



HEALTH INDUSTRY INSIGHTS EXECUTIVE BRIEF

Virtualization in Healthcare: Less Can Be More

Adapted from *Virtualization: Healthcare's Cure for the Common Cost?* by Marc Holland, IDC #HI205033

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INTRODUCTION

Healthcare providers face the seemingly impossible task of increasing services while having to cut costs. In addition, these organizations face the challenges of managing increasing amounts of data in a highly regulated environment. Not surprisingly, healthcare providers are looking to their IT departments to help them succeed.

This Executive Brief discusses server and desktop virtualization technologies increasingly being adopted in many industries. It also describes the benefits and challenges of adopting virtualization in the healthcare environment and provides guidance to healthcare organizations evaluating this technology to centralize IT and cut capital costs.

VIRTUALIZATION GOES MAINSTREAM

U.S. healthcare providers are facing enormous pressure to improve quality of and access to care while simultaneously controlling costs. Pressure to control costs is coming from the government and especially employers, which pay more than two-thirds of the nation's healthcare bill.

At the same time, payers, the government, employers, and consumers alike are demanding better quality of care and improvements in patient safety and service quality. This, combined with the government's directive to bring the U.S. healthcare industry into the digital age, has accelerated the adoption of IT in almost every aspect of healthcare delivery. But while IT is seen as a critical element of change, competition for capital in healthcare organizations is limiting the rate of IT investment.



As a result, many healthcare organizations are looking for new ways to control infrastructure costs and make expenditures go further. While standardization of hardware and applications has long been a cost-saving tool, enterprises are also looking to newer technologies such as virtualization to reduce IT infrastructure costs and redirect those savings to improvements and expansion of other, customer-facing services.

According to IDC research, server virtualization is largely considered to be mainstream in many industries. Recent end-user surveys have found that as many as 50% of companies surveyed use the technology, including in such mission-critical applications as supply chain management and enterprise resource planning. In fact, those employing server virtualization on average report that roughly one-quarter of their production applications are running on virtual machines.

Within the next 12 months, these same users expect nearly 50% of their applications will be hosted on a virtualized server. The healthcare industry has likewise begun to adopt this technology.

VIRTUAL MACHINE SOFTWARE AND ITS USES

Virtual machine software uses excess processing capabilities in certain computers, or adds a new layer of emulation, to enable multiple operating environments and related applications and tools to run simultaneously. As a result, operating systems and applications that were previously run on dedicated machines can now run on the same machine.

Each of the added operating environments is a file that "thinks" it controls the entire machine, but resources are actually allocated on a needs basis. Usage is determined at configuration of the computer or is controlled by management software. This virtualization can happen at both the server level and the client level.

At the server level, virtualization can cut IT hardware spending. Consolidation continues to be the major use case as customers look for ways to reduce server footprints, utilize the capacity of their systems better, and lower their datacenter power consumption. Companies also are looking to streamline the deployment of new or enhanced IT services. Being able to support development, testing, and production on a single system in a safe way is another response to this requirement. Virtualization enables faster, more agile provisioning of systems, going from weeks to, in some cases, hours, or even minutes.

Similarly, organizations are seeking ways to reduce ongoing support and server administration costs while increasing the availability of IT services. Early data suggests virtualization can help an organization reduce its server to admin ratios. And organizations are constantly finding new uses for server virtualization, including broadly using the technology for business continuity and resource pooling. Disaster recovery is another growing application for virtualization.

Because of the success of virtualization at the server level, interest continues to rise in client virtualization. IDC defines virtualized client computing as the set of virtualization software and delivery technologies enabling a new client-computing model aiming to solve existing client management, security, and compatibility problems. Included is desktop virtualization, which delivers entire desktop environments to clients by running an isolated virtual machine, complete with its own operating system, applications, and data on top of an existing PC's operating system.

IDC contrasts virtualization *of* the desktop and virtualization *on* the desktop. The two approaches are categorized as follows:

- **Server-hosted virtualization.** Virtualization of the desktop is a type of server-based computing where the virtual client is streamed onto a target PC. Many vendors refer to their server-hosted virtualization solutions as virtual desktop infrastructure solutions.
- **Client-hosted virtualization.** Virtualization on the desktop is a type of virtualization software that creates a local virtual machine on a host PC.

