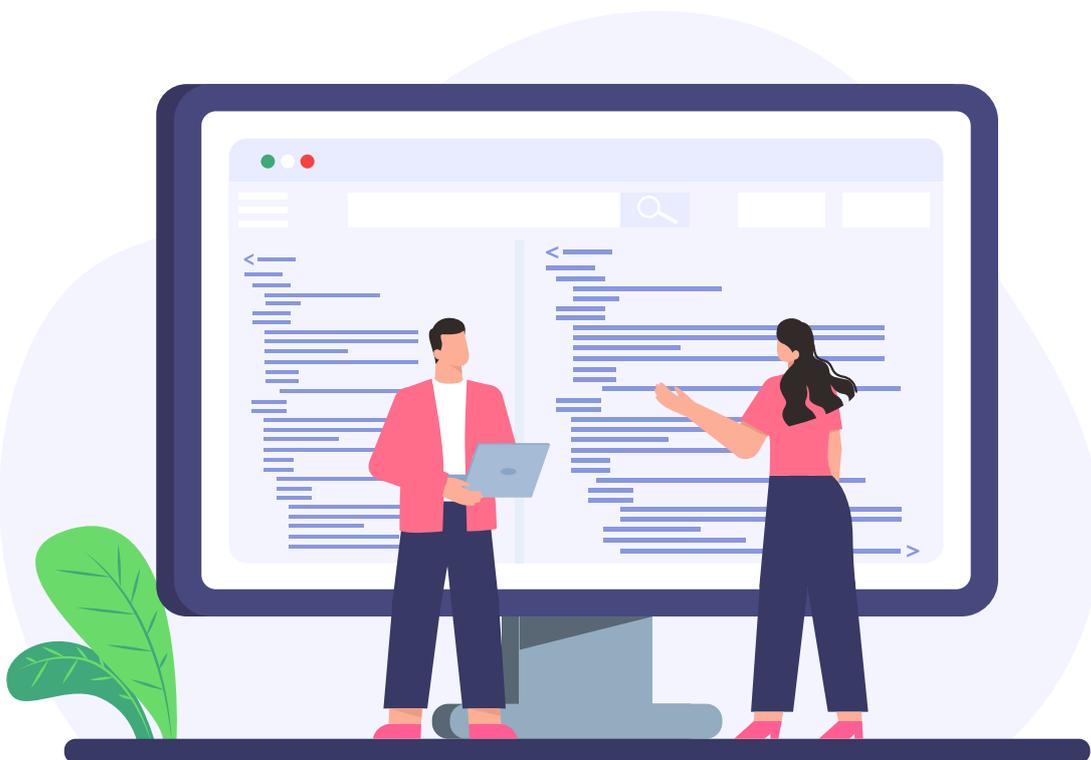
Best practices for imaging machines

Imaging a machine with the relevant OS and disk partitions is the first step involved in OS deployment. You can either image machines that are online with applications running or machines that are shutdown. In this section we will discuss the best practices to be followed while imaging.

Ensure uninterrupted power supply

The speed at which the imaging process happens depends on three factors:

- The size of the hard disk

- The RAM capacity of the computer that is imaged

- The bandwidth of the organization's network

The imaging speed determines the duration of the imaging process, and it's essential to ensure uninterrupted power supply for the entire duration. Losing power during the imaging process could lead to an error in disk imaging and even failure. The IT team must ensure that the system in which imaging is performed does not lose power during the imaging process.

## Why copy empty spaces: Disk defragmentation

Techopedia defines defragmentation as "the process of moving the data blocks on the hard drive around to bring all the parts of a file together.".

Whenever you add a new file or modify an existing file in your hard disk, there is a possibility for disk fragmentation. During modification, fragmentation occurs if there is no contiguous space next to the old file, resulting in the modified file being stored in another location.

Defragmentation ensures seamless access to the hard disk by arranging the parts of a file continuously, thereby optimizing storage capacity. Easier access to hard disk will accelerate data recovery, resulting in faster image creation.

