COST REDUCTION, REDUCED OVERHEAD AND HIGHER AVAILABILITY FOR HEALTHCARE CLIENT

The Practice, a Medical Imaging Practice located in the Midwest, embarked on streamlining a new platform to enhance their service. This platform would enable doctors to access and review patients' results from any imaging location within their practice, ensuring faster delivery of results, especially in critical life-or-death situations.

During the platform's development, the Practice quickly established their initial primary storage system. However, they also recognized the need for a secondary data storage system to handle potential catastrophic events or aid in disaster recovery.

With a patient-first mission and the responsibility of managing medical regulations, the Practice understood the importance of safeguarding sensitive data. They needed their IT staff to effectively manage the entire environment without compromising data security.

The virtual environment comprised 70-80% of their setup, consisting of 150 VMs associated with the business office and the deployed platform. This VMware-based system included Windows VMs for PACS image viewing and Linux-based "Depot Servers" for storing the PACS images.

In the main data center, there was an additional array connected to an older competitor's array using fiber channel. In the new/secondary data center, fiber channel or iSCSI based volumes were replaced with NFS-based data stores, resulting in a more streamlined and cost-effective environment. The VMs' operating systems were attached via NFS to SSD-based volumes on the StorONE array, while the PACS data, handled by Linux VMs, resided on NFS-based hybrid (SSD/HDD) data stores.

The SSD-based data stores were relatively smaller compared to the ones used for PACS data storage. This setup allowed the Practice to enjoy the benefits of flash technology where necessary for VMs, while gaining the cost efficiency of hybrid volumes for other data, effectively reducing their total cost of ownership (TCO).

Data stores were structured as pooled entities rather than individualized ones within VMware, aiming to separate the main system with MC/HA from the secondary one. Each depot server storage capacity ranged from 70 to 80 TB per VM.

CHALLENGES

Storing PACS images in raw format poses a challenge since they cannot take advantage of deduplication, a feature commonly utilized by modern all-flash arrays. Consequently, using such arrays for this specific application use-case would be both expensive and inefficient.

The Practice also needed an all-flash repository to efficiently handle the base VM OS and application layer, while the PACS image data required an inexpensive deep archive type system.

This capability holds great importance for the practice as they aim to adhere to the recommended architecture by PACS system vendors while maintaining cost-effectiveness. By doing so, they ensure optimal support while achieving their desired financial goals.

SOLUTION

The solution aimed to achieve consistent setup and easy management for the IT team, while also providing a highly available and high-performing repository for the PACs image data.

By employing StorONE, which allows hosting of virtual machine OSs on flash and PACS data on a hybrid (SSD/HDD) volume, the practice achieves excellent performance for the active data set while significantly reducing costs.

This hybrid approach ensured quick access to The Practice's business-critical data. The agnostic and immediate availability of data were of utmost importance to the medical group given the nature of their business requirements.

StorONE delivered a hybrid system comprising 24x 3.84TB SSDs and 42x 18TB HDDs, implemented in a dual-controller HA platform with appropriate network connectivity tailored to the environment.

To serve the PACS data, a Linux-based VM called the depot server was employed. This depot server incorporated typical Linux-based operating system components and application layers to connect to and serve the PACS image data.

The depot server utilized VMDK-based storage repositories as part of its configuration. In the final configuration, the Practice was able to quickly configure 6 depot servers with capacities ranging from 62TB to 80TB each. The system can easily be expanded for more as the environment continues to grow.

With StorONE, the system was able to provision an all-flash VMDK volume from one datastore on the StorONE array, dedicated to the base OS and application data. Simultaneously, VMDK volumes were provisioned from another datastore, utilizing a hybrid configuration to leverage cost-optimized media like the SSD & 18TB HDDs in the StorONE platform.

Traditionally, achieving this setup would require two separate storage arrays, increasing both cost and complexity. However, StorONE's Virtual Storage Container™ enabled the delivery of isolated storage resources from a single system. This significantly reduced the overall cost and complexity of the solution while meeting the administrative requirements of a small staff managing the environment.

IMPLEMENTATION

The implementation of The StorONE Engine aligned with the customer's overall design approach, which aimed to provide an easily accessible and maintainable PACS image repository for their end-user customers.

Transitioning from a decentralized methodology to a centralized approach, The StorONE Engine offered comprehensive flexibility to accommodate the diverse use-case requirements within this centralized deployment model.

The initial step in establishing this model involved creating two different types of repositories: an All-Flash datastore repository and a Hybrid (flash/HDD) repository to store the depot server VMs that catered to the distinct data types.

Within The StorONE Engine, this was achieved by creating Virtual Storage Containers™. The Practice selected the appropriate media pool(s), capacity, and necessary protection for each container. Two Virtual Storage Containers™ were set up: one for the base OS and application data of the depot server, and another for the PACS images. As the requirements for base OS and application data varied, each volume was optimized and tuned to meet the specific use-case and data needs.

An additional advantage of The StorONE Engine was its capability to leverage their Virtual Storage Containers™, which were sized and tuned to align with the requirements of each use-case, all within the same storage subsystem. This capability played a crucial role in fulfilling the main design goal of easy implementation and support.

BENEFITS

By implementing a consolidated storage approach, the Practice revolutionized their entire environment, empowering their staff to deliver enhanced service, improve response times, and expedite the delivery of results. This transformation not only elevated the patient experience by providing quicker access to vital health information but also had a positive impact on the overall business operations.

The utilization of The StorONE Engine allowed the Practice to store multiple types of media pools on diverse all-flash or hybrid datastores, catering to different data types. Importantly, this implementation did not require extensive training for the staff, as the transition was seamless, enabling them to effortlessly manage their data.

In addition, during the initial replication process of copying data to the new StorONE array the Practice found that it took only a couple of days to move data that they had expected would take two weeks, which is one of the benefits of the hybrid datastores

The combination of these advantages, along with the cost-effectiveness in terms of capacity, made StorONE the perfect fit for the Practice's needs.

CONCLUSION

The StorONE Engine's capability to accommodate multiple use-case requirements through our Virtual Storage Containers™, along with the ability to select the appropriate media pool, size, and protection for each use-case, played a crucial role in fulfilling the project's design goals.

The implementation process not only went smoothly, but it also resulted in cost and complexity reduction. The Practice successfully delivered a system that was easy to deploy, scale, and support, meeting their operational needs effectively.

> **Performance is great! We were able to replicate a depot server to our secondary data center in under 2 days, where originally it was going to take at least 2 weeks.**
>
> The Practice's Network Engineer