Both approaches are garnering strong interest from users, with virtual desktop infrastructure deployments more common than client-hosted virtualization. While less mature, client-hosted virtualization offers a more lightweight and flexible approach than virtual desktop infrastructure. As both types emerge, IDC believes that ultimately enterprises will employ a combination of these technologies, based on employee roles and use cases.

THE BENEFITS OF VIRTUALIZATION IN HEALTHCARE

Virtualization in general provides many key benefits. Because virtual machines are files, they can be copied, backed up, replicated, and moved just as though they were files. As a result of this resource-sharing capability, healthcare organizations can improve system availability and performance by doing the following:

- Eliminating unplanned outages by enabling automatic switchover to working resources

- Dynamically allocating system resources to accommodate peak workload requirements
- Providing the ability to shift workloads to available servers during periods of scheduled downtime

Energy savings from virtualization can come from decreased energy consumed by idle servers as well as reduced cooling needs and space requirements with fewer servers in the datacenter. Additionally, public perception associated with organizations that are trying to be more "green" adds an intangible benefit.

As more healthcare workers become mobile, client virtualization provides the ability to log in to essentially any computer connected to the network. With proper authentication and security procedures, the "new" computer acts just like the worker's own, with the right applications and access to appropriate data. As a result, workers do not have to carry laptops from location to location, which not only is easier but also helps minimize the number of copies of sensitive patient data.

From a regulatory compliance standpoint, the standardization of a virtualized image and the ability to secure and patch only that image as new threats emerge also provide benefits by showing regulators that the healthcare organization is taking a proactive approach to PC and data management. Inventory control and audit reports are also easier to produce, making the IT audits run smoother.

In a virtualized world, when peak periods are required, the ability to add processing power to virtualized clients allows the process time to be cut significantly. At month's end, for example, as healthcare organizations are trying to finalize reports, IT can easily reallocate virtualized resources to accommodate peak usage by employees during the day and batch processing at night.

Virtualization also simplifies software licensing management by having the applications run from the virtualized image. Users will be unable to install their own applications, and only licensed applications will be accessed through a virtual image. As a benefit, a portion of the return on a healthcare organization's investment into desktop virtualization may in fact come from a decrease in licensing costs. If nothing else, a better understanding of an institution's licensing needs makes it easier to be compliant with applications running on the network.

In addition, virtualization can help multilocation healthcare organizations consolidate local datacenters, freeing up the physical office space to allow for conversion to revenue-producing activities. Finally, improved customer service in the form of reductions in help desk call volumes and improved first call resolution rates result from

replacement of aging desktops with new equipment, standardized desktop images, and improved remote desktop support and network management tools.

As mergers and acquisitions continue in the healthcare industry, virtualization has the potential to significantly alter operating cost structure for managing IT. IDC has found that in the "physical world" on average, most organizations employ one IT professional for every 20–30 servers installed in the datacenter. In the virtual world, the same IT professional can manage 60–80 virtual machines, or more.

IDC has seen several examples of the benefits of this technology in the healthcare industry. For example, a \$6 billion health system with more than 43,000 employees expects to save between 15% and 20% of its annual IT operating costs when a three-year virtualization project is complete. This organization is predicting server savings on the order of \$30–40 million during that period.

VIRTUALIZATION CHALLENGES IN HEALTHCARE

While the benefits of virtualization are clear, adopting the technology does present some challenges. First, because the technology is just being adopted in the healthcare industry, integrators experienced with both virtualization technologies and the specific vertical market applications found in healthcare are rare. While many technology providers have extensive experience with virtualization projects in general, few have implemented the technology in a healthcare organization.

Look for this situation to change, however, as integrators see healthcare as a major opportunity. Similarly, there has been a lack of active participation and cooperation on the part of packaged application software providers that specialize in healthcare, and this has hindered the advance of virtualization across the industry.

Virtualization at the desktop requires investment in server infrastructure and brings its own set of complexity issues, particularly with managing server capacity and workload. Typically, organizations implement server virtualization first, but they also should pilot desktop programs to ensure that the server consolidation can handle the added capacity of virtualization at the client side.