Follow the steps below to defragment a disk:

- Go to **Control Panel > Administrative Tools**
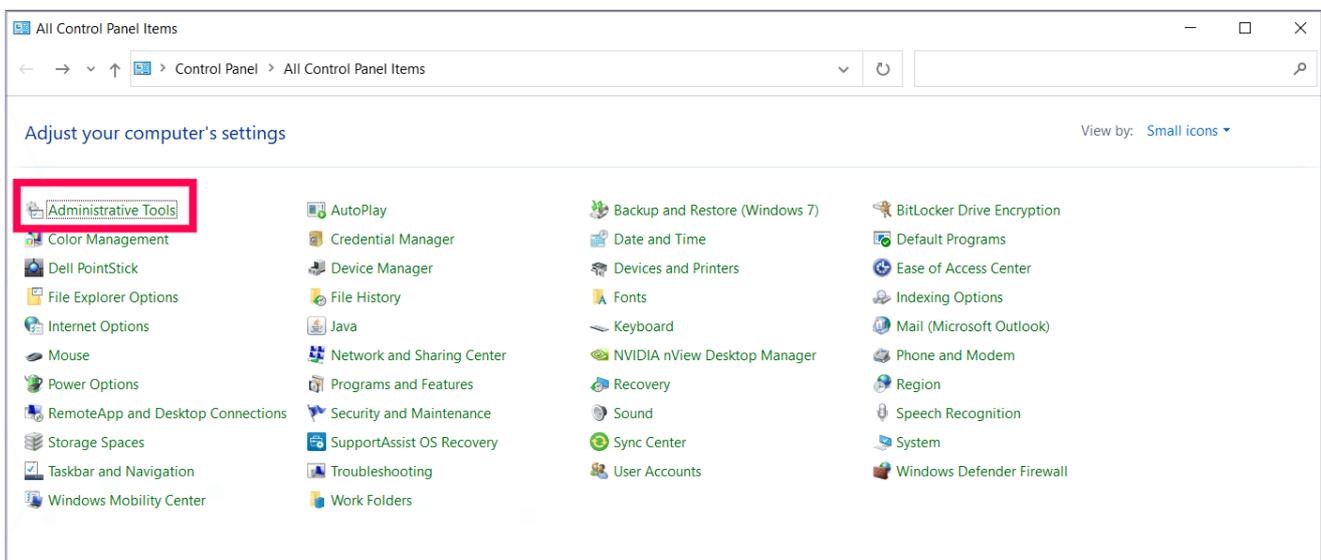
- Select **Defragment and Optimize Drives.**
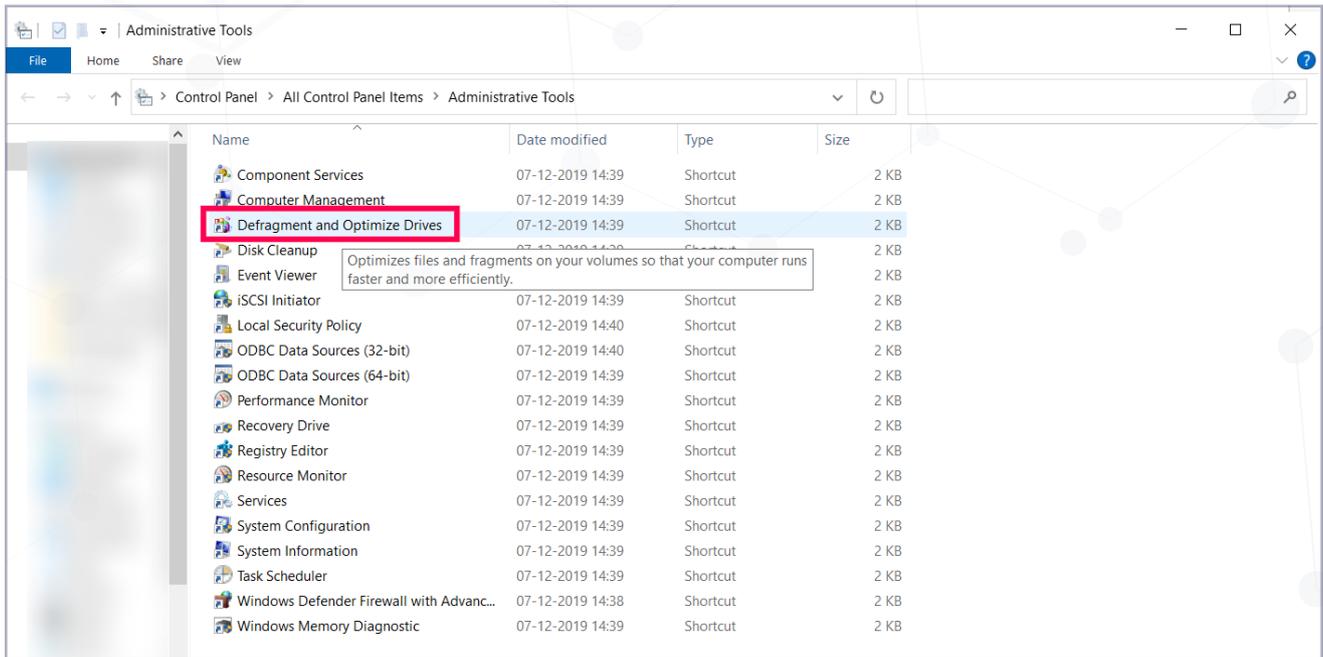
- Select the **drives** that you want to defragment and click **Analyze.**

