

Desktop Virtualization: A Study on Thin Client Technology

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Abstract: A practical research result on the virtualization technology is Desktop virtualization. Its goal is to make the desktop virtual wherein the users can log in through the virtual network with any devices at anytime and anywhere to get their personal desktops. One such effective technology is The Thin Client technology which is widely regarded as an effective virtual desktop computing model. It's a secure device where programs, applications, memory, and sensitive information are stored securely in a data center instead of the device itself. These are viable alternatives to regular PCs for businesses that demand flexibility, energy efficiency, improved data security, and longer IT infrastructure lifespan.

Keywords: History of Thin Client, Thin Client Hardware, Thin Client Software, Thin Clients Empowering, Educational Institutions, Pros of thin client devices, Cons of thin clients.

Introduction:

To commence with, it is an effective PC replacement technology that facilitates immediate access to virtual desktops and applications and offers centralized computing capabilities. In the data center changes in the hardware & software and application upgradation can be easily made. It increases the workplace productivity by helping the IT teams to overcome the hitch of resolving the issues at the end user desktop location. In addition to the above the centralized backup of desktops and client access devices simplify the administrator workload. This technology is a server-based computing model that reduces TCO (Total cost of ownership). The applications run on a remote backend server and are displayed on desktop devices users can access application suites from any device connected to the server without requiring IT to install applications on separate devices.

With limited moving components, low memory, and microprocessor demands, these devices consume energy in approximate 8-20 watts in comparison to 170 watt PCs which leads in

drastic reduction carbon footprint, wherein the companies can reinvest the cost savings from electricity, elsewhere. Usage of conventional PCs would make it a complicated scenario in building the PC maps & their drives for a hundred desktops or more. This Thin Client technology is a viable option as it has minimal configuration and comes with plug and play features thus helping the company to gain significant cost savings from reduced levels of IT help desk support, low energy consumption, limited moving components, and high availability. They play an integral role in enabling remote work solutions. The endpoints are ideal for use as the foundation of a customized, enterprise remote work solution. They represent efficient, remotely managed devices that free IT departments to prioritize IT innovation for competitive advantage. Features like easy profile setups with centralized remote management and management software take off the burden of IT systems management. These devices enable flexible deployment by offering both Linux and Windows firmware versions, including a variety of codecs as well as remote display protocols such as PCoIP and Blast Extreme.

Thin Client Architecture

Thin Client Hardware

Thin Clients include hardware with low energy processors, memory, and limited moving components & offer better performance in demanding conditions in comparison to the traditional PCs. A lean client is normally one of many network computers which share computation needs by utilizing the resources of a single server. The users interact with a Thin Client device as if it is a full PC, even though all files and applications are stored on the server. It takes minimum hardware to boot up the primary OS and connect to the server.

Thin Client Software

Thin Client technology streamlines and simplifies desktop endpoint devices by minimizing software footprint on the client side. It contains a small operating system (OS) that significantly decreases client-side setup and overall administration. The software allows the device to boot and connect to the Thin Client Server. The process begins with booting the OS after which the client receives the IP address and sets other variables. Then the system connects to the server-side computing through industry-standard products or protocols such as VMware, Citrix, RDP, and browser-based connectivity. Users then log into the server using server-side credentials. Thin Client solutions facilitate cloud access which eliminate the

need for a large set of data storage, local user applications, and system assets. In this way, a good portion of software workload execution is delegated to a secure data center which centralizes different elements for increased visibility, transparency, and scalability such as information recovery, user utilities, and desktop repurposing functions.

Thin Clients Empowering Educational Institutions

Currently using PCs is questionable in academic institutions where activities like annual enrollments increase the user count. Updating computers with the latest software and programs is a time-consuming process and affects productivity which leads to poor academic performance and finally unsatisfactory results. Hence, it makes sense to consider affordable and collaborative technology that allows IT to create simple, secure and centrally manageable infrastructure. This helps teachers and students focus on important deliverables rather than having them waste time on reporting and troubleshooting IT issues. It is also important that the administration has control of each and every computer system to ensure the best possible usage of technology for educational purposes. In the case of a traditional PC environment, it would require institutions to install various software on each system which enhanced the complexity of the process. On the other hand, Thin Client technology gives the administrator complete control of the operations on each system along with the power to limit operational capability on a particular system.

Advantages of thin client devices

- **Economical:** Thin clients lack a hard drive and often use less powerful processors than PCs. Therefore, the cost of each device is lower.
- **Scaled:** Expanding a server-based system simply requires adding a thin client and connecting it to an account on the server.
- **Eco Friendly:** Thin clients have a smaller carbon footprint than PCs because they have fewer moving parts. With smaller processors and less memory, thin clients also generate less waste heat. Thin clients are centrally controlled by a server. This means they are:
- **More secure:** Since users can't install programs or store files on their terminal, thin client devices are less vulnerable to malware.
- **Easily managed:** Installing new software, patching applications or operating systems, or upgrading the network requires work only on the server rather than on each terminal.

Moreover, since user files are stored centrally, files can be found by searching a single location.

- **Less vulnerable to data loss.** Enterprises can control access to, and use of, the centrally stored files. Specifically, a system of thin clients can be configured so that the devices can access files without copying or deleting them.

D-Adv of thin clients

While thin clients are versatile, in certain scenarios, PCs provide more optimal features. The greatest drawback of thin clients compared to PCs is the lack of power. Certain types of applications, such as computer-aided design programs, require more processing power and memory than a thin client can provide. Since thin clients run software and use files stored on a server, an enterprise must invest in a powerful server and high-bandwidth network infrastructure or the system may bog down. Worse yet, a single point of failure can take an entire enterprise down. Viz, poor server maintenance or a bad network switch can stop productivity altogether.

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