Government as a Cloud Provider

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Executive Summary

On the cusp of an IT consolidation in 2016, the State of Nebraska cabinet agencies needed a cost-efficient, high availability storage solution for critical enterprise applications. The becoming-central technology agency had a small environment that had reached capacity, and network managers knew an all flash Network-Attached Storage (NAS) environment would be needed to successfully begin an extensive consolidation initiative.

The Office of the CIO (OCIO), poised to increase the State's storage capacity, began working with an established partner to design a private cloud environment for the State Enterprise. The purpose of the State designing its own on premises infrastructure was essential to having a consistent environment, also managed and supported by State IT resources. Having gained this level of control over its storage environment, the State Enterprise technology provider could essentially guarantee its customer base a secure, high availability NAS storage solution. The private cloud infrastructure came to be the "High Availability Enterprise Storage Solution", and proved to be capable of supporting the State's storage capacity and performance needs, as anticipated, during a period of rapid growth for the State's data center.

Exemplar

An early benchmark for the consolidation initiative set by the OCIO leadership was to reduce the State's data center footprint while opting for more efficient data storage. As enterprise technology resources worked to eliminate more than 300 redundant or obsolete physical servers from disparate agency data centers and closets, the agencies were able to migrate to an all-flash solution with no front-end server. High Availability Enterprise Storage offered competitive latency with other cloud providers and improved efficiency or latency. As the OCIO on-boarded Agencies of various magnitudes, they presented four tiers of storage to choose from based on their customers' business needs.

The High Availability Enterprise Storage solution presented immediately recognizable efficiencies in performance, maintenance and availability. Before even beginning to consolidate the State agencies, the OCIO had successfully leveraged itself a partner in a collocated data center with Active/Active architecture. The State Enterprise technology provider had formed an unprecedented Public-Public partnership with the Douglas Omaha Technology Commission (DOTComm). The two entities collocated their existing data centers in Omaha and Lincoln, resulting in such increased resiliency that the State was able to eliminate its obsolete disaster recovery location in favor of the new design.

While these efforts continued to increase efficiency for the State Enterprise, opportunity for other public entities increased as well. Nebraska's OCIO operates as a cost-neutral agency, and the State technology provider began offering its tiered storage solution to City and County entities. The High Availability Enterprise design, equipped with a dedicated network connection gave the State's private cloud service a competitive latency by comparison to public cloud providers. Soon, non-cabinet agencies, boards and commissions, along with local county and city governments began to seek out the State for their infrastructure, storage, and technical support (CIO Blog: Cooperation, 2018).

Concept

Prior to 2016, the majority of the State agencies managed application and data storage as independent organizations. This decentralized approach fostered the duplication and allowed disparate servers to take up valuable real estate inside of State offices. Technology came at a higher expense while the model itself failed to optimize resources. In March 2016, efforts to centralize the State Agencies, Boards and Commissions to the enterprise infrastructure began. This was Phase One of the long-term consolidation project.

The OCIO set in motion an ambitious and rapid plan for consolidation, but the centralized tech agency

wanted to have two active data centers for increased resiliency in the infrastructure. An all-flash solution with a NetApp MetroCluster enabled instantaneous failover and disaster recovery. Since installing its private cloud solution, the State virtualized nearly 90% of its servers.

The OCIO also designed the mainframe environment to move seamlessly between the data centers in Omaha and Lincoln. Critical applications such as those hosted on the State's Mainframe are required to be accessible at all times in order for Nebraska's State Agencies to effectively serve customers and/or citizens. The OCIO made certain that critical applications would have the ability to failover to a secondary location (CIO Blog: Plan to Fail(over), 2018). This attention to technical detail played a significant role to protect State and Local government entities from data loss.

High Availability Enterprise Storage had to meet the following objectives in order to effectively provide Nebraska's public entities with a competitive private cloud offering:

- ✓ Efficient
- ✓ Highly Available
- ✓ Secure
- ✓ Cost Effective
- ✓ A hybrid combination of On-premise and Cloud Infrastructure

Significance

Consolidation
By building its private cloud infrastructure, the State technology agency was able to support rapid growth of the Enterprise Data Center.

Cost
State of Nebraska consolidation reduced Total Cost of Ownership (TCO), which tilted the scale towards utilizing the State as a private Cloud provider for all Public entities.

High Availability
The high availability storage solution offered continuous data protection for mission-critical applications via synchronous replication. This protection became guaranteed as a result of a public-public partnership with collocated active/active data centers that delivered zero data loss (RPO) and near-zero failover time (RTO under 120 seconds).

Support

The OCIO provided a single point of contact via the State of Nebraska Service Desk for all customers (including Local entities) of the State's private cloud, specifically for requests regarding the High Availability Enterprise Storage Solution. All customers received effective 24/7 support, which earned the OCIO a 4.5 customer satisfaction rating on a 5.0 scale (CIO Blog: Customer Service Year in Review, 2019).

Impact

Multiple public-public partnerships between the State of Nebraska OCIO and other State or Local entities resulted in cost savings, increased security and highly available applications:

- 71 State agencies saved $30 Million+ to date.
- The State collocated its data center by partnering with DOTComm (Douglas County/Omaha), and DOTComm in turn was able to rely on the State's data center for Open Systems storage.
- The State of Nebraska's Public Service Commission opted to partner with the State's Enterprise Geographic Information Services (GIS) for administration and storage of street centerline data to gain a cost-savings of $288K/year, with enhanced availability over the prior solution.
- 78 of 93 Counties migrated to the State's virtualized AS/400 servers, and brought with them 450+ applications, which the State replicated across two active/active data centers. In addition, the counties received "regional support" provided by State IT site support. For each county, the State's solution reduced annual cost from $4,000 to $400.
- The Statewide Radio System, a partnership between Nebraska Public Power District and the State, used the High Availability Enterprise Storage Solution to provide free use of redundant core switch to the City of Lincoln.
- The State's Joint Operations Center (JOC) moved its servers to the State's private cloud, avoiding a cost of $300K for the State to pay for enhancements the JOC's separate data center.
- The City of Lincoln chose to utilize the State-hosted Data Center with shared Mainframe eliminating the need for a City-hosted Data Center and cost of Mainframe.