- Once the drives are analyzed, click **Defragment.**

Sharpen your axe before chopping the tree: Repair bad sectors

A logical bad sector can be a portion of your hard disk that is malfunctioning due to software errors. These errors can be the result of sudden power outages, improper data, file system errors, viruses, malware, etc.

To identify and eliminate logical bad sectors in your target machine, you can use the CHKDSK command. This command scans the computer, spots the logical bad sector in your hard disk, and repairs it, ensuring an error-free hard drive for imaging.

The steps given below explain the whole process in detail:
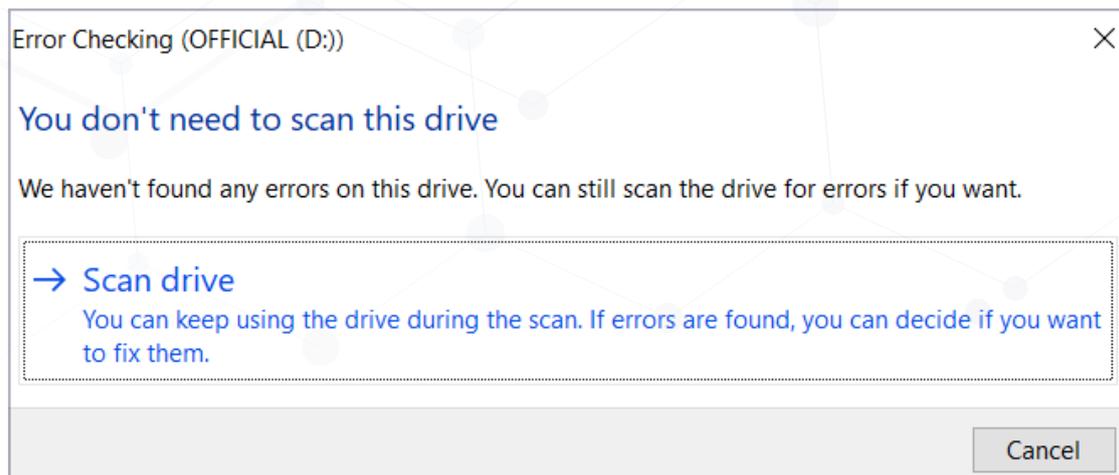
- Open **File Explorer** and right-click the **drive** you want to analyze for logical bad sectors.

