

Technical Review

Dell EMC PowerStore: Data-centric, Intelligent, Adaptable Storage

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Abstract

This report provides a brief introduction to Dell EMC's PowerStore mid-range storage appliance and documents ESG's testing that was focused on VMware integration and the distinctive AppsON feature, enabling organizations to run VMs directly on the appliance without external servers.

Challenges

IT's job has changed dramatically in the last few years, as IT organizations have been asked to make available huge amounts of data, of diverse types, in multiple locations, on-premises and in the cloud. There is so much to handle, and constant change. In recent ESG research, 64% of respondents said that their organizations' IT environments are more complex than two years ago.¹ In addition, users are demanding that applications and infrastructure operate fast, with around-the-clock availability, automation, and agility. ESG research also shows that organizations are focused on digital transformation—that is, leveraging digital technology to drive new strategies and business models. Their top digital transformation objectives are to become more operationally efficient (55%), and to provide a better and more differentiated customer experience (49%).²

Figure 1. Complexity and Digital Transformation Objectives



Source: Enterprise Strategy Group

Clearly, managing silos of infrastructure dedicated to different data types and locations is a logistical nightmare that increases costs and inhibits digital transformation. Looking at the coming avalanche of data to handle and infrastructure to manage, IT organizations are seeking technology solutions that can do the heavy lifting. They need technology to help them get the right infrastructure for every data type, while keeping management simple and bringing greater flexibility and agility as workloads shift.

The Solution: Dell EMC PowerStore

Dell EMC PowerStore is a completely new Dell Technologies' mid-range storage appliance, built from the ground up using the latest technologies to deliver the performance, availability, security, flexibility, and ease of use that modern applications require. Dell Technologies designed PowerStore with a new, container-based architecture and a commitment to meeting

¹ Source: ESG Master Survey Results, [2020 Technology Spending Intentions Survey](#), January 2020.

