PXE Boot Server using AIO Boot Creator and WinUtil
(Pre-Boot Execution)

Mr. Jay Kantilal Bhakhar[1], Mr. Prasad Kailas Kalamkar[2], Mr. Om Bapu Hagawane[3],
Mr. Pavan Pralhad Aghav[4], Prof. Sneha B. Sahane[5]
Department of Computer Engineering[1,2,3,4,5]
MatoshriAasarabai Polytechnic, Eklahare, Nashik, Maharashtra, India

Abstract*: A PXE (Pre-boot Execution Environment) boot server is a network protocol that allows a computer to boot and install an operating system over a network. It is a powerful tool that simplifies the installation process and reduces the risk of errors and inconsistencies, particularly in large organizations where multiple computers need to be provisioned with the same operating system and software. To set up a PXE boot server, a DHCP server and a TFTP server are required. Once the server is configured, the client computers need to be set up to boot from the network. The CTT Windows Utility is a handy script that provides an all-in-one solution for managing your operating system. After you launch the script via PowerShell with Administrator rights, you are welcomed by a four-tabbed interface where you can simply mark the settings or option you want. The five tabs included are representative for their roles, namely Installs, Tweaks, Config, Updates and MicroWin. The Installs tab provides a plethora of options in terms of basic applications recommended for the average user. The PXE boot server & CTT WinUtil tool can save time, reduce costs, and improve the overall efficiency of the IT infrastructure*

Keywords: Operating System, Client Computer, Network Protocol, Pre-boot Execution Environment, DHCP Server, PowerShell

I. INTRODUCTION

PXE (Pre-boot Execution Environment) is a network protocol that allows a computer to boot and install an operating system over a network. A PXE boot server is a server that stores the necessary files and software for PXE booting. In a PXE boot environment, the client computer sends a broadcast message to the network requesting a boot image. The PXE boot server responds to the request by sending the necessary files to the client, including the boot loader, operating system, and configuration files. The client then boots up and installs the operating system over the network.

After installation of the operating system in to the system From an Elevated (Run as Administrator) PowerShell prompt**"iwr -useb https://christitus.com/win | iex"**After you launch the windows utility script via PowerShell with Administrator rights, you are welcomed by a four-tabbed interface where you can simply mark the settings or option you want. As of the writing of this article there is 5 main parts tabs included are representative for their roles, namely Installs, Tweaks, Config, Updates, Micro Win This is a tool that has evolved over several years and achieves much more than just debloating a Windows install. I have expanded it to install the programs you select, which is a bigger selection than ninite. The classic debloat is there, but also includes a tweaks section with quality-of-life features.

A PXE boot server can be useful in many situations, such as in large organizations where a large number of computers need to be provisioned with the same operating system and applications. It can also be useful in cases where a computer does not have a CD/DVD drive or the installation media is not available

II. BACKGROUND

PXE was designed for use in large-scale corporate environments to simplify the process of deploying new computers with standardized system images. PXE booting allowed administrators to configure a single image for deployment across the entire organization, ensuring that each computer was set up consistently and efficiently. Over time, PXE has

become a widely-used standard for network booting in various environments, including data centers, academic institutions, and government agencies.

PXE booting is commonly used to boot a variety of operating systems, including Windows, Linux, and macOS, as well as diagnostic and recovery tools. The use of PXE boot servers has become increasingly popular due to their ability to streamline the installation process, reduce costs, and minimize the risk of errors during deployment. As a result, many organizations now utilize PXE boot servers as a standard part of their IT infrastructure.

The install is basically a better version of ninite that many people use. It leverages Microsoft's winget utility to not only install tons of software that you select with a check-mark, but also gives you the ability to upgrade all the software quickly. By using this utility, you will save hours on the install, but also make it very easy to keep all your programs up to date.

