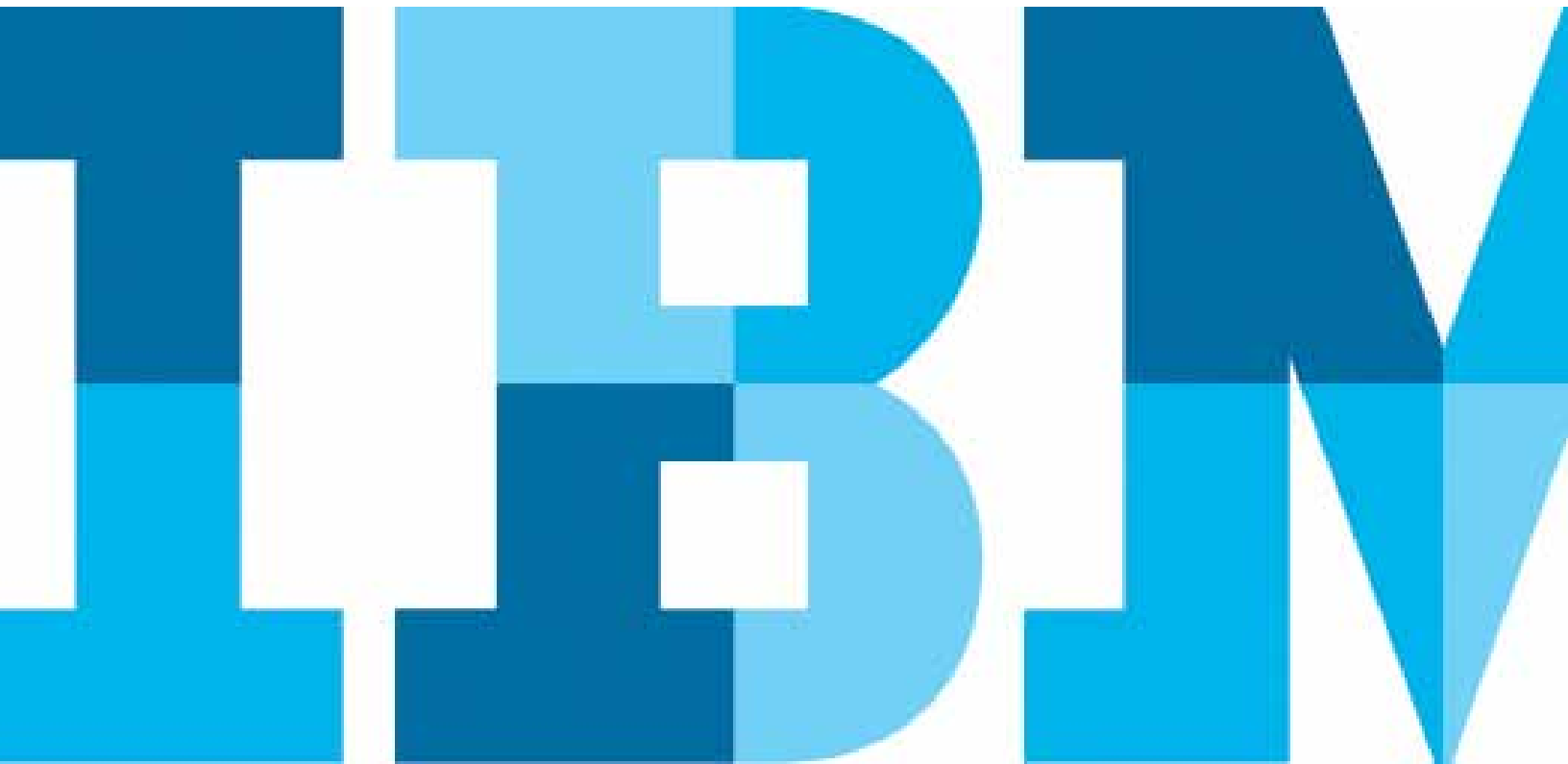


FlashSystem—Driving productivity and efficiency in the healthcare industry



Nurses use mobile carts with built-in laptops to chart information regarding their patients. Every time a nurse checks a patient, dispenses medication, or takes vital signs, information is logged into a laptop wirelessly connected to the hospital's network. This data is recorded into a backend database where information regarding the patient is stored. Every time a nurse inputs information or pulls information about a patient or client, they use the database. Every time doctors access this information whether in the hospital, at their practice, or from their home, they use the database. Every time administrators access this information, they use the database. For hospitals with hundreds of patients and hundreds of employees, this puts tremendous pressure on the database applications. Generating high numbers of both read and write cycles lead to longer latencies when accessing traditional hard drives. This I/O bottleneck can be reduced significantly, if not eliminated, by replacing these hard drive arrays with solid state storage. This reduction in response time allows greater productivity and efficiency leading to better patient care and lower operating costs.

Medical images

Medical images represent 30 percent of the information stored on the world's computers. Picture Archiving Communication Systems (PACS) include Magnetic Resonance Imaging (MRI), Ultrasound (US), Full Field Digital Mammography (FFDM), Positron Emission Tomography (PET) and a host of other medical imaging techniques. More images are taken for patients daily, and the resolution for these images is growing significantly as well. As the volume and complexity of these images grow, medical personnel must access and sort the data in a timely manner to serve their patients. Complicating matters are the growing choices that patients have among doctors and healthcare institutions. Files must be retrieved quickly and efficiently for sharing and transferring. Saving and retrieving images using a traditional hard drive array slows significantly as the transfer size and number of transfer requests increase. Requests stack up very quickly as each transfer requires more time due to the size of the transfer. Using solid state storage, transfers can happen up to 50 times faster. This alleviates the bottleneck and lowers the response time for each request. Whether these massive sets of databases need to be accessed in the operating room while performing a new medical procedure or viewed simultaneously by doctors around the globe while performing a diagnosis, accelerated databases with low latency access are critical.