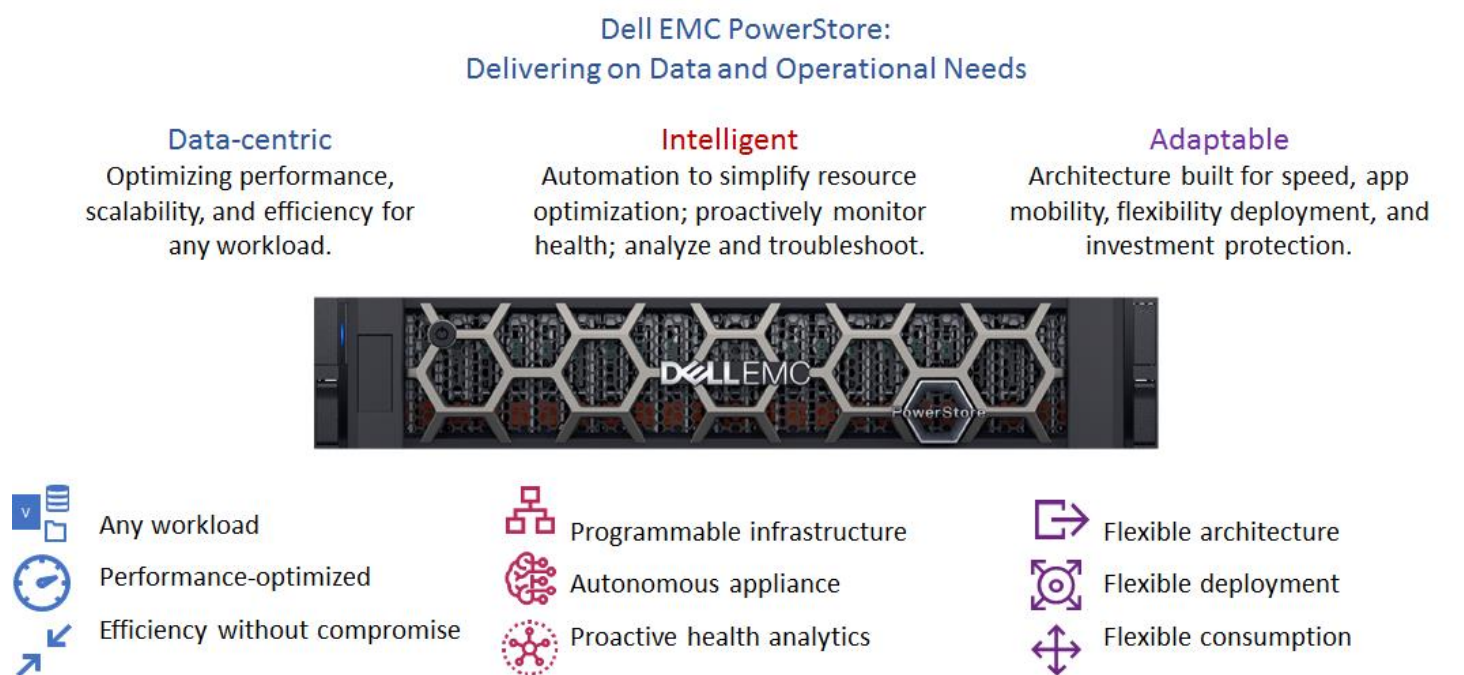
² *ibid.*

organizations' needs to support all types of data with less complexity, greater agility, intelligence, automation, and cost efficiency across customers' hybrid cloud deployments. Dell Technologies describes PowerStore as delivering on three key pillars of capabilities: *Data-centric, Intelligent, and Adaptable*. A complete description of the numerous features is beyond the scope of this document, but a summary follows.

- **Data-centric to optimize every workload.** Supports any on-premises or cloud workload (physical, virtual, block, file, vVols, apps, databases, and containers). It offers scale-up and scale-out compute and storage, supporting up to 2.8PB effective capacity on each appliance, and eight active-active nodes; high performance using end-to-end NVMe, dual-port Intel Optane Storage Class Memory (SCM), and SSD; and always-on data reduction with at least 4:1 efficiency guaranteed.
- **Intelligent to simplify tasks and relieve IT.** Automates storage provisioning and deploys in seconds; integrates with VMware and leading DevOps frameworks, including plug-ins for vRealize Orchestrator, Kubernetes, and Ansible; automatically discovers new cluster resources; provides intelligent data placement and efficiency recommendations to improve system utilization and performance; and includes CloudIQ to monitor usage and reduce risk.
- **Adaptable deployment, app mobility, and consumption.** Container-based microservices architecture delivers maximum flexibility, portability, and security; PowerStoreOS installs on the appliance or VM; with AppsON, can run apps directly on the appliance; includes flexible consumption models, non-disruptive upgrade options at any time, and product credits.

Customers can migrate to PowerStore seamlessly and non-disruptively from other Dell Technologies platforms.