III. DEVELOPMENT

The development of PXE boot server technology began in the late 1990s when Intel Corporation designed the Pre-boot Execution Environment (PXE) protocol. The primary goal was to provide a standardized method for booting computers over a network, enabling remote installation of operating systems and other software.PXE booting was initially designed for large corporations that required a reliable, scalable way to deploy new systems. In the early days, PXE booting was accomplished through complex and often proprietary solutions that were expensive to implement and maintain. As technology has advanced, so too has the range of applications for PXE boot servers. Today, PXE boot servers are used in a wide range of settings, from data centers and academic institutions to government agencies and small businesses.
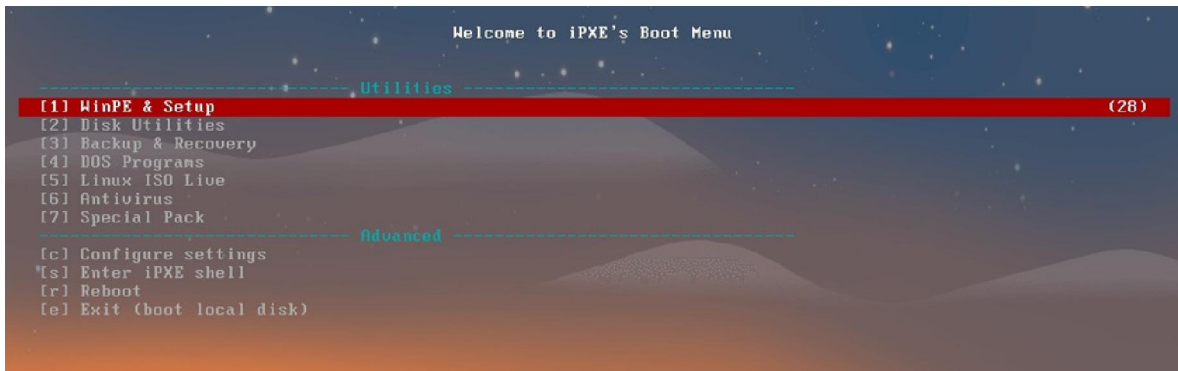
They provide a powerful tool for administrators to streamline the installation process, reduce costs, and ensure consistency across large numbers of systems. Overall, the development of PXE boot server technology has transformed the process of installing and deploying operating systems, making it faster, easier, and more efficient than ever before.

IV. METHODOLOGY

Install and configure a DHCP server: The DHCP server assigns IP addresses to the computers on the network. Configure the DHCP server to assign the IP address of the PXE boot server the default gateway and provide the address of the boot server as the next-server address

Install and configure a TFTP server: The TFTP server is used to transfer files between the PXE boot server and the client computers. Install a TFTP server on the PXE boot server and configure it to listen on the appropriate network interface.

Install and configure a web server: The web server is used to host the boot images and other files required for PXE booting. Install a web server on the PXE boot server and configure it to host the required files.

Create the boot images: The boot images are the files that the client computers will download and execute during the PXE boot process. Create the boot images using a tool such as Syslinux or GRUB.

Configure the PXE boot server: Configure the PXE boot server to point to the location of the boot images on the web server. You may also need to configure other settings suchas the boot menu.

The Installs tab provides a plethora of options in terms of basic applications recommended for the average user. Here you can choose to grab multiple browsers, communication apps, document viewers, multimedia tools as well as various utilities. Simply select the programs you need or use and hit the install button to grab them all at once.

The Tweak tab allows you to select various enhancement options based on whether you use a desktop or laptop. The options here are split into two categories, namely the Essential and Miscellaneous tweaks. You can enable and disable all and, if you happen to change your mind, you can undo everything with one click.

The options in the Essential category include disabling telemetry, hibernation, GameDVR or creating a restore point, just to name a few. The Miscellaneous features allow you to toggle power throttling, notifications, UAC along with removing Microsoft Edge and Cortana.

The configuration tab is where you can install various features of Windows that may not be available on the newer versions. Other configuration options available for Windows include resetting the Windows Updates, installing system features, scanning for system corruption or accessing various legacy settings panels.

Lastly, Chris Titus Tech's Windows Utility enables you to take care of the Windows Updates and even includes a quick way to disable them altogether, if you are using the PC for a specific purpose. By following this methodology, you can set up a PXE boot server that allows you to boot multiple computers over the network & CTT WinUtil tool for windows optimization.