- Select **Properties.**
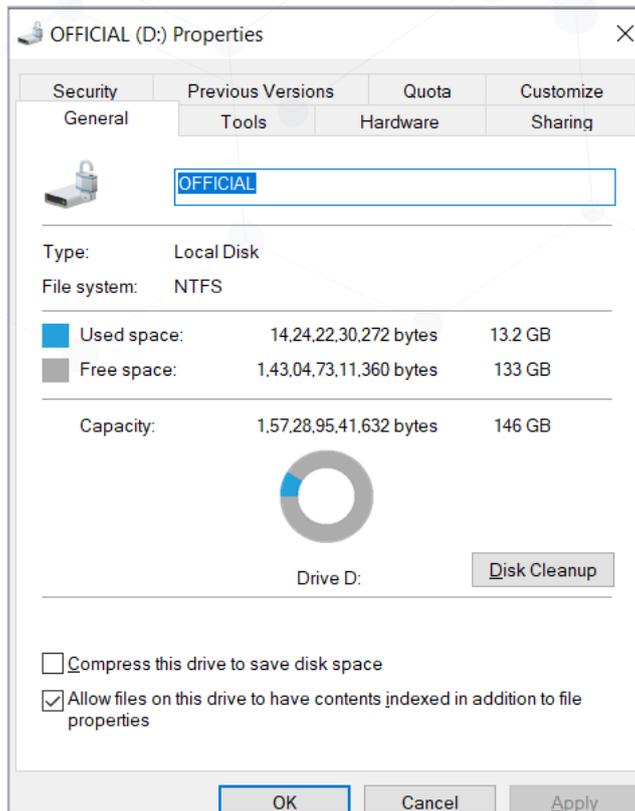
• Select the **Tools** tab and click **Check.**
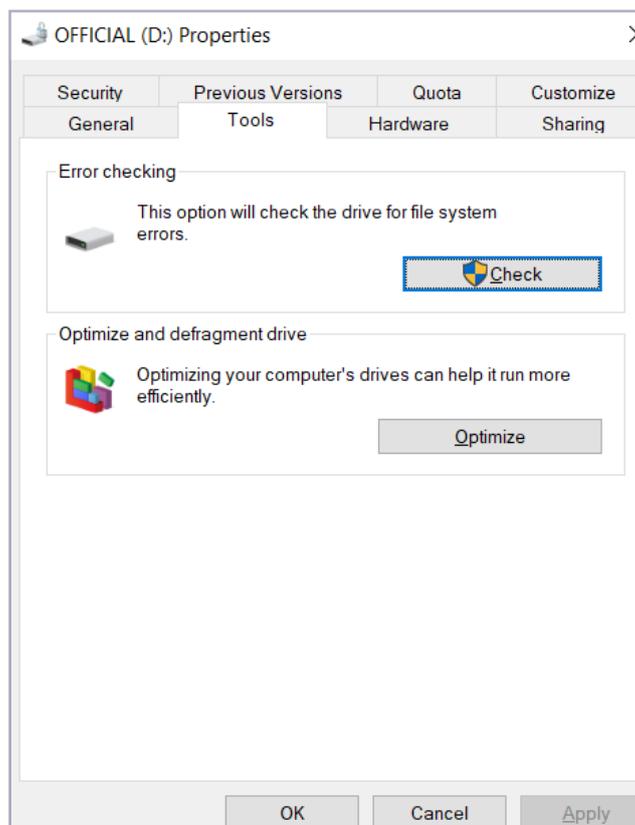
• Click **Scan drive** to initiate the process.

- After successful completion, click **Close** to complete the process.

## Patch up: Check for patch and software updates

Ensure there are no ongoing Windows OS patch updates or any software installation processes in the target machine. If the image creation process is initiated during such circumstances, the pending updates will be reflected in all the computers where the image is deployed.