Figure 2. Dell EMC PowerStore: Data-centric, Intelligent, Adaptable



Source: Enterprise Strategy Group

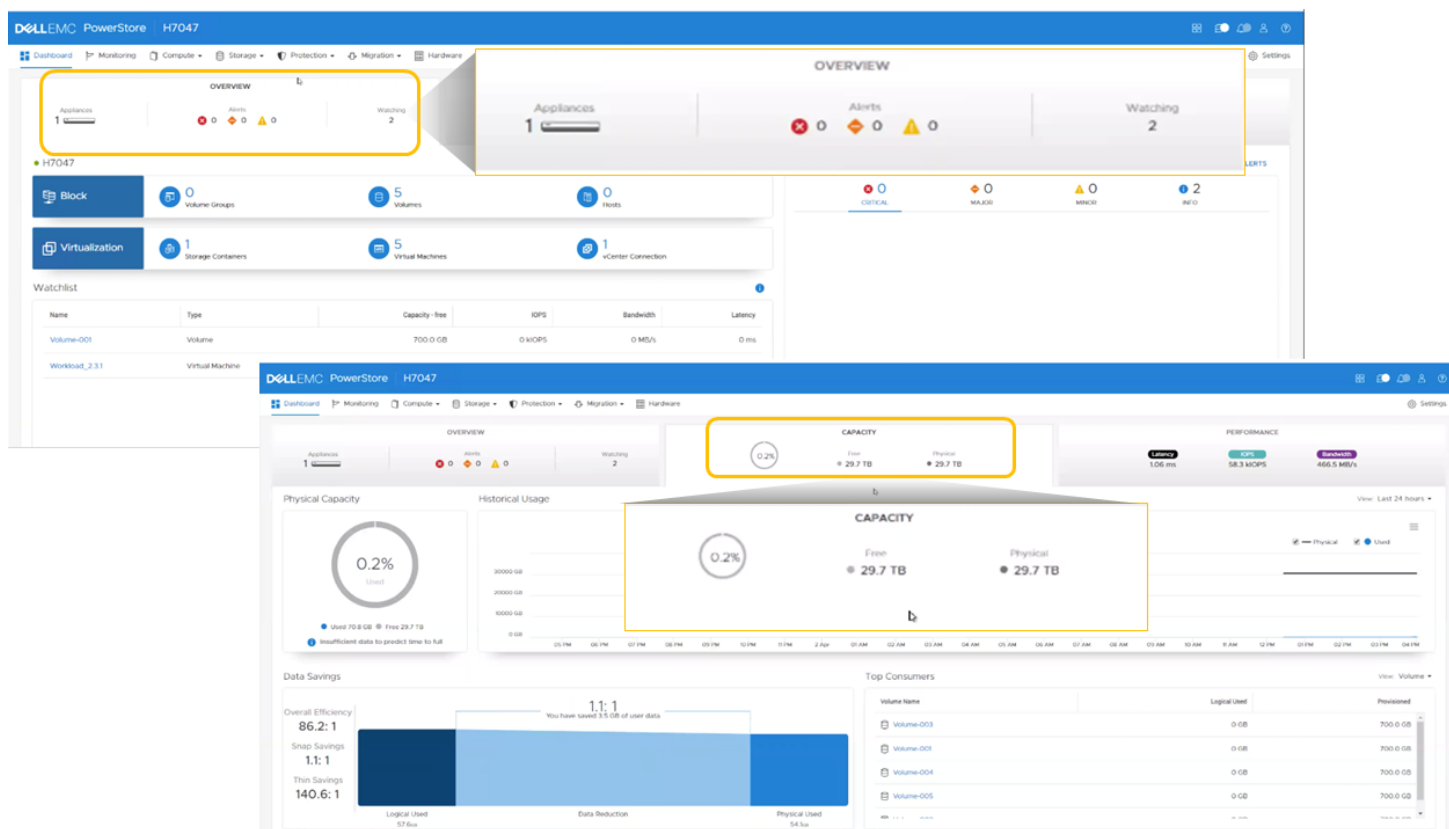
ESG Tested

ESG viewed a demonstration of two key PowerStore benefits: administrative ease of use, and VMware integration including AppsON, an innovative feature that allows virtualized applications to run directly on the PowerStore hardware.

Ease of Use

First, we toured the management of a dual-node PowerStore appliance configured with NVMe SSD storage; this appliance had a hypervisor deployment with VMware ESXi installed directly on the hardware and the PowerStoreOS running in a VM. The administrative interface includes all the expected features of a modern appliance, including the HTML5 GUI, detailed alerting, visibility of the health and status of traditional and VMware Virtual Volumes (vVols), easy-to-configure data protection, and details about capacity and performance. Administrators can manage any cluster of PowerStore appliances from a single pane of glass and can drill down for additional detail into specific appliance components including drives, fans, and power supplies. Figure 3 shows the Overview and Capacity tabs of the PowerStore Manager interface.

Figure 3. PowerStore Manager



Source: Enterprise Strategy Group

From the Protection tab, administrators can create snapshot and replication policies in a few clicks and apply them to any volumes or vVols-based virtual machine. This screenshot shows the interface for editing protection policies, including snapshot and replication rules.

PowerStore includes many built-in intelligence features that autonomously handle tasks such as initial volume placement, data migration, and

load balancing; in addition, a machine learning engine focuses on performance and capacity optimization across individual and clustered deployments. CloudIQ provides predictive analytics and proactive monitoring to identify and manage problems before they impact the environment.