V. TESTING

Testing a PXE boot server is an essential step to ensure that it is functioning correctly and that client systems can successfully boot over the network. There are several ways to test a PXE boot server, including:
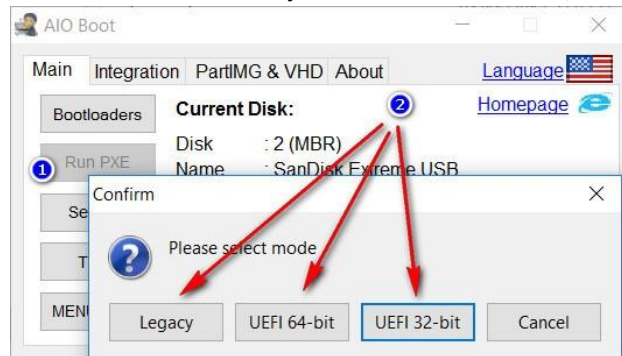
1.Verify network connectivity: The first step in testing a PXE boot server is to ensure that the client computer can communicate with the server over the network. This can be done by pinging the server from the client computer.
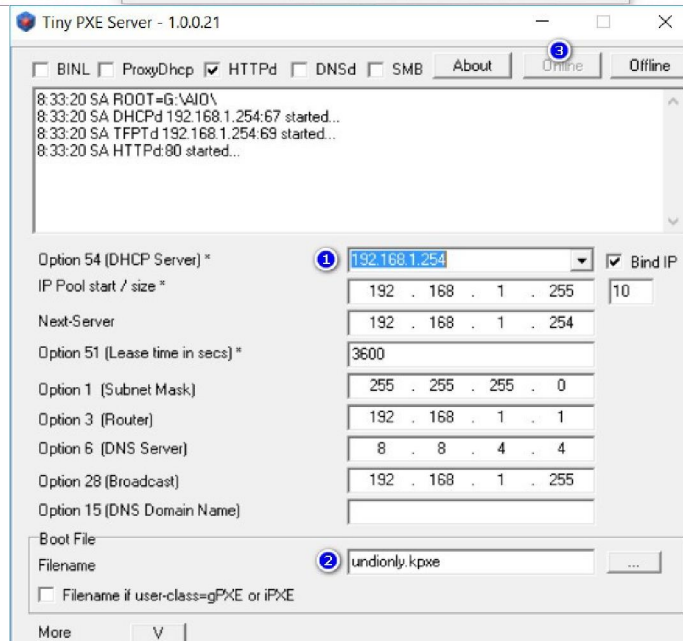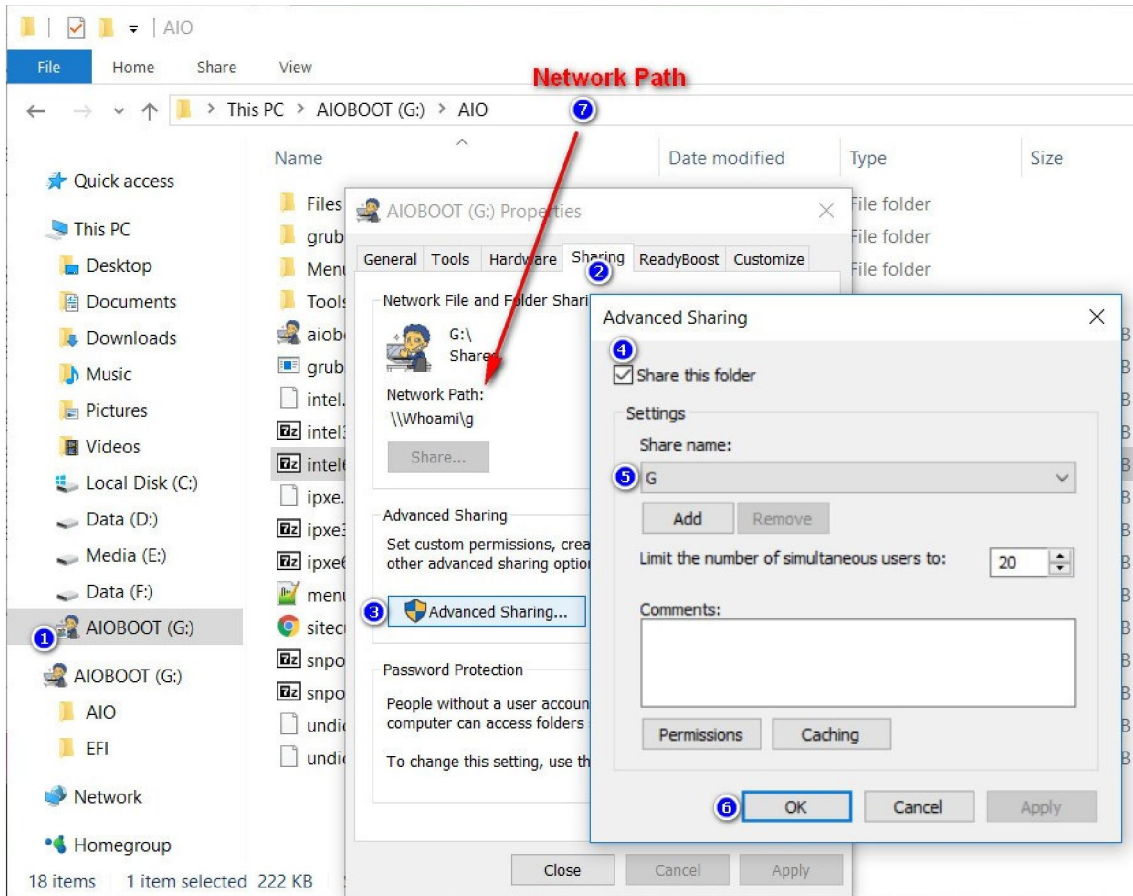
2.Verify DHCP configuration: The PXE boot process requires a DHCP server to assign IP addresses to client systems. It's important to ensure that the DHCP server is configured correctly and is providing the necessary IP addresses to the client computers.

