Canadian Museum Redefines the Museum Exerience, while using an Azure Stack HCI Hybrid Cloud Solution

The Canadian Museum for Human Rights deploys a hybrid cloud architecture for on-premises exhibit digital management and integration with Azure Services

CANADIAN MUSEUM FOR HUMAN RIGHTS

The Challenge

- Replace traditional SAN infrastructure and transition to an affordable, highly scalable software-defined data center with industry-standard hardware
- Find a hybrid-cloud infrastructure to support on-premises workloads with cloud for backup and disaster recovery and integrate with existing Azure Stack cloud solution
- Maximize storage efficiency and save on physical storage costs

Organization Overview

As the world's only museum solely dedicated to human rights, The Canadian Museum for Human Rights (CMHR) is centered around the idea that respect for and understanding of human rights can serve as a positive force for change in the world. The museum opened in September 2014, and offers an immersive digital and interactive museum experience with an integrated online experience. Located in Winnipeg, Manitoba, the CMHR employs around 150 people.

IT Challenge: Refresh on-premises SAN with a hybrid-cloud infrastructure for its on-premises interactive multimedia exhibits, online experience, archival media and surveillance video bulk storage, and data center backup, with integration with Azure Services

The CMHR's mandate is to explore the subject of human rights in order to enhance the public's understanding of human rights, promote respect for others, and to encourage reflection and dialogue. One of its goals was to take its human rights message beyond the museum's physical walls and into the digital space by building an immersive and interactive museum gallery and online experience. With its ten impressive interactive multimedia core galleries and two temporary galleries consisting of five hundred screens of high-definition video and extensive rich and interactive online content, the CMHR puts a high value on its IT infrastructure.

The CMHR needed a low-latency, highly resilient solution that could manage over three hundred virtual machines (VMs) and run applications such as Microsoft Exchange, SharePoint, enterprise resource planning (ERP) software, museum ticketing, point of sale management for its gift shop, video surveillance, video content production, and most importantly, its digital asset content management system.

The CMHR also needed a primary, bulk, and backup storage solution that could bridge the gap between traditional and cloud storage for its on-premises workloads.

Since the museum's opening, the CMHR has gone from working with 1080p to 4K uncompressed video, generating much larger video files. In addition, the CMHR records oral histories to capture stories and interviews from human rights activists. These histories are recorded in uncompressed 4K video and can range from five to twelve hours. Coupled with an extensive museum surveillance system, the CMHR would need a sizable bulk storage solution with at least a petabyte (PB) in capacity.
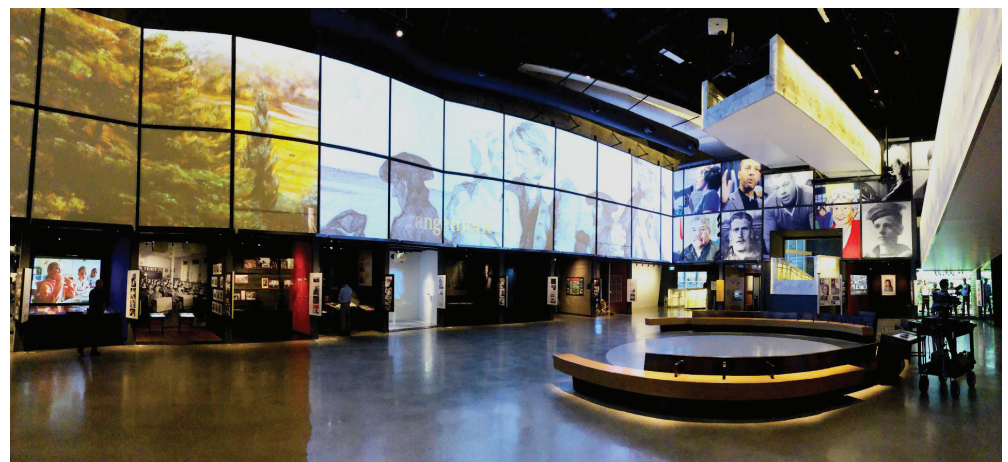
In addition, the CMHR was looking into an on-premises backup solution that would be large enough to back up both primary and bulk storage and keep the primary applications, especially the museum galleries, up and running in case of catastrophic failure. The CMHR was still undecided as to whether they would go to the cloud or find a secondary site for its disaster recovery solution.

The CMHR was also updating its backup solution from Microsoft's Data Protection Manager (DPM). Veeam was selected as the single backup management platform for cloud, virtual and physical, to manage its on-premises and cloud backup.

Cost was another driving factor. The CMHR would need at least two petabytes of total storage, a sizable amount. The CMHR was looking for a vendor that had extensive Microsoft expertise and could provide an affordable industry-standard hardware solution that did not require costly annual service and maintenance contracts or charge OEM taxes on hardware.