Another major challenge is a cultural one — user resistance. Virtualization requires not only IT staff but also any worker using a computer to adapt to a more centralized, structured computing infrastructure. In particular, healthcare workers are used to having control over their patient information, as long as it is used in compliance with company and government regulations. With

virtualization, these knowledge workers now must also adhere to authorization restrictions on data and applications.

Many workers install personal applications on their corporate desktops or laptops. With virtualization, this is difficult and often even impossible. While this gives greater control to the IT department, it does take some of the "personal" out of personal computers.

The full extent of the benefits associated with server virtualization is achieved when combined with standardization. Environments composed of a highly heterogeneous server inventory consisting of hardware, operating systems, and other components from multiple vendors should be migrated to a standardized platform as an integral part of the virtualization effort.

Meeting these challenges can be difficult for IT departments, however. They usually can be overcome by proper planning and training. IDC believes that healthcare IT staff, executives, and knowledge workers will look past the cultural concerns when they see the benefits to them and their organization.

PROVIDER SELECTION CONSIDERATIONS

There have been significant benefits from virtualization reported in many industries. IDC expects to see similar outcomes in healthcare. As healthcare organizations look to partner with integrators and virtual machine software suppliers, IDC recommends they consider the following:

- How much healthcare industry experience does the integrator/software provider have? Preferably, the potential partner should have direct healthcare virtualization experience. If not, is it familiar with the applications and other workloads that will be run on the virtualized machines? Can those experiences translate to a successful implementation?
- Will the integrator/software provider help prioritize and plan an implementation program? Prioritization, especially in the healthcare industry, should include security, audit, and regulatory compliance. The ability to secure and centralize and control data is critical, followed by methods to tighten enterprise networks in this centralized, yet distributed environment.
- How will the integrator/software provider help plan resource allocation to minimize peak-period slowdowns and underutilization of resources? Ask for references and examples, preferably in healthcare or another highly regulated industry that requires regular audits and reporting.

- How will the integrator/software provider balance server versus desktop virtualization? While desktop virtualization should be part of an overall strategy within IT, it must coincide with server virtualization and building a solid storage area network, or SAN.
- How will the integrator/software provider deliver virtualization in organizations with mixed computing environments? Many larger healthcare systems have grown by merger and acquisition. Therefore it's paramount to manage multiple operating systems and hardware types.
- How will the integrator/software provider deliver upgrades and patches? One of the fundamental benefits of virtualization is to provide highly available computing. An inability to modify a system without shutting it down defeats the purpose.
- What are the projected economic advantages? An integrator/software provider should provide estimated cost reductions, such as cooling and power costs and capital equipment savings. These projections of course should be supported by references and examples.

CONCLUSION AND ESSENTIAL GUIDANCE

IDC predicts that over the next five years, virtualization of server and desktop resources will profoundly change the cost and support paradigms of healthcare in the same way the introduction of virtual operating systems transformed mainframe computing 30 years ago. IDC believes that the benefits will more than justify the conversion effort.

Healthcare organizations, especially larger hospitals and medical facilities confronted with major IT cost and technology challenges, have much to gain from virtualization. As such, these organizations should begin to develop a strategic plan for virtualization, starting with an inventory of their IT resources and an assessment of the potential economic benefits of standardization, consolidation, and virtualization.

Provider organizations considering such action should also seek to identify other "virtualization pioneers" willing to share their experiences, both good and bad. They would do well to look outside healthcare to financial services, manufacturing, and banking, as those industries have the most experience to date.

Healthcare organizations should work closely with their healthcare IT application software vendors to make sure that they, too, are looking at virtualization solutions and to help them identify, test, and resolve any

technical issues associated with operating their applications in a virtualized environment.

As with any major IT change, healthcare organizations should plan big, but start small. Pilot programs will not only offer proof of concept but also gain line-of-business champions along the way.

IDC data suggests that in other industries, upward of 40–50% of companies have implemented server virtualization beyond simple pilots, with desktop virtualization becoming the next virtualization frontier. Among healthcare provider organizations, the implementation number is still below 10%, but rising.

IDC believes that success in other industries will show the way to healthcare organizations and that virtualization at the server and desktop levels will dramatically help consolidate IT resources and cut overall IT costs, enabling healthcare providers to focus more of their resources on meeting patient needs.

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