Solution Brief

NetApp Storage Solution for VMware Private Cloud: Enabling Efficient, Flexible Clouds

KEY BENEFITS

- Automate and accelerate deployment by instantly provisioning servers and storage together.
- Improve efficiencies by directly managing core storage operations using VMware® vCenter™.
- Enable end users to self-service their requests with integrated end-to-end orchestration.
- Eliminate planned downtime with nondisruptive operations and data mobility.
- Lower your TCO by standardizing on a single storage platform.

Making the Transition to the Cloud

Virtualization goes a long way toward improving resource utilization, reducing power and cooling consumption, and increasing asset-to-administrator ratios. Cloud environments build upon virtualized infrastructures and expand their capabilities to offer a service-driven IT model that improves IT agility and responsiveness to business needs.

The transformation to cloud computing requires that you expand your focus beyond the infrastructure optimization provided by virtualization and include operational efficiencies and IT service optimization. Cloud environments address these requirements with intelligent, automated provisioning; end-to-end visibility; and centralized management of cloud assets. Additional cloud attributes include integrated data protection and real-time data mobility to deliver nondisruptive operations and dynamic service-level management.

The Solution

NetApp and VMware—leaders in storage and data management and virtualization solutions, respectively—share a common vision to accelerate the path to the cloud through advanced virtualization, automation, and self-service capabilities. The NetApp® solution for VMware Private Cloud, available as a NetApp Verified Architecture, combines innovative NetApp and VMware technologies and best practices, enabling enterprises and service providers to rapidly deploy an integrated cloud solution built on a shared virtualized infrastructure. Together our industry-leading storage, virtualization, and cloud technologies provide an agile data infrastructure that enables enterprises to evolve to the cloud and deliver IT as a service for increased business agility with lower cost and complexity.