VMware Integration: AppsON Feature

The focus of our testing was on the integration with VMware. Through the AppsON feature available with the hypervisor deployment of PowerStore, ESXi is loaded directly on the hardware. The PowerStoreOS runs in a VM on each of the two nodes and allows organizations to run virtual machines directly on PowerStore without the need for external servers. This deployment provides the same data services, features, and functionality on the same hardware, but can be used to simplify, scale, and secure applications such as edge-based IoT analytics and other data-intensive applications. Other use cases

include loading infrastructure applications, such as antivirus or monitoring software, directly on a PowerStore VM to consolidate compute and storage. VMs hosted directly on PowerStore are managed with standard VMware tools including vMotion and storage vMotion to move workloads into and out of PowerStore in minutes.

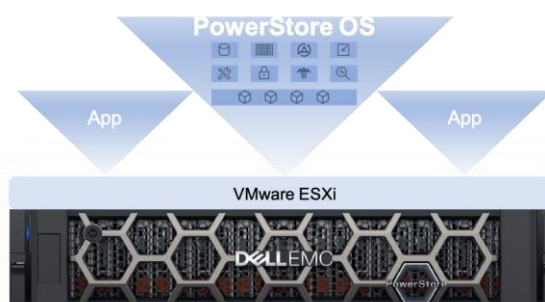
The screenshot displays two side-by-side configuration windows in the Dell EMC PowerStore management console.

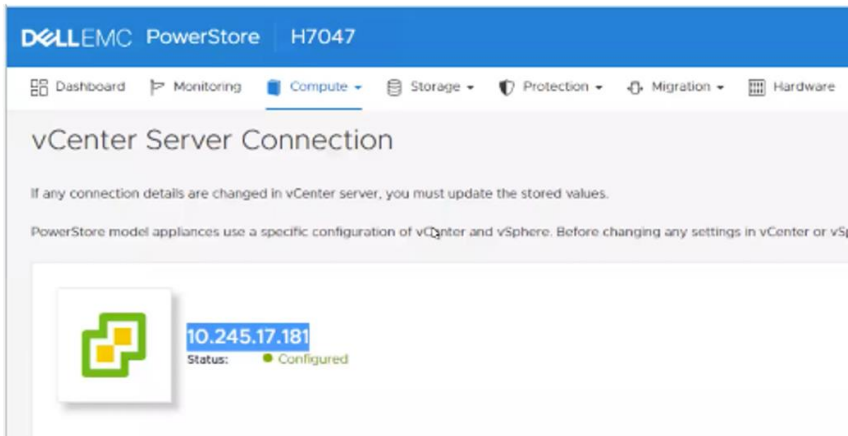
Edit Protection Policy:

- Policy Properties:** Includes fields for 'Name' (containing '5min') and 'Description (Optional)'.
- Snapshot Rules:** A table with columns 'Name', 'Days', and 'Frequency/Start Time'. It lists two rules: '5min' (checked) and '15min'.
- Replication Rules:** A table with columns 'Name', 'RPO', and 'RPO Alert Threshold'. It contains a message: 'There are no replication rules. Click the CREATE button to add a replication rule.'

Edit Snapshot Rule:

- Snapshot Rule Properties:** Includes a 'Rule Name' field.
- Days:** A row of seven radio buttons for days of the week (S, M, T, W, T, F, S), all of which are selected.
- Frequency/Start Time:** Includes a 'Frequency' dropdown set to 'Every' and a 'Start Time' field set to '5 minutes'.
- Retention:** Includes a 'Keep For' field set to '4' and a unit dropdown set to 'hour(s)'.





ESG began testing in PowerStore Manager by launching the vCenter Server Connection (see figure at left), which connected the PowerStore appliance to a standard vCenter server, which provided the familiar VMware look and feel for administrative tasks.