Instead of updating in a single console, these patches and applications will have to be updated in all the image-deployed machines. Partial OS and application updates may also lead to boot errors after deployment. So it's better to ensure the image-captured computer is updated with the latest patches and other relevant applications.

Lower your disk usage

The storage capacity that your computer currently uses is termed disk usage. This is a performance-related metric indicating the amount of work being done by the computer at any given moment.

If the image creation process is initiated when disk usage is already high, the process might be slow or the machine might even freeze. This is why it's advisable to wait for any existing processes to finish or to kill them before image creation.
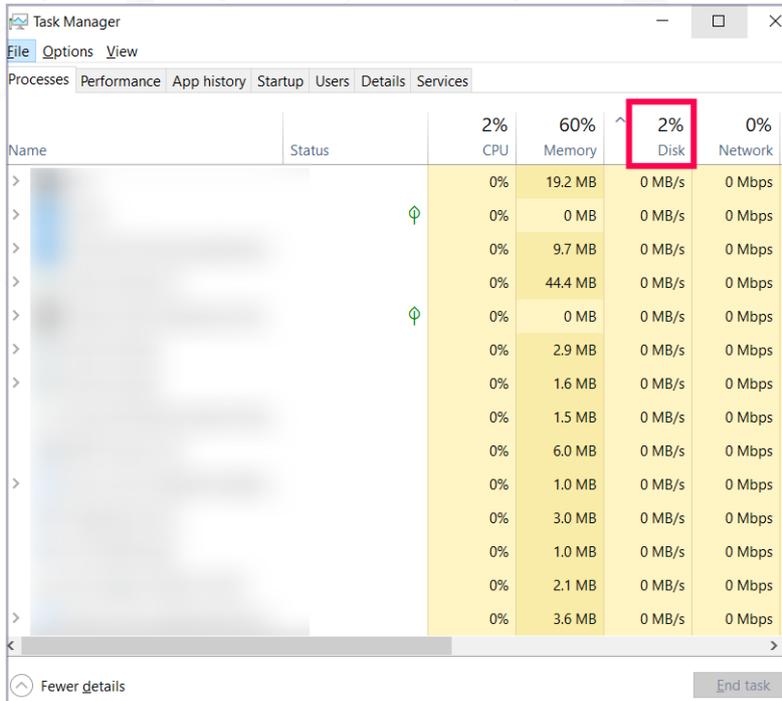
To see your Windows machine's disk usage, open the Task Manager in the computer to be imaged. From the Processes tab, you can check the disk usage of the computer.

Ramp down your RAM: Memory level

Similar to disk usage, the memory level of the computer to be imaged should also be low for a quick and efficient image creation process. This can again be verified from the Processes tab of the task manager.
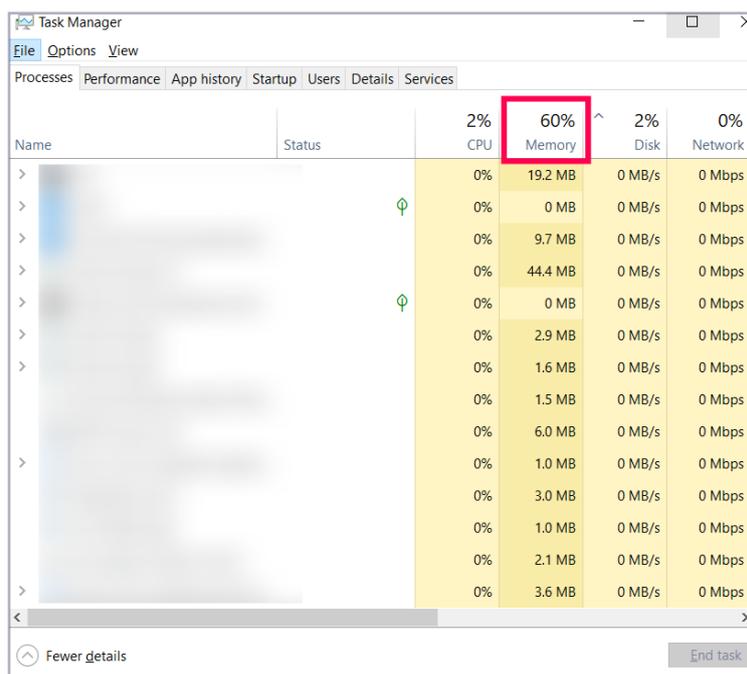
A comprehensive OS imaging and deployment solution like OS Deployer will offer you the option to select the required memory level to be used during imaging. If there are other applications running while imaging, you can select the memory level as low. Whereas if the machine has no other applications running, the memory level can be selected as high, since the RAM consumption will not affect any other process and the imaging will be faster.