3.Verify TFTP server configuration: The TFTP server is responsible for providing the necessary files to client computers during the PXE boot process. It's important to ensure that the TFTP server is configured correctly and is serving the necessary files to the client computers.

4.Test the PXE boot process: Once the DHCP and TFTP servers are configured correctly, the PXE boot process can be tested by booting a client computer over the network. During the boot process, the client computer should connect to the PXE boot server and load the necessary files to initiate the installation process.

5.Verify the installation process: After the client computer has successfully booted over the network and initiated the installation process, it's important to ensure that the operating system and any necessary software is installed correctly.

6. The options in the Essential category include disabling telemetry, hibernation, GameDVR or creating a restore point, just to name a few. The Miscellaneous features allow you to toggle power throttling, notifications, UAC along with removing Microsoft Edge and Cortana.

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WinUtil Tool (CCT)

After installation of the operating system in to the system From an Elevated (Run as Administrator) PowerShell prompt**"iwr -useb https://christitus.com/win | iex"**to test the working of the CTT WinUtil Tool

The install is basically a better version of ninite that many people use. It leverages Microsoft's winget utility to not only install tons of software that you select with a check-mark, but also gives you the ability to upgrade all the software quickly. By using this utility, you will save hours on the install, but also make it very easy to keep all your programs up to date.

USE CASE

The use case diagram shown in Figure has five actors. First actor is the high-level manager. He (He/She) can login into the system and can add the use case of a PXE server is typically in environments where there are a large number of

client computers that require standardized software and operating system installations. The following are some examples of use cases for a PXE server:
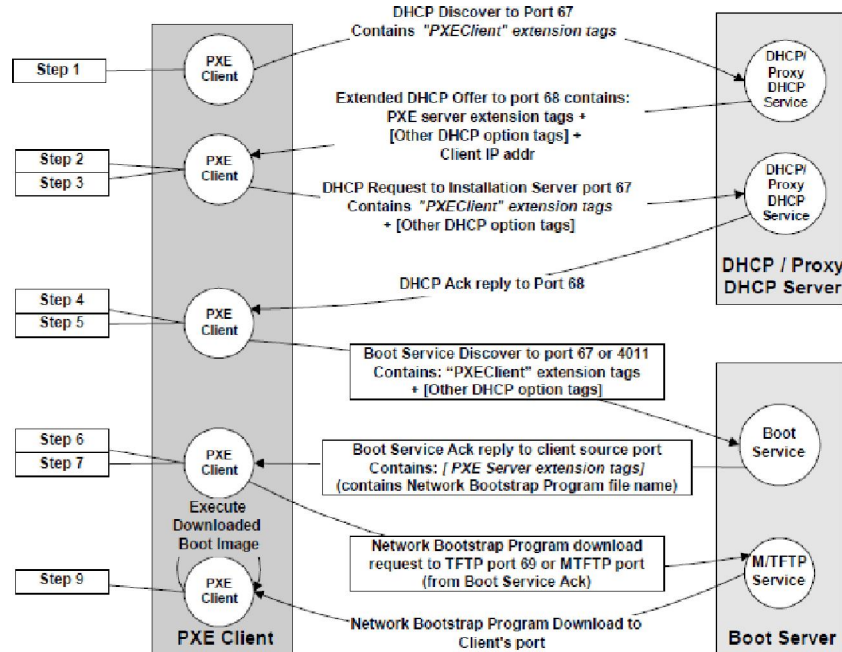
Large Enterprises: In large enterprises, where hundreds or thousands of computers need to be set up and maintained, PXE servers provide an efficient way to install software and operating systems quickly and consistently.