The CMHR's goals in updating its infrastructure included:
- Eliminating its traditional SAN infrastructure and transitioning to an affordable, highly scalable software-defined data center with industry-standard hardware
- Maximizing physical storage capacity and efficiency, saving money on upfront storage costs
- Deploying a new backup solution to protect on-premises and cloud data

The Solution: DataON hybrid cloud solution for Microsoft Azure Stack HCI for primary, bulk and backup storage, with DataON MUST and Windows Admin Center

Christopher Rivers, Director of Information Technology, Canadian Museum of Human Rights, learned about DataON at Microsoft Ignite about five years ago. He initially engaged with the team looking for a Microsoft software-defined storage solution. In 2018, the CMHR went out with a RFP to refresh its IT infrastructure. Rivers was interested in a Microsoft Azure Stack HCI solution that could integrate Microsoft Azure cloud services such as backup and recovery and cloud monitoring with an on-premises Storage Spaces Direct-driven hyper-converged or converged infrastructure.

Rivers was impressed with DataON's extensive Microsoft software-defined storage experience. Rivers said, "DataON, as an organization, was ahead of the curve compared to other vendors who submitted proposals." Rivers said. "They blew everybody out of the water."

Traditional OEM vendors push their own storage solutions," he continued, noting that they are pushing either enterprise storage or their software-defined storage. Rivers said, "Neither would work for us, considering our long-standing issues with both the high cost and complexity of our existing enterprise SAN."

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Rivers worked with the DataON team and chose a three-tiered hybrid cloud solution for Azure Stack HCI that seamlessly integrated within the CMHR's existing Azure Services.

The CMHR's three-tiered infrastructure consisted of:

- **Primary server**—Four-node all-NVMe SSD hyper-converged infrastructure (HCI) optimized for IOPS and performance
- **Bulk storage**—Four-node converged servers optimized for performance and expansion, with an all-flash cache tier, high-capacity JBODs attached to each server, and over 1PB of traditional HDD storage
- **Backup storage**—Six-node converged servers optimized for performance and expansion, with all-flash cache, high capacity JBODs attached to each server, and 1.4PB of traditional HDD storage

The Result

- Smooth transition within two months from traditional SAN to Microsoft Azure Stack HCI solution
- Able to upgrade or replace hardware with cutting-edge technology at substantially lower prices without waiting for OEM qualifications
- Significant infrastructure performance with all-NVMe flash in the primary server and NVMe cache tiers in both backup and bulk storage
- Eliminated OEM costly service and management contract fees with commodity-based hardware.
- Bought a superior software-defined hybrid cloud infrastructure at a third of the price of a SAN
- Seamless integration between on-premises storage and Azure cloud services with Veeam backup management
- Received comprehensive support from DataON and Microsoft product management teams

For increased fault tolerance and resiliency, the CMHR deployed a three-way mirror solution. Three-way mirroring can safely tolerate at least two hardware problems (drive or server) at a time, which was essential for the CMHR in ensuring that its digital museum stays up and running and avoiding any data loss in its extensive digital multimedia repository.

Using Hyper-V Live Storage Migration, the CMHR moved thirty percent of its VMs and some bulk storage from the original SAN to the new DataON solution. Initially, Rivers and team were using Data Protection Manager to manage its backups, but they transitioned to a Veeam backup and replication solution that made it simple to use Azure Blob storage as a secondary cloud-based backup. "It was a very straightforward process," Rivers said, "the Veeam solution is solid and made it simple for us to deploy a complete Microsoft hybrid cloud solution. We were able to add an additional layer of resiliency for our on-premises backup in the cloud with affordable Azure Blob storage, which saved us the cost of a second data center and hardware."

The Results

Rivers is pleased with the fast two-month transition from a traditional SAN to the new DataON hybrid cloud solution for Azure Stack HCI with Azure services.

The CMHR saved a sizable amount of money choosing DataON solution for Azure Stack HCI. If Rivers would have gone with a SAN, it would have cost four times more. The CMHR no longer pays service and maintenance fees and steep OEM-branded replacement hardware costs. Industry-standard hardware is cheaper and gives administrators the opportunity to buy cutting-edge technology without waiting for OEM qualifications, and at substantially lower prices.

The CMHR achieved significant performance improvements for its workloads and VMs on its all-NVMe flash primary production server. Backup and read/write times between primary and bulk storage are must faster as a result of 40GbE RDMA connectivity and all-flash cache storage tiers used for quick access to its most commonly used workloads and data. "Performance is better all the way around and NVMe flash really makes a difference," Rivers said. Benchmarked in VM Fleet, the four-node cluster delivered eight hundred thousand IOPS in one of the earlier releases of Windows Server 2019 and performed well in random 4K and sequential 512K reads and writes.