Heart of the matter: Check for OS partitions

For seamless imaging and deployment, ensure that the following partitions are included in the imaging process:

- System/firmware partitions: In short, the system/firmware partitions are a portion of the hard disk that contains the software to boot the operating system. These are created for GUID-Partition-Table-style disks.

- System-reserved partitions: Similarly for Master-Boot-Record-style disks, system-reserved partitions are created. These partitions contain the boot manager and the boot configuration data and are used to boot the operating system.

- OS partitions: These partitions contain the OS file and file systems necessary for booting and deployment.

These partitions must be included in the OS image as they're required to boot the system after OS deployment.

Intruder alert: Check for external devices

Ensure that you do not connect or disconnect any external devices to the machine during the imaging process. When it is connected, the newly detected registry components might interrupt the imaging process.

Clear your clutter: Naming image files

Follow a comprehensive naming convention for all your images where the names are unique and easy to recognize. Frequent changes in the name of the image after creation might make the image inaccessible, resulting in deployment errors. Stick with a single name and avoid frequent changes.

Disable bitlocker encryption

Accurately identifying the storage location of the data that's in your hard disk is essential for retrieving and deploying the data to the target computer. That's why disabling the bitlocker encryption during imaging is essential, as it can hinder the identification of contents present on your hard disk.

You can use the following methods to disable bitlocker encryption in all your Windows operating systems:

- Using Windows command prompt

- Using Windows GUI mode

- Using Windows PowerShell mode

For a detailed explanation, refer to this document.

Why carry extra: Shrink partitions

A common scenario during imaging and deployment is that the target disk size is smaller than the image size. To navigate such situations, you can choose to shrink the partitions present in your image to reduce the image size.

This reduction in image size allows users to deploy the image even on target disks of lesser size. Also, you can choose to remove unnecessary partitions during imaging, thereby reducing the size of the image. For example, data partitions containing user data can be removed, as they don't have OS files, file systems, and files necessary for booting.

Best practices for creating bootable media

According to Microsoft, "Windows PE (WinPE) is a small operating system used to install, deploy, and repair Windows desktop editions, Windows Server, and other Windows operating systems."

Before deploying OS images, the target computer needs to be booted into this WinPE environment to prepare it for the deployment process. This process also becomes necessary while imaging offline computers. Bootable media is used to boot computers into the WinPE environment, and it can be in PXE, USB, CD, DVD or ISO format.

In this section, we will discuss some best practices to be followed while creating and using bootable media.

Pack your essentials: Hard disk and network drivers

A hard disk driver allows communication between the hard disk drives and the computer, whereas a network driver enables communication between the network connections and the computer.

You need to make sure that you have added the relevant network and hard disk drivers while creating the bootable media. These drivers should support the WinPE toolkit and the target computers used for deployment.

Keep your drivers updated

To avoid slow running speeds and other performance-related issues in your machine, ensure that your network and hard disk drivers are updated before deployment.

Updating all your drivers can also help you ward off any hacker or other malicious software that can compromise your machine. This is why it's better to add the latest drivers to your bootable media before deployment. Also, ensure the latest version of the WinPE tool is added in the bootable media.

Using OS Deployer's Scan driver repository option, you can scan your driver repository, allowing the latest drivers to be reflected in your console. This can be done once the latest drivers are added to the driver repository.