As the PowerStore appliance is an active-active fully redundant HA appliance, the PowerStore OS runs on each of the two nodes. In this model, ESXi hypervisor is loaded onto each of the two internal nodes in the appliance, and the PowerStore OS is

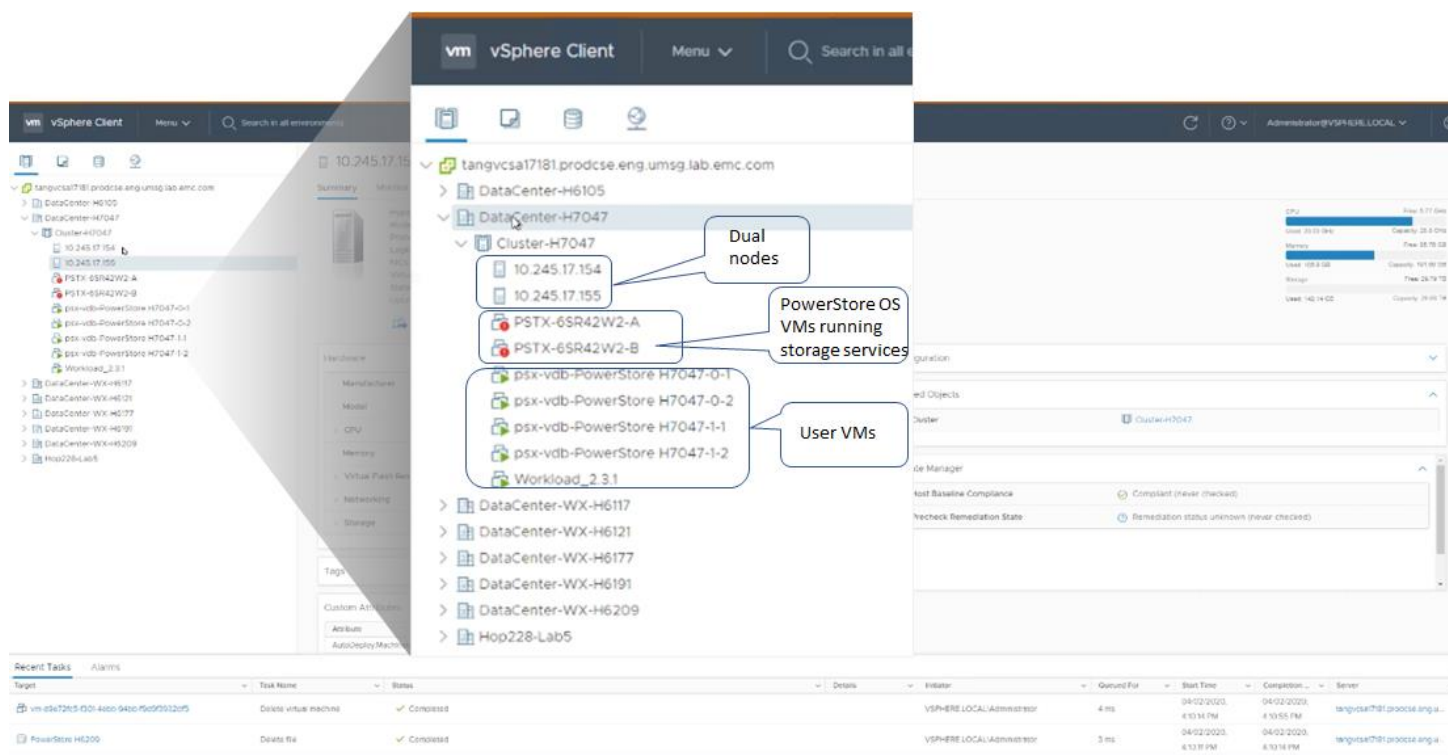
running as a virtual machine in each of the two nodes. Each PowerStore OS VM is configured with half of the node's available CPU and memory, while the remaining half is available for user VMs. This PowerStore appliance had five user VMs installed, including one running HCI Bench, a workload generator.

Administrators can drill into each VM for details of capacity, performance, alerts, protection, vVols, usage, etc. VMs can be viewed and managed through both the PowerStore and vCenter GUIs using the same VMware tools with which administrators are already familiar. This is a significant benefit as it simplifies management and enables fast time to value. Figure 4 shows the PowerStore management interface, displaying the five user VMs configured on this appliance; Figure 5 shows the vSphere client view, including the two PowerStore nodes, the VMs running storage services for each node, and the five user VMs.

