HealthTech Advisors

Desktop Virtualization for Clinical Workflow Optimization

August 2023

Executive Summary

Clinical Workflow Productivity

One of the more significant and costly challenges for hospital systems is investing capital funds for regularly scheduled PC replacements. This causes a situation where the average age of PCs can exceed five years and results in a high hidden cost of increased break/fix activity. **In the past several years we have seen PC ages increase in some hospitals where 50% or more are 5 to 8 years old. Unplanned outages of PCs result in clinical workflow inefficiencies and causes a substantial burden for IT support staff and unnecessary cost.**

Delivering EHR, Clinical Ancillary & Busibess Applications with Virtualized Technologies

Most healthcare organizations utilize a virtual application delivery technology from companies such as Citrix and VMware, and have a good track record of providing high availability to EHR and business applications, even on an older population of PCs in the workplace. Both Citrix, VMware and other technologies such as NComputing Verde VDI have provided virtual desktop infrastructure (VDI) technologies for more than a dozen years. VDI differs from application publishing in terms of VDI providing a full Microsoft Windows instance and applications from the data center to the end-user device. The end-user device can be a full PC or a scaled down and inexpensive Zero Client workstation. The term "Zero Client" refers to a thin-client workstation that replaces the full PC with Window architecture and that securely operates within the VDI platform.

VDI is Mature and Ready for Healthcare Organizations

In years past, full VDI was cost prohibitive for most healthcare organizations and the VDI management tools were not as complete as they are today. VDI is a mature technology and cost effective in terms of longer useful life of Zero Client PCs and substantial reduction of IT support for break/fix. Zero Client lifespan is typically longer than regular PCs; eight years or more is expected from Zero Clients versus the three to four years with a traditional PC. And with the cost being as low as $300, Zero Clients cost about 70% less than full PCs.

VDI Recommendation

VDI can very likely be deployed for about the same cost as a Windows 10 PC replacement project and the total cost of ownership over an 8-year period can be less than traditional PCs. **Another major benefit of VDI is increased clinician satisfaction because they now have complete roaming capability between VDI workstations. Their VDI session follows them to wherever they login next.**

Now is the time for change and adoption of desktop virtualization by starting a pilot implementation, testing frequently and recognizing that VDI provides the best value when you focus on the clinical users that need IT systems mobility as a normal part of their workflow.

PC Support Challenges & Costs

Healthcare organizations have struggled for years to provide and to maintain their laptop and desktop computer environments for their clinical users. This is especially difficult for hospitals and clinics with their EHR, clinical ancillary and business application. Implementing an EHR is very expensive and the planning for upgrades often requires changes or upgrades to the desktops and laptops, which are referred in this document as the end user device environment.

Even a few years ago, when user access was primarily limited to end-user devices that were purchased by the hospital, the effort required to maintain security and to manage the end-user devices has been challenging, expensive and inevitably has gaps. Combine the existing challenges with the current dramatic shift to allow staff to work remote, makes the effort required to maintain a stable end user device environment increasingly difficult.

Each time the IT support staff needs to go to the end-user devices to make a change or repair, the cost to maintain the desktop environment goes up. Hospitals tend to replace desktop computers only when there are no other options. This creates an environment where the average age of a desktop PC can be five years or more. After three to four years of use in a typical clinical production environment, the frequency of break-fix events increases dramatically and this results in even higher support costs. Very few hospitals track the actual cost of supporting their end user device environment; however, hospitals are becoming more aware of these hidden costs and are beginning to recognize the resulting poor performance of aging end-user devices. Out of control end user device costs and frustrations have made desktop virtualization very appealing and advances in desktop virtualization technology is allowing it to be cost effective.

Clinical Workflow Productivity and User Satisfaction

Clinical workflow and user satisfaction are key performance indicators for many IT departments. Without VDI, every time the clinical user moves to the next desktop, they have to login to that workstation and re-launch any of the clinical applications that their workflow needs. The login process requires multiple steps and can take minutes to complete in some environments. The lack of computing session portability from one PC to another creates clinical workflow inefficiencies and a major dissatisfier of clinicians.

One method used to combat this time consuming login process is to deploy a single sign-on solution. One of the more popular versions allows the clinical worker to tap their ID badge on a reader attached to the desktop, the single sign-on software helps to automate the process of logging in to all of the applications the user needs. This is expensive, but because of the time savings it provides to the clinical user, it is considered worth the expense by many hospitals. This helps the situation, but the process of launching each of the applications is still required, the automation only speeds the end user's portion of the login process. Each application still takes time to launch and the end user still must navigate to the appropriate location in the application to continue their work.

VDI Improves the Clinical User Experience

Because virtual desktop infrastructure (VDI) provides a simplified login process, each application remains open and running. This is a significant improvement for the end user. When they move to a different end-user device, they only need to login to their virtual desktop to continue working. One login, without the delays from having to launch each of the clinical or other applications they use in their day to day workflow. The VDI desktop provides an improved clinical user experience by removing the painful process of constantly re-launching each of your applications as you move from one end-user device to another.