Data Centers: Data centers often require standardized server installations to be deployed quickly and efficiently. PXE servers enable administrators to set up and maintain server installations with minimal effort. Academic Institutions: In academic institutions, where there are many computer labs with identical software configurations, PXE servers simplify the process of deploying and maintaining these labs.

The five tabs included are representative for their roles, namely Installs, Tweaks, Config, Updates and MicroWin. The Installs tab provides a plethora of options in terms of basic applications recommended for the average user. The PXE boot server & CTT WinUtil tool can save time, reduce costs, and improve the overall efficiency of the IT infrastructure Debloating windows is always a moving target and there are many utilities out there. Many of them are too heavy handed in my opinion. This takes a more minimal approach that should not damage your Windows install. At the top there are three buttons Desktop, Laptop, and Minimal. These are curated selections based on my recommendations

Desktop - This is for Desktops *DUH*, but it will disable features like power throttling and many services will be set to not auto start. This will give your desktop the best performance without any downside.

Laptop - This one is just like desktop but doesn't mess with power settings as we don't want to kill our laptops battery.

Minimal - This one will just do the absolute basic privacy / security settings. Very minor optimizations will also be made.

Clear- Deselect all the selected option's

[NOTE: THIS PART OF THE UTILITY CAN BREAK AN INSTALL IF USED CARELESSLY, BUT IT DOES MAKE A RESTORE POINT SO IF YOU HAVE A LOT PROBLEMS WITH IT, YOU CAN USE SYSTEM RESTORE TO ROLLBACK THE CHANGES OR THE UNDO ALL OPTION. THIS IS SOFTWARE IS PROVIDE WITHOUT ANY WARRANTY AND WE ARE NOT RESPONSIBLE FOR ANY MISUSE.]

Windows updates set to defaults are crazy. They install and download at weird times and often update far too much. Itprovides 3 options our recommended one that only installs security updates and allowing features updates after they have been proven over many years.

However, there is a disable all button. It is NOT recommend doing this, but is there for people that have specific software that they don't update and don't want their windows install changing at all. This is NOT secure, but often more stable and why you'd want to do something like this.