Figure 4. User VMs: PowerStore Manager View

Name	Alerts	Type	Guest OS	Num. Of CPUs	CPU Usage (GHz)
vm psx-vdb-PowerStore H7047-0-1	--	Primary	Other 3.x Linux (64-bit)	4	3.2
vm psx-vdb-PowerStore H7047-0-2	--	Primary	Other 3.x Linux (64-bit)	4	3.1
vm psx-vdb-PowerStore H7047-1-1	--	Primary	Other 3.x Linux (64-bit)	4	3.2
vm psx-vdb-PowerStore H7047-1-2	--	Primary	Other 3.x Linux (64-bit)	4	3.1
vm Workload_2.3.1	--	Primary	Other 3.x Linux (64-bit)	8	0.2

Source: Enterprise Strategy Group

Figure 5. PowerStore VMs from vSphere View

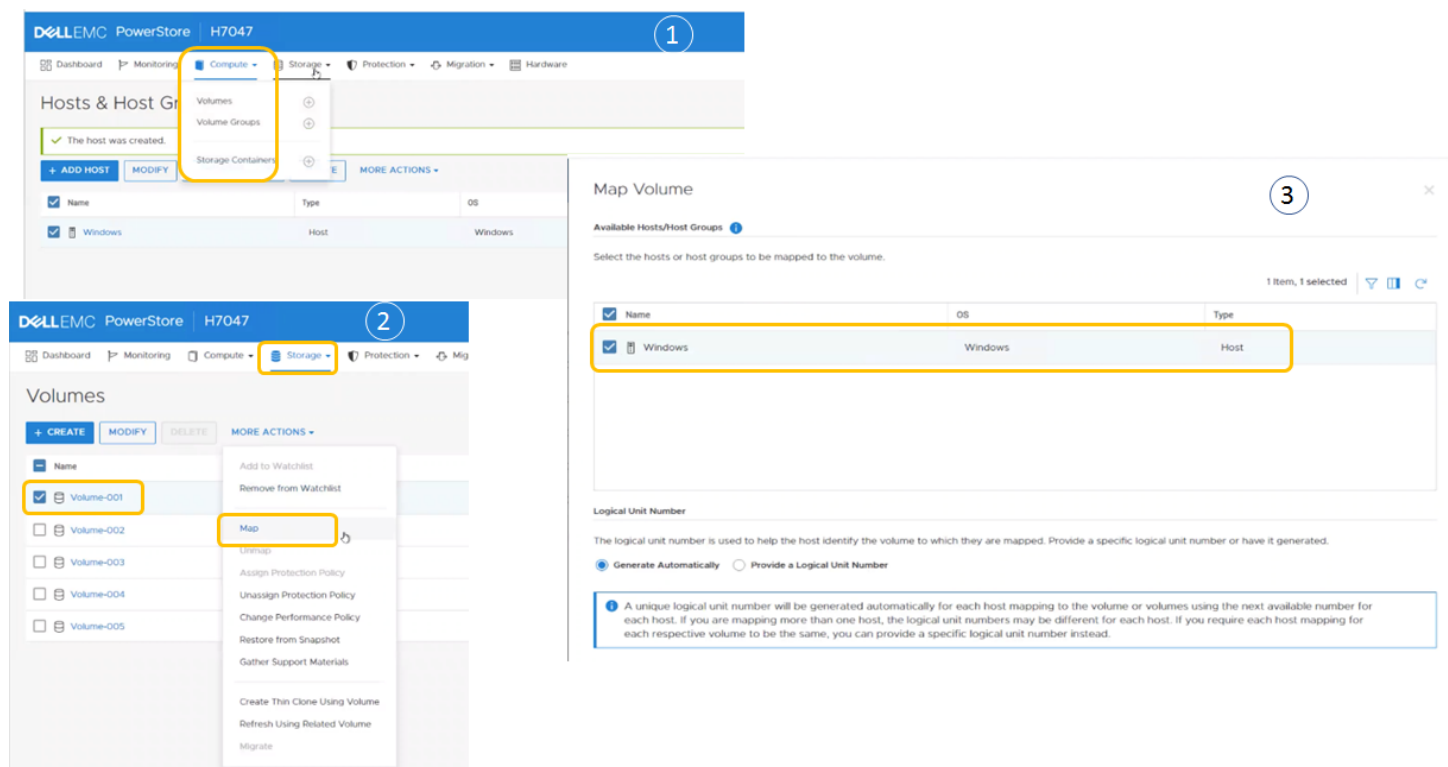
Source: Enterprise Strategy Group

Snapshots

We also explored the ability to take VM snapshots directly from either PowerStore Manager or vSphere. We selected a previously created policy of taking snapshots every five minutes and saving them for four hours; next, we selected a VM and clicked apply. Creating policies is equally simple and fast. Next, we took a manual snapshot, and the snapshot immediately appeared in both the PowerStore and vSphere UIs; snapshots can be created from both interfaces. From vSphere, we could also select from a list of previous snapshots to restore if needed.

Present Volumes to External Host

Finally, we explored the ability for PowerStore to also act as a traditional external storage appliance. From the PowerStore GUI Storage tab, we were able to create a new volume and provision it to an external Windows host in just a few clicks. Figure 6 shows the screens involved to select a PowerStore volume and map it to an external host.

Figure 6. Mapping Volumes to External Host

Source: Enterprise Strategy Group



Why This Matters

Ever-growing data stores that need to be available, protected, high performing, agile, and secure place escalating demands on IT administrators at companies of all sizes. Other pressures include the high expectations of senior management that digital transformation will deliver data-driven decisions, innovation, and greater efficiency.

ESG validated that Dell EMC PowerStore provides a full featured storage solution for diverse data types. It is extremely simple to manage and includes built-in intelligence and automation to streamline management and optimize resources. We also validated the ability to run VMs directly on the appliance and manage them easily through both PowerStore Manager and vSphere. This innovation can help both data center and remote offices to better support data-intensive workloads, as well as keeping infrastructure applications such as antivirus closer to the data.

The Bigger Truth

