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ONAPP SCALE OUT SAN FOR THE CLOUD

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Scale It As They Come

Building a cloud infrastructure capable of meeting the varied performance, availability and resiliency demands of a vast customer base is daunting for even the most seasoned data center professionals. And yet, this is precisely what cloud and managed service providers (MSPs) need to be able to do in order to attract the widest array of clients possible. Traditional data center technologies like storage area networks (SANs) are not particularly well suited for meeting the elastic scaling needs of cloud environments, nor are they cost effective enough to warrant a big up front investment.

Cloud providers can't live by the mantra, "Build It and They Will Come", instead, they need to have the capability to "Scale It As They Come". Indeed, the accelerating trend of the software defined data center, requires CSPs and MSPs to leverage existing data center assets to their fullest, in order to remain competitive in a market that is currently dominated by large industry players with plenty of excess computational, network and storage capacity available on the cheap.

A British technology company by the name of OnApp, is leveraging the capabilities of the virtualized server data center to help the CSP/MSP community to efficiently create highly scalable virtualized storage area networks that can span across multiple hypervisor servers and provide all the various performance and availability attributes required to build a storage as a service (SaaS) catalogue.

Virtualized Hypervisor Capacity

The concept behind the OnApp offering is simple yet elegant. Rather than build out separate silos of SAN capacity, administrators merely utilize the disk bays already inside the physical hypervisor server and manage physical disk resources across hypervisors as a virtual distributed disk array, managed via a central UI.

The OnApp solution also "scales out" by installing the virtualized storage controller VM on additional physical servers. This method of scaling is ideal for the provider. As additional servers are added to the environment to meet customer on-boarding, an OnApp VM is installed on those servers to further scale storage capacity and performance. Essentially, storage and all its demands becomes a function of customer on-boarding.

With this approach, instead of committing to a large, proprietary SAN purchase, the CSP can incrementally add commodity storage resources as new clients come online. Importantly, their storage costs can now immediately be recovered with each new contract, rather than get tied up on excess, underutilized SAN capacity.

Referred to as OnApp Storage, this solution provides all the necessary scale, performance attributes and cost efficiency cloud providers need in order to attract and retain clients. OnApp Storage is included with the OnApp Cloud management platform from version 3.0 and above and currently supports Xen and KVM hypervisor offerings.

Self-Healing Virtual Disks

Data center managers can add SSD, SAS and SATA disks to the hypervisor server(s) to create virtual disks (or "vdisks") and use the OnApp virtual storage controller to aggregate the disk resources into pools called "data stores". OnApp states that since each internal disk drive I/O queue is independent, I/O throughput is optimized because there is no bandwidth bottleneck.

OnApp's patent pending "smart disk" technology is a paradigm shift from centralized SAN controller disk management. Under OnApp each physical disk in the distributed virtual SAN is a self-contained unit capable of discovering its own resiliency attributes and can self-enable features like load balancing and synchronization with other physical drives.

As a result, physical drives can be transported and installed across hypervisor servers without losing its data or requiring a RAID rebuild. Furthermore, the system is totally self-healing since it tracks where data is across each physical drive and can re-build vdisk data stores should data corruption or a mechanical failure occur on one of the physical drives.

Elastic Tiered Storage

For resiliency purposes, the OnApp virtual storage controller is deployed across a minimum of two hypervisor servers and the management console is hosted on a dedicated server called the OnApp controller server. The virtual SAN can initially be configured with as little as 1TB and run over commodity ethernet connectivity between hypervisors, from 1Gbit upwards. Infiniband support is planned for the near future.

Each data store can be assigned to a high/medium/low performance tier according to the performance attributes of the disk resources in each pool. In addition, data stores can be configured with various resiliency characteristics like RAID striping and replication.

For instance, disk resources can be replicated across as many as 4 different devices to ensure data is protected across both multiple disks and multiple physical servers in the data center. OnApp also provides snapshots to support point-in-time recovery and directly integrates with the service providers backup server to store VM snapshots and templates. Thin provisioning can also be leveraged to help drive further efficiency into how disk assets are allocated.

Customer VMs can be optimally located on hypervisors that host a local copy of data. By setting 'read-local' in the UI, VM reads can be optimized to only reference the local copy, thereby minimizing the amount of network traffic between hypervisors. Data store content can also be migrated from one set of virtual disks to another, and data stores and virtual drives can be deleted and resized as needed to configure additional capacity or to de-commission workloads. OnApp can also be used to configure data stores for traditional SANs, providing comprehensive storage management for all data center disk resources.

Integrated Control

The OnApp storage management console - an integrated part of OnApp's cloud management control panel - allows cloud administrators to flexibly configure and assign data store resources based on application service level agreements (SLAs), changing end user requirements or to spin up resources for a new client. Storage resources can be configured through the graphical user interface (GUI) or via a command line interface (CLI) to support service automation.

Cloud administrators can obtain statistics on all disk resources, whether server based or SAN based to ensure performance is adequate across all performance classes.

Storage Swiss Take

Virtualization and the software defined data center are technologies which are helping to level the playing field between the big name cloud service providers and the hundreds of new managed service providers vying for cloud footprint market share. Businesses that are considering moving workloads into the cloud are expecting to dramatically lower their cost of computing and storage while maintaining or even exceeding their current “in-house” service levels. In order to effectively compete in this burgeoning market space, CSPs and MSPs need to wring out the highest possible value from their infrastructure assets.

As we discussed in our article "How Legacy Storage Breaks The Cloud", traditional data center technologies like SANs are not capable of providing many of their key attributes, like modular growth and storage elasticity, that CSPs and MSPs need to be competitive. Furthermore, proprietary storage arrays are cost prohibitive, especially when compared to the cost of server based commodity disk.

As we discussed in our article "Cloud Defined Storage", a different approach is needed. OnApp’s scale out SAN technology delivers all the software feature functionality of high-end storage arrays, but instead leverages low cost commodity disk and the ubiquity of hypervisor server technology to enable cloud providers to massively scale storage performance and capacity extremely efficiently. In short, OnApp is a storage virtualization vehicle cloud providers can ride to create a compelling storage service catalogue that rivals the cloud industry behemoths.

About Storage Switzerland

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