Rivers' experience working with DataON has been positive. The team was engaged and responsive and helped him work through bugs and put him in touch with Microsoft's product management team that has been providing the assistance and support to address an issue with Dedup. Veeam has been an effective backup management tool, allowing the CMHR to seamlessly manage its on-premises backup and Azure disaster recovery solution for a complete Microsoft hybrid-cloud experience.

With Windows Admin Center, Windows Server 2019 centralized management console, Rivers can better manage the Museum's Storage Spaces Direct hybrid-cloud deployments. He can manage Hyper-V clusters, Storage Spaces Direct, Azure Cloud services, software-defined networks, and much more. This integration simplifies management and offers essential GUI monitoring of the CMHR's on-premises clusters and storage as well as in Azure unavailable in previous versions of Windows Server.

The CMHR is also using DataON's MUST monitoring and management tool in conjunction with Windows Admin Center. Available as a stand-alone application or third-party plug-in for Windows Admin Center, MUST adds to the Windows Admin Center experience with disk mapping, historical data reporting, system alerts, and call-home service. If there is ever an issue with a cluster or drive, MUST e-mails the CMHR's IT team, improving the team's response times to resolve any issues that might lead to downtime or data loss.

Rivers concluded, "In our adoption of a hybrid cloud, a hybrid squared cloud infrastructure, where we can support our traditional Infrastructure as a Service (IaaS) to modern Web applications, either on-prem or in the cloud, I think we're reasonably ahead of the curve of most of the worldwide IT industry."

**CMHR HCI and Bulk Storage Clusters with
(4) DataON S2D-5224, (4) S2D-5208 and (4) DNS-4760 JBODs**

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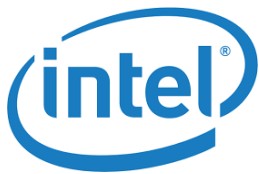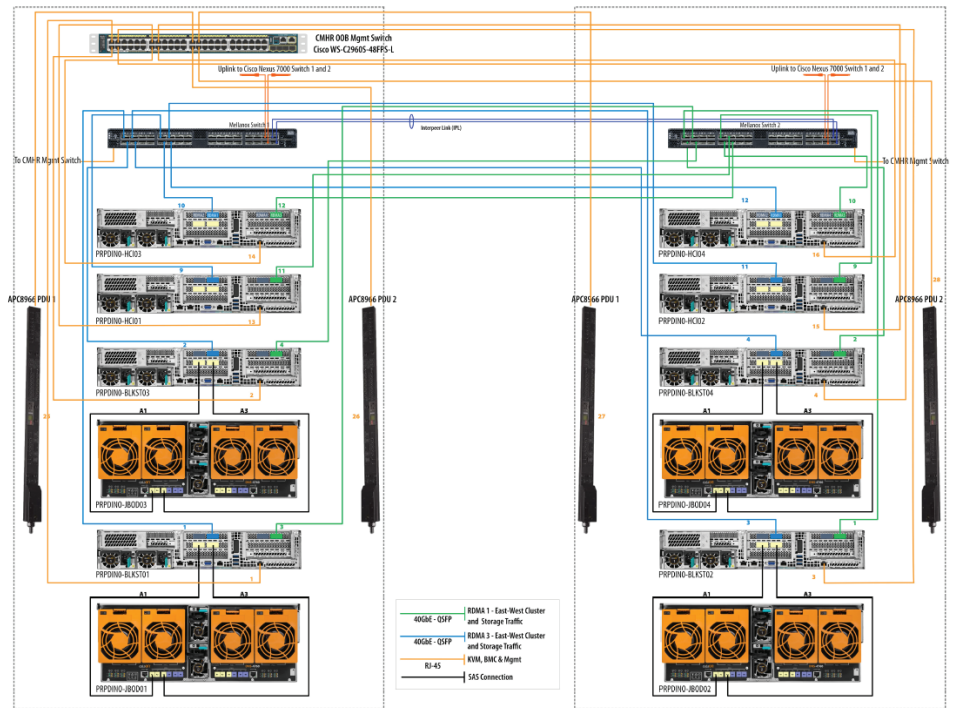
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About DataON

DataON DataON is a hybrid cloud computing company focused on delivering Microsoft Azure Stack HCI solutions, on-premises storage systems, intelligent edge appliances, and cloud-based Microsoft Azure Services. Our company is helping enterprises and customers who have made the "Microsoft choice" to modernize their IT with Microsoft applications, virtualization, and data protection through a complete and turnkey experience. With over 650 HCI clusters and 150PB of storage deployed, DataON enterprise-level solutions are designed to provide the highest level of performance, manageability, and security offered. DataON is a Microsoft Gold Partner, Microsoft Cloud Service Provider (CSP), and an Intel Platinum Partner.