Data drives every organization. Today, diverse data sets can be created, stored, and used from edge to core to cloud, collected from sensors, aggregated in databases and repositories, analyzed and poked and prodded to deliver insights. Storage infrastructure has transformed to accommodate these needs. Decades ago, most data was stored in a single location—a mainframe computer. Over time, separate infrastructures were designed for particular data types, capabilities, or purposes—for example, block storage was separate from file storage, and high-performance data wasn't stored on the same infrastructure as backup data. Every silo has gained from iterative innovations; today's IT offers storage-class memory and NVMe for maximum performance, scaling to multiple petabytes of capacity in a single file system, virtual and containerized applications that can move between appliances, and so much more.

These few examples demonstrate the creative ways that vendors and IT have transformed the digital landscape. Now, Dell Technologies is bringing many of these innovations back together into a single platform, Dell EMC PowerStore, built with the latest architectural features and intelligent automation. PowerStore offers performance, capacity, scalability, availability, data efficiency, automation, analytics, and even flexible deployment and consumption options. PowerStore starts with a new, flexible architecture, built with container-based microservices. It brings advanced data services to any type of workload in any location, can be performance-optimized, and is scalable and efficient. Intelligence and automation optimize data placement, provide health checks, and unburden IT from labor-intensive tasks. PowerStore also plugs into leading DevOps frameworks. It is flexible, adaptable, software-defined, and offers deployment and consumption options to fit any need.

ESG validated the ease of management and the innovative VMware integration features, including:

- Simple management, including capacity and performance optimization, alerting, and data protection.
- Integration with VMware, including AppsON feature to run VMs directly on the appliance.
- Ability to manage and protect VMs through both the PowerStore and vSphere GUIs.
- Ability to simultaneously use PowerStore as a traditional external appliance.

Dell EMC PowerStore provides flexibility to provide the best environment for any workload, and to adapt as needed for the life of your data. As this is a new architecture with new capabilities, ESG looks forward to hearing how customers experience PowerStore in their own data centers and remote offices.

While this paper focused particularly on ease of use and AppsON, there is a lot to learn about this powerful new platform in terms of not only technical capabilities, but also options for traditional or cloud-like consumption models, innovative upgrade policies, and more. ESG believes that PowerStore can offer exceptional capabilities that can be tailored to any workload need and would encourage any organization looking for a strong mid-range storage platform to take a look.

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