Medical reports

Healthcare IT is entering into an era of technology overhaul as healthcare and insurance requirements meet government regulations. Medical reporting is a tremendous overhead and cost burden within the healthcare industry. This trend promises to increase as the demand for new services and broader access continues to increase. Information regarding patient billing, patient privacy, patient medical records, compliance reporting and countless other reports are run on a daily basis. These administrative reports are pulled from the same databases that support the everyday activities of the physicians, nurses and patients. Many of these reports are run as an end of day batch process. As the patient load increases, as the reporting requirements increase and as the regulations increase, the length of the batch process increases in time and cost. Once again, solid state storage is the most effective solution to improve the performance of the batch process.

I/O bottlenecks due to slow disks

Heavy transactional database applications have “hot” content causing significant delays in I/O performance. The application demands data faster than the storage is able to deliver it, causing excessive CPU cycle demands on the storage controllers and diminishing user responsiveness by the application. The latency between a database and an existing hard disk-based storage array can cause performance bottlenecks that frustrate your customers and users.

Even if your database application is optimized for performance, you might find that your performance bottleneck is in the inability of your hard disk drive based storage system to access data quickly enough.

Hard disk drives are just too slow. Traditional hard disk based systems incur a performance penalty because of the high access times of hard disk drives. Access time is the time it takes for a request for data to be sent and completed. The fastest hard disk drives have peak performance access times of only 5 milliseconds.

Adding hard disks does not improve access times. You cannot resolve this latency bottleneck by expanding the storage system and adding more hard disk drives (HDD).

Conventional hard disk drives cannot deal with simultaneous high-demand read and write access requests. Databases that are heavy in both read and write access need performance that hard disk drives just cannot deliver.

Hard disk drives have long access times that can negatively impact your website’s performance. Additional hard disk drives only cover the need for greater capacity, but cannot solve your I/O performance bottlenecks.

Improve performance with IBM FlashSystem

Fundamentally, applications and their users do not know what technology is storing the data. The only insight we have to storage is how long we have to wait for the data requested. With the performance gap between processors and hard drive-based storage systems widening, solid state storage is entering the limelight. Since solid state systems rely on memory chips for data storage, they offer unprecedented access times that narrow the gap between the processor speeds and storage speeds. Processors have evolved over 100 times in processing potential in the past 10 years while storage response times of spinning disks have stagnated and have only increased storage capacities. Flash storage recovers the lapse in I/O performance of the last 10 years. Newer flash systems have become increasingly sophisticated, higher performing and lower cost, which sends a clear message ... there is no better tool for improving I/O performance.

Flash is a non-volatile storage media that stores data electronically so it performs at much higher speeds and is more power and space efficient compared to traditional, mechanical hard drives. These speed increases are in both response times and scalability. By removing the latency of moving parts, FlashSystem units present access times of less than 100 microseconds, over 20 times faster than HDD.

In typical capacity scenarios, only parts of the corporate dataset are “hot” and require frequent access. Databases, with indexes and structured table data, are stored on FlashSystem, while the remainder of the data is stored on your existing conventional hard disk arrays. This tiered storage approach will give you the ability to scale to significantly higher loads without impacting response time. After shifting the critical application workload to flash systems, our customers report that this technique also resolved the workload of less critical apps as there is no longer the contention between the workloads. Most importantly, the load on their database increased significantly while response times stayed flat and deterministic.

FlashSystem products ensure both speed and reliability in accessing data. As a hardware-based system FlashSystem products deliver exceptionally low response times to applications to ensure the best processing efficiency and end user experience. The scalability of increasing the users or workload is also in place for further revenue growth. Identifying the workloads that are the most business critical and benefit the most from higher performance, when moved to FlashSystem, relieve the incumbent infrastructure to bring benefit to all application units.

Best yet, since FlashSystem products are interoperable through traditional SCSI, Fibre Channel and InfiniBand protocols, expensive and time-consuming application changes are not necessary to recover the lost time previously wasted on I/O. Applications will always require data and that data should be as quick as possible to avoid waiting on the processors and, more importantly, the users. Storage performance is a race to zero latency.

Conclusion

The healthcare industry is expanding and evolving at a rapid pace in multiple sectors serving multiple segments of society. Not only do healthcare companies battle life and death for their patients, they battle life and death for their own existence within the whirlwind of ever changing medical procedures, new drug discoveries, patient priorities and government regulations.

Solid state disks offer increased performance to critical applications reducing latency and accelerating database management. Driving productivity and efficiency in the world of healthcare, the IT professional must manage increasing amounts of data as increasing numbers of users demand access. Hard disk drives cannot deliver the “hot” files fast enough for demanding customers. FlashSystem increases performance by dramatically reducing the latency of the storage.

The microsecond latency of FlashSystem allows your time critical data to be served quickly—satisfying your customers, internal reporting, freeing up your processors and allowing for future growth.

Notes