Best practices for OS deployment
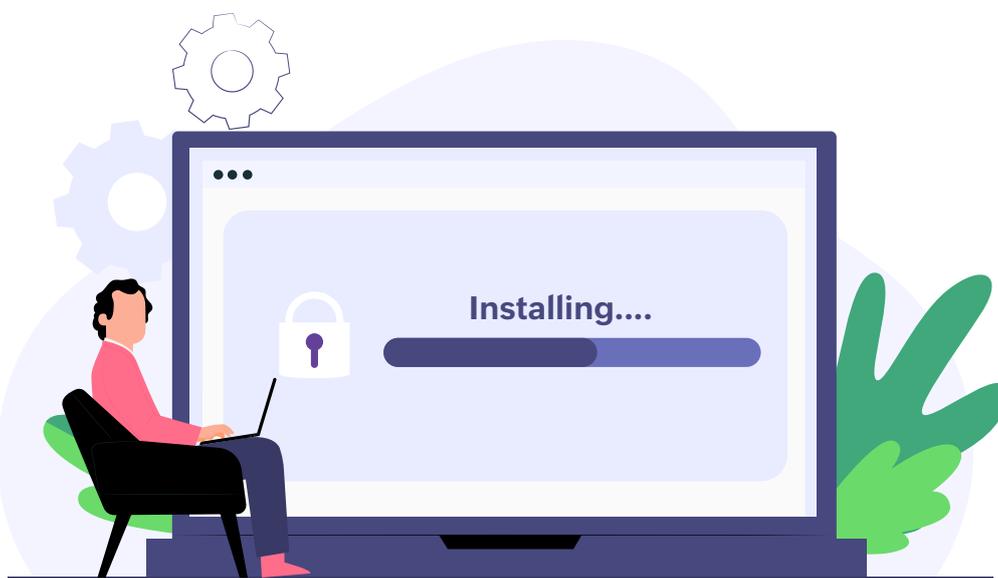
Once you've created a golden image and bootable media, the final step involved in our process is OS deployment. Here we customize the images and the deployment process, schedule it, and then initiate deployment.

For a seamless deployment process, let's discuss some best practices to be followed.

Ensure uninterrupted power supply

Similar to imaging speed, the speed at which the deployment happens depends on the following factors:

- The size of the hard disk

- The RAM capacity of the computer where the image is deployed

- The bandwidth of the organization's network

The deployment duration may be longer depending on these factors, and the target computer must have a power source for the entire duration. If the system battery drops too low during deployment, it might lead to errors and failure during deployment.

Find the right address: Hard disk number

Though most computers have a single hard disk, there are some machines (for example virtual machines) that have more than one hard disk. In such cases, it is best to select the appropriate hard disk number to perform the deployment and make sure that the target computer has the required hard disk drivers to perform deployment.

To find the hard disk number:

- Open the **Command Prompt.**

- Execute the command **diskpart.**

- Execute the command list **disk.**

Optimize your bandwidth level

If your solution allows you to customize the deployment bandwidth, you can restrict the bandwidth usage for optimum deployment. This can prove useful if you're deploying to multiple computers, as the amount of bandwidth consumed becomes higher, resulting in slower deployment.

Multiple deployments, longer wait time

Similar to bandwidth level, specify a wait time for initiating deployment if permitted by your OS deployment solution. During this time, the server will wait for the target computers to connect and retrieve the image for deployment. It is better to have a longer wait time for multiple deployments and a shorter wait time for fewer deployments.

Enable PXE server port

During deployment, ensure that ports 67, 69, and 4011 (TFTP, DHCP) are enabled and not used by any other process, as it is used for configuring the Preboot Execution Environment (PXE) server.

| Conclusion

OS imaging and deployment is a complex and tiresome process that can be streamlined with the help of comprehensive solutions like OS Deployer. However, following the above-mentioned best practices during imaging and deployment can help you accelerate the whole process and optimize your time and effort.

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