V. RESULT / OUTPUT
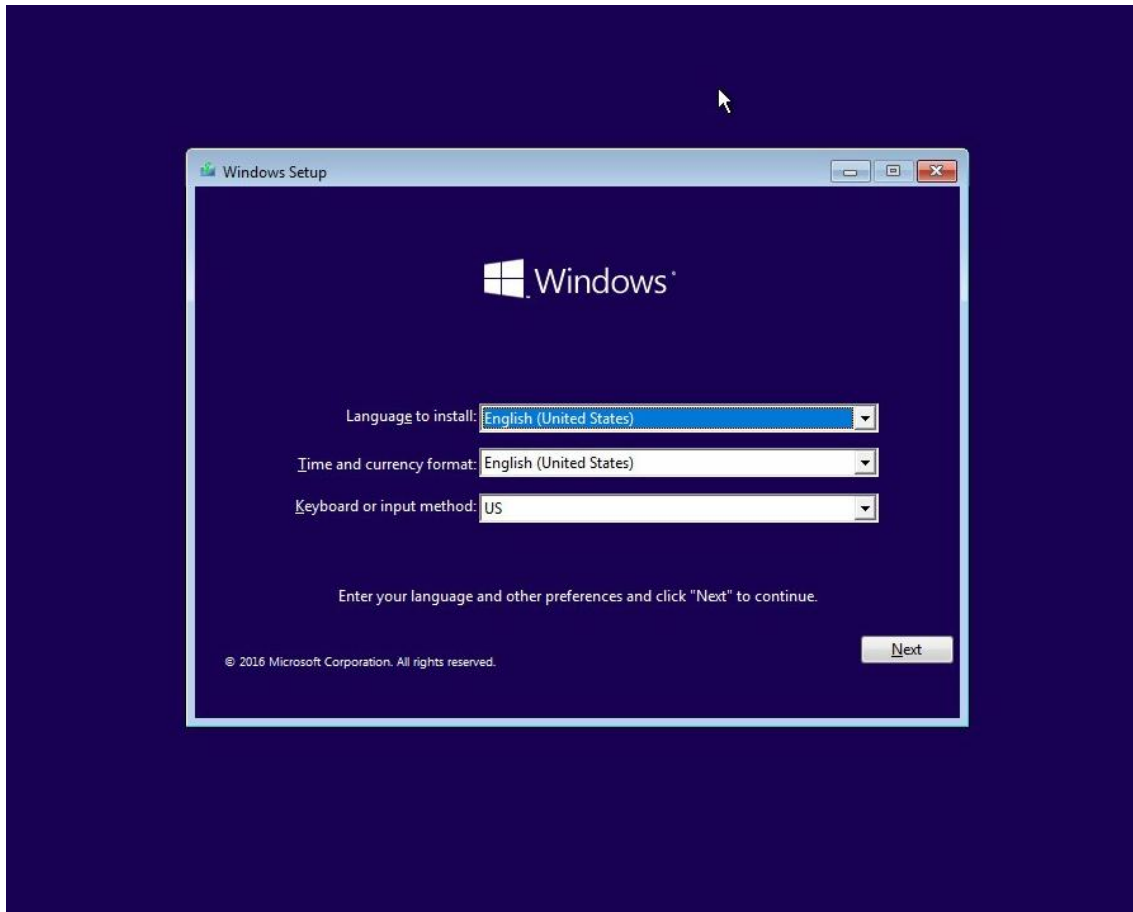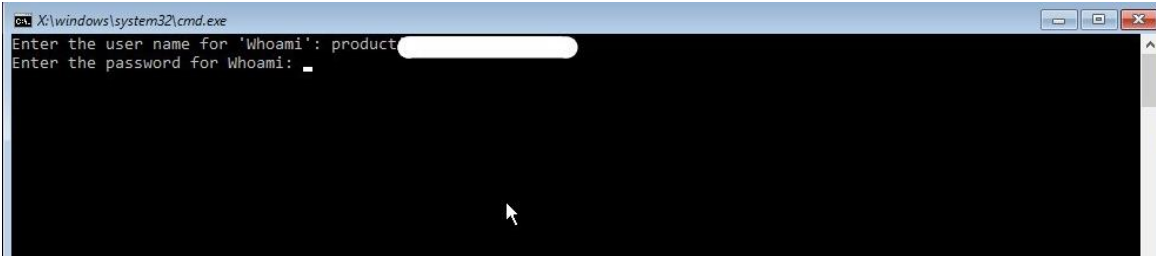
VI. CONCLUSION

In conclusion, PXE boot servers are a powerful tool for organizations that need to deploy and maintain large numbers of computers with standardized software and operating system configurations. By enabling computers to boot over the network, PXE boot servers simplify the process of deploying new installations and maintaining existing ones, reducing the need for manual configuration and minimizing the potential for errors. While PXE boot servers have been around for many years, there is still room for improvement in areas such as security and user experience. As organizations continue to rely on technology to support their operations, PXE boot servers will remain an essential tool for managing large-scale computing environments.

Here you can choose to grab multiple browsers, communication apps, document viewers, multimedia tools as well as various utilities. Simply select the programs you need or use and hit the install button to grab them all at once.The PXE boot server & CTT WinUtil tool can save time, reduce costs, and improve the overall efficiency of the IT infrastructure.

VII. ACKNOWLEDGMENT

We acknowledge the importance and utility of the PXE (Pre-boot Execution Environment) boot server in simplifying operating system deployment and software provisioning across networked environments, particularly in large organizations. Additionally, we recognize the value provided by the CTT Windows Utility script in streamlining operating system management tasks, offering a user-friendly interface, and facilitating essential functions such as application installation, system tweaks, configuration, updates, and potentially PXE boot server setup.

The combined use of PXE boot servers and the CTT Windows Utility script can significantly enhance the efficiency of IT infrastructure, saving time, reducing costs, and ensuring consistency in system provisioning and management. These tools contribute to smoother operations and improved productivity within organizational settings.

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