All-Flash Storage in EHR and VDI:
Lowering Costs, Improving Quality of Care

Healthcare providers are facing significant pressure to upgrade and modernize their technology infrastructure to support value-based care initiatives in areas such as population health and chronic disease management, maintain the privacy and security of electronic protected health information (ePHI), and address myriad other challenges. At the same time, budgets remain constrained and IT leaders must make a compelling business case for each new technology investment.

Amid these ongoing difficulties, healthcare IT decision makers are turning to all-flash storage as one of their core technologies, particularly for mission-critical applications such as electronic health records (EHR) and virtual desktop infrastructure (VDI). The performance and availability gains provided by all-flash storage enable critical improvements in patient care and clinical efficiencies. In addition, with the right solution in place, all-flash technology can deliver major reductions in total cost of ownership (TCO) for healthcare providers of nearly any size.

To determine the extent of improved results and cost savings achieved with all-flash storage, Forrester Research conducted a Total Economic Impact™ survey evaluating results from five healthcare providers using Pure Storage FlashArrays. From these interviews, Forrester Research developed a composite mid-market regional healthcare provider to show how a similar organization could experience an average increase in profitability (above the cost of acquiring the storage itself) of more than $1 million over a three-year period – through improved clinician productivity and cost savings in the management and deployment of storage.[1]

These results validate that flash storage is not just the future of storage for healthcare; it is the present. Organizations adopting the right flash-storage solutions are a gaining competitive advantage from a clinical, security, financial and operational perspective.

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The benefits of flash for EHR

With their widespread adoption and technological evolution, EHRs are no longer just about record keeping. Instead, they are a critical component in improving the quality, safety and efficiency of care, engaging patients and improving care coordination in a secure manner. In addition, many healthcare providers are gaining value and synergy by integrating their EHRs with back-office functions such as billing and scheduling.

As EHRs continue to be more integrated with other information systems and integral to every aspect of healthcare, they are placing tremendous demands on IT departments and infrastructure. In addition, EHR functionality expectations and new capabilities are increasing. Indeed, according to a survey by Software Advice, the number of buyers in 2015 replacing existing EHRs increased 59 percent – from 40 percent – since 2014.[2]

The storage infrastructure is particularly affected by the evolution and changing requirements of EHRs. Indeed, data growth will accelerate as clinicians continue to utilize data-intensive procedures and healthcare facilities leverage the value of their EHRs.

It's not just about capacity, of course. The proliferation of EHR-driven services is demanding levels of performance, scalability, simplicity and resiliency that are beyond the capabilities of legacy hard disk drive (HDD) systems. Procedures such as heart scans or MRIs require massive amounts of data along with the highest levels of storage performance. Clinicians cannot afford to be hampered by storage bottlenecks, which impact quality of care and patient satisfaction.

The availability of cost-effective, enterprise-class flash storage is a game-changer for EHRs. Flash delivers IOPS performance that is orders of magnitude greater than HDD. "We've put the technology to the test, and it keeps working time after time, which is exactly what we need," said Brett Taylor, director of IT, Infrastructure & Operations, for Duluth, Minn.-based St. Luke's Health Care System.

By getting results of procedures much faster, clinicians can increase the quality of care they provide by being able to develop more timely and accurate treatment plans, and increase productivity with freed-up time to see more patients. As noted by Forrester Research, the sub-millisecond latency of the all-flash solution in its composite organization resulted in improved productivity and EHR performance that contributed an incremental $1.029 million to the bottom line over a three-year period.[3]

In addition, the all-flash solution was much simpler to manage, deploy and scale for the healthcare organizations that participated in the Forrester Research study. Compared with HDDs, the all-flash solution was easier to maintain and had less RAID rebuild operations. Overall savings through simplified deployment, management and other areas such as power and cooling totaled nearly $900,000 over a three-year period.[4]

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The benefits of flash for VDI

VDI is emerging as another mission-critical application for healthcare organizations. With VDI, healthcare providers can enable mobility in a secure environment because data and applications are centrally located in the data center. This is important in today's environment as clinicians strive to improve productivity through mobile solutions such as tablets and bring-your-own device (BYOD) initiatives.

For administrators, VDI can be a cost-effective alternative to traditional modes of equipping end users, particularly with the use of thin and zero clients. VDI can also deliver improved data protection versus traditional laptop and desktop environments. In the EHR survey cited earlier, tablet/mobile integration was ranked by 21 percent of respondents as the top-requested EHR functionality.[5]

Just as flash storage has become integral to the successful deployment of EHRs, it is equally important to the successful deployment of VDI. Legacy HDD systems struggle to deliver the performance required by VDI: They often fail under the weight of log-in storms, and they cause latency when delivering important applications or the results of data-intensive procedures.

In supporting VDI in healthcare environments, most all-flash solutions will deliver the performance required, but additional features and functions can help extend the value of the solution beyond performance. For example, in healthcare data files – unlike images – much of the data can be de-duplicated and compressed, so healthcare providers should choose a solution that has integrated deduplication and compression features. High levels of data reduction lead to lower costs, reduced energy consumption and more efficient use of storage.

In addition to efficiency, security is another important concern for VDI environments. A robust all-flash solution should encrypt every piece of data without impacting performance and have built-in security features that support the measurement of IOPS performance. With such a solution, VDI can help to reduce the risk of ePHI breaches without impacting overall storage performance. By securing the VDI environment, the solution can also reduce or eliminate system takedowns and frequent data migrations. In its survey, Forrester Research estimated the security benefits of this model to be more than $234,000 over a three-year period.[6]

Partnering with the right solutions provider

All-flash technology is not just faster storage; it is a technology that provides a new paradigm for healthcare providers, enabling many new and impactful features. With all-flash technology, healthcare providers can leverage their EHRs to significantly improve patient care. Jeffrey Tang, chief technology officer for Martinez, Calif.-based Contra Costa Health Services, pointed out, "Storage has become a background technology allowing us to focus on other projects impactful to improving patient care." All-flash technology can also leverage innovations in VDI to improve productivity and enable secure mobility.

In evaluating flash storage, healthcare organizations should seek certain requirements. An all-flash solution, as opposed to a hybrid solution, will deliver the performance required for EHR and VDI, while modernizing a healthcare organization's storage infrastructure for the future. In addition, it is important to consider other features and functions that will help healthcare organizations improve operations and reduce costs, specifically a solution that:

- **Enables non-disruptive upgrades** in order to improve productivity, reduce costs and lower risk by eliminating the need to do forklift upgrades and risky patient-data migrations every few years.
- **Includes advanced deduplication and compression** features, which helps shrink storage footprint and thereby lower costs and reduce complexity.
- **Incorporates embedded encryption** to enhance security without sacrificing performance.
- **Is simple to manage and scale**, while allowing the reduction of TCO through improved productivity, lower overhead, simplified management and deployment, reduced energy consumption and advanced lifecycle management.

In conducting thorough due diligence, healthcare organizations should partner with a trusted all-flash solutions provider that had a proven track record of delivering both quantitative and qualitative benefits for their healthcare provider customers.

To learn more about the Forrester Research survey and Pure Storage's all-flash solutions, go to: info.purestorage.com/HealthcareTEICaseStudy_TEI-Report.html

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> *Chief Technology Officer*
> *Contra Costa Health Services*

[1] "The Total Impact of Pure Storage FlashArray FA-400 Series Storage Solutions," Forrester Research, May 2015.
[2] EHR Software Buyer Report – 2015.
[3] Ibid, footnote 1
[4] Ibid, footnote 1
[5] Ibid, footnote 2
[6] Ibid, footnote 1

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