Remote Workers and Information Security

In July 2020, Gartner conducted a survey across multiple industries that suggested as many as 82% of companies will continue to have a portion of their staff working from home. This greatly increases the complexity of maintaining strong security and management of end-user devices. The traditional approach of purchasing desktop computers, installing an operating system image, and configuring the computer before deploying it to the end user is quickly becoming untenable.

Traditional work remote options have fallen short and a better solution is required. Remote workers need the same experience no matter the location. Desktop virtualization provides a centralized data center solution that leverages existing laptop PCs and the purchase of low cost zero and thin client devices. Careful planning can bring costs in-line and deliver a VDI solution that dramatically improves an organization's ability to respond to upgrades, manage security, and reduce desktop support staff.

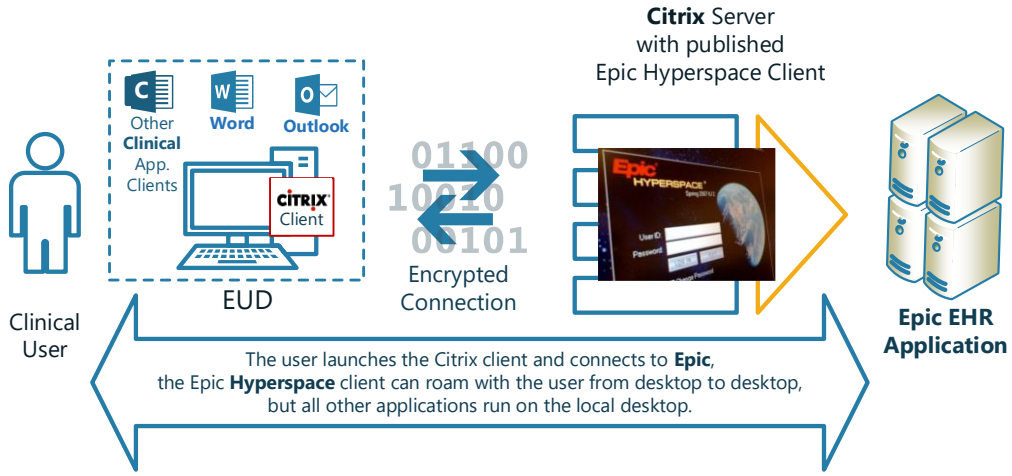
Data security is where deploying VDI becomes a best practice and significantly better solution than the alternatives. It is now possible to provide access to EHRs and other enterprise and department applications from an end user device that only requires a secure network connection to a virtual desktop running on a server in the data center. This moves all of the security and management of the virtual desktop to the datacenter.

The physical end-user device can now be a zero client, a thin client, or a PC re-purposed to be a VDI terminal. Data no longer sits on the user's physical desktop and the user is able to move to any physical end-user device and continue working from their virtual desktop session. Both the cost of purchasing and managing the physical end user device drops by more than half of the current costs. New devices can be purchased and deployed quickly, because they have minimal configuration, and management of those physical devices is simple and at a low cost.

Furthermore, the thin and zero client end-user devices can have a useful life double that of traditional PCs and reduce break-fix effort to nearly zero because most have no moving components inside the device. The VDI desktop solution provides simplified resource management, capacity can be easily sized up or down. Remote work is more secure and nearly identical to working locally. Application upgrades and software patching no longer require the IT staff to touch each end-user device.

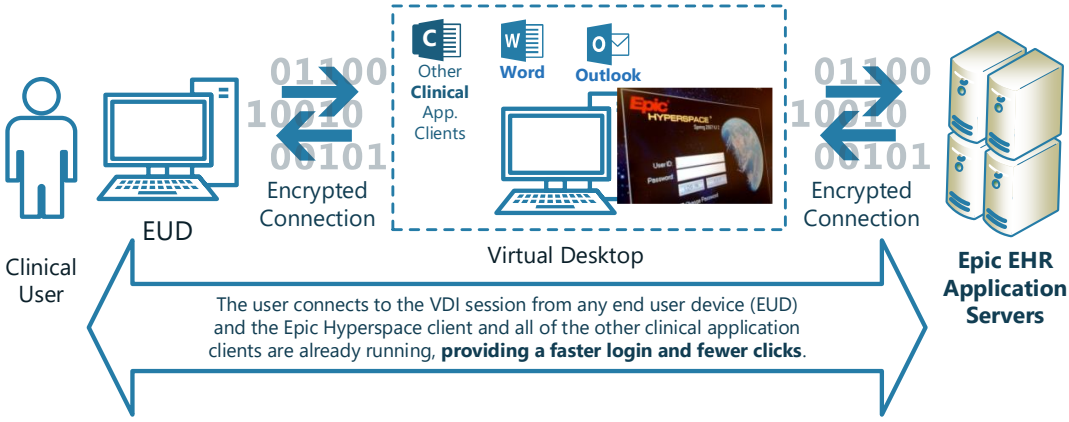
What About My EHR Environment?

Let's use Epic as an example. Epic environments provide end-user access to Epic Hyperspace as a published application session running on a Citrix server. These Citrix sessions are an application virtualization solution, where the Epic Hyperspace client is running on a Windows Server in the data center. Shared Hyperspace sessions running on a VDI server are easy to manage and monitor for application performance. The general architecture is shown below.



Full VDI Instance with EHR Systems

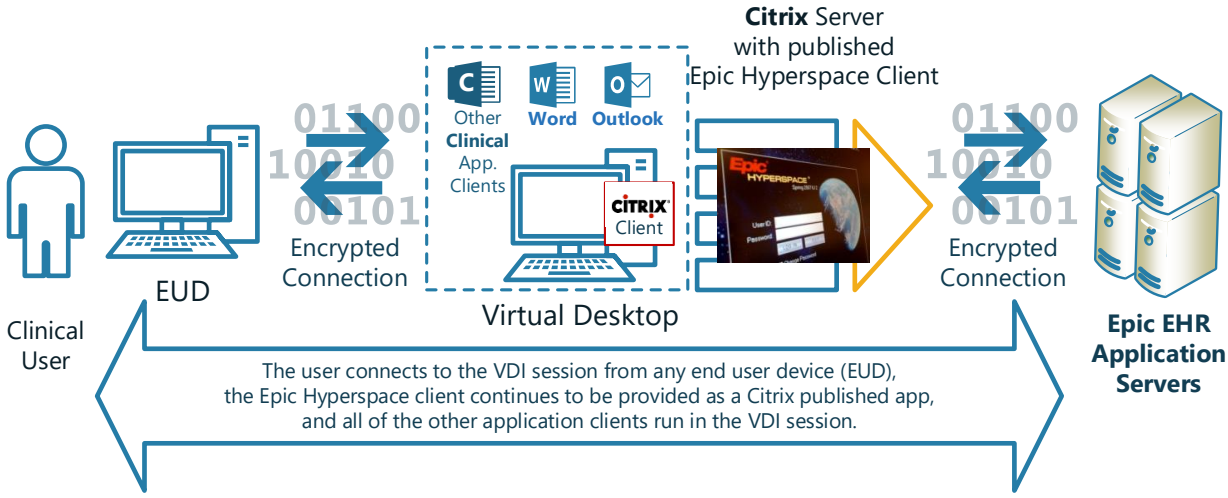
For the most part, the move to Windows 10 or 11 has had minimal, if any impact on the EHR environments because EHR client is running on a Windows Server. For the very small number of organizations that are running the EHR client on a Windows 10 virtual desktop, there is an important performance difference. While Windows 10 provides significant improvements in almost every other measurement. The performance of the EHR client software running on a Windows desktop does not provide the same performance metrics as measured by EHR monitoring software. The architecture of the full VDI instance is illustrated below.



Why does this happen? The full Windows PC has more background processes and overhead that compete with the EHR client software. These background processes and overhead are very desirable for the end user, except when you are measuring application performance for an individual application. What this means for users running their EHR client on a VDI virtual desktop is that their performance measures will not be as high as they are for a user running their EHR client as a published application on a VDI server.

VDI Instance with EHR Client in a VDI Session

For healthcare organizations that already have a VDI server environment with the EHR application publishing in production, the virtual desktop session can run the published application session as a "session in session" solution, also known as a "double hop" configuration. This simply means that a user connects to their VDI desktop and then launches the EHR application through a VDI client session that is running on their virtual desktop. This may seem to be more complex, but it takes advantage of all of the strengths of the virtual desktop and the published application solutions. This architecture guarantees that the performance of EHR client is the same as today and leverages the capital investment in the VDI platform. The image below depicts the VDI instance with session-in-session running Epic Hyperspace in Citrix.



Citrix has wisely created what they call a "Multi Type" license that allows a single license to be used to access both the Citrix published application and the VDI desktop. This helps lower the cost of implementing a Citrix VDI solution when you are already paying for a Citrix published application solution.

Conclusion

Virtual Desktop Infrastructure is now a mature technology and organizations should recognize that there is a learning curve for technical teams. Not only do you need to train your staff, you need to test the applications in your environment to make certain you are able to successfully implement all of the technical details. For example, managing applications and printing will consume the majority of the technical staff's time. HealthTech Advisors[2] recommends that the best way to ensure you have a successful implementation is to conduct application packaging, integration and testing well before any plans to deploy the VDI environment. However, when the cost, performance, and future sustainability of VDI is compared to the alternatives, there is in the opinion of HealthTech advisors no better way to provide an outstanding clinical user experience and deliver a highly manageable and supportable end-user device environment. Now is the time to start moving to desktop virtualization by starting small, testing often and recognizing that VDI provides the best value when you focus on the clinical users that are continually moving to a different end-user device as a normal part of their workflow.

It's recommended to not waste capital funds replacing old PCs running Windows with new PCs. *Now is the time for change and adoption of* ***Desktop Virtualization*** *by starting a pilot implementation, conduct thorough testing and understanding that VDI provides the best value when you focus on the clinical users that need IT systems mobility as a normal part of their workflow. If you would like assistance with VDI strategy, planning, costing, and developing a pilot environment, please contact us at HealthTech Advisors.*

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