Business White Paper

How Healthcare Providers Can Improve Application Performance In The Cloud

Five ways to ensure a faster, more consistent user experience for improved patient care

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Some healthcare providers may have been wary in the past of moving to the cloud due to security, compliance, or performance reasons. But the shift is inevitable. With the global market for electronic medical records (EMRs) expected to exceed $22 billion by the end of 2015, healthcare providers are shifting their focus on big data analytics and cloud computing to improve patient health information management.

As part of the shift to the cloud and big data analytics, healthcare providers are increasingly reliant on fast databases containing a variety of patient information—structured, semi-structured, and unstructured. If the healthcare industry is to become cost-effective, speedier, and more efficient, it will need to undergo a massive overhaul in its healthcare information systems to optimally utilize the massive data it generates every day.

Why consider a shift to the cloud?

The move to the cloud in healthcare makes sense for several reasons. Modern healthcare information technology in the cloud has the potential to empower care delivery organizations to digitize, electronically move, and store patient health data across the world in a matter of seconds. Patient data contained within EMRs can be securely amalgamated from a number of sources to help ensure better quality across the full continuum of care.

The issue comes down not just to data volumes, but also to the number of users requiring access to the information. In many instances, especially for larger healthcare institutions, it is not uncommon to have tens of thousands of concurrent users reading and writing to EMR and other databases, consuming massive amounts of compute, storage and network resources. When those

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databases reside on shared, multi-tenant cloud infrastructure, application performance can quickly degrade when traffic from one tenant or application spikes, consuming an unfair portion of resources in the shared pool. That makes the types of infrastructure, such as the variety of compute nodes or storage arrays used in a cloud-based environment, a crucial decision-making point—one that should be asked by any IT professional charged with equipping a healthcare organization with a state-of-the-art infrastructure.

When considering improving cloud-based application performance, there are several considerations to take into account specifically concerning the storage infrastructure deployed by your cloud service provider.

1. Prepare for peak user times

First, healthcare end users require fast performance when accessing and using their EMR or other applications, especially during peak times, leading to improved decision-making and timely, more informed patient care. Consideration of peak times is a crucial factor. Although it may sound obvious, when healthcare professionals all arrive at work at 9:00 AM to start reviewing patient data, they can't be held back by congested infrastructure resulting in slow performance, potentially causing them to get backed up for the entire day. Thus, planning your cloud infrastructure for this peak usage is critical.

To further complicate matters, EMR and other healthcare applications are typically input/output (I/O) intensive, leaving them to compete intensely for limited storage resources. Because storage I/O is one of the biggest storage performance bottlenecks, considering the ability of your cloud provider's platform to support that I/O activity is essential.

2. Go with solid-state discs (SSDs)

There has been much industry debate about whether to use SSDs, traditional hard disk drives (HDDs) or a hybrid combination of both to optimize performance of emerging cloud-based applications. The reasons to go with SSDs are manifold.

Solid State Drives feature a non-mechanical design flash-mounted on circuit boards, and are shock resistant up to 1500g/0.5ms. HDDs consist of various moving parts, making them susceptible to shock and damage.

SSDs can have 100 times greater performance, almost instantaneous data access, quicker boot ups, faster file transfers, and an overall snappier computing experience than hard drives. HDDs can only access the data faster if it is closer to the read/write heads, while all parts of the SSD can be accessed at once. SSDs are also less costly, cooler, quieter, and consume less power. Be sure to choose a cloud provider that deploys SSD arrays from reputable brands that are highly reliable and offer superior quality.

Although some cloud providers are choosing hybrid HDD/SSD set-ups, different types of issues can arise with them as well. Applications may compete for the flash tier of storage based on data access, resulting in oversubscribed flash and sub-optimal performance for all applications.

3. Allocate input/output operations per second (IOPS) to each application

Especially in a multi-tenant environment typical of the cloud, even fast storage via SSDs, resource contention will inevitably occur. More "hungry" customer applications that need more IOPS at any point will time will take resources from other applications that also

may need it. When multiple applications share the same storage infrastructure, they also share storage performance (both IOPS and bandwidth). One application—or "noisy neighbor"—can easily consume an unfair share of the resources, leaving mere scraps for others. ClearDATA, the most advanced cloud computing platform built exclusively for healthcare, uniquely overcomes the "noisy neighbor" effect through use of storage arrays from SolidFire within its infrastructure.

4. Understand that not all SSDs are created equal

All SSDs offer fast performance, but raw performance is not enough. Healthcare professionals and practitioners need consistently high performing EMR and other applications to do their jobs effectively. SolidFire storage arrays feature industry-leading capabilities that allow providers like ClearDATA to offer this consistent performance. Within a SolidFire storage array, performance and capacity are presented as independent unified pools that are entirely separate from one another. Each storage volume within the system can be allocated an exact amount of capacity and performance (IOPS), both of which can be changed on the fly without migrating data or impacting performance.

This is why ClearDATA can offer consistent, predictable, fast performance through Quality of Service (QoS) guarantees for life-saving healthcare applications. QoS settings eliminate resource contention and variable application performance issues that can potentially be caused by noisy neighbors. There's no longer any reason to accept unpredictable or unexpectedly slow performance at times when it is needed most.

Similar to the way VMware virtualizes compute resources, SolidFire storage systems virtualize performance separate from capacity, giving IT managers an unprecedented level of storage control.

Through ClearDATA, IT managers can now provision, change, and guarantee storage performance on demand without interruption or downtime.

5. Choose flexible capacity on-demand

Many cloud providers tie storage volume to IOPS or data volume requirements. So, for instance, IT professionals may have to purchase 3,000 GB of storage, even if they don't have to manage high data volumes. ClearDATA, on the other hand, allows customers to purchase and adjust storage requirements at any time, on the fly, based on data volumes and performance requirements. There's no need to be saddled with unnecessary storage resources that go unused, or to live with slow performance when more and faster storage is needed.

There are many advantages to the combination of ClearDATA's state-of-the-art data center facilities backed by SolidFire storage. SolidFire delivers the capability to allocate and manage all-flash storage performance independent of capacity. This QoS control empowers healthcare organizations to:

- Get exactly the performance they require for their life-saving and critical healthcare applications
- Guarantee that application performance
- Change performance without data migration or adding more storage capacity
- Obtain a storage service that provisions performance separately from capacity without wasting either one for greater cost-efficiency
- Experience few-to-no performance issues and bottlenecks from their storage services

ClearDATA storage solutions, fueled by SolidFire storage systems, offer healthcare providers significant scale and guaranteed storage performance while leveraging the agility and cost efficiencies of cloud environments. Combined with enterprise healthcare applications such as EMRs, ClearDATA delivers validated solutions that make cloud-based deployments more cohesive, automated, and dynamically scalable.

Conclusion

Performance can make or break the success of healthcare organizations as they increasingly move into the cloud. Yes, security, back-up, and compliance concerns are also crucial, but with patient outcomes and care now more closely linked than ever to software application performance, healthcare organizations of many kinds are realizing that they must harness the world's most robust IT infrastructures in order to remain competitive. A highly available, compliant infrastructure, robust solid-state storage, and focused healthcare industry expertise are the core building blocks necessary to gain ongoing success. Healthcare institutions of all kinds that adopt these foundational elements will be those that thrive in today's rapidly changing healthcare landscape.

About Us

ClearDATA is the nation's fastest growing healthcare cloud computing company. More than 310,000 healthcare professionals rely on ClearDATA's HIPAA compliant cloud computing HealthDATA platform and infrastructure to store, manage, protect and share their patient data and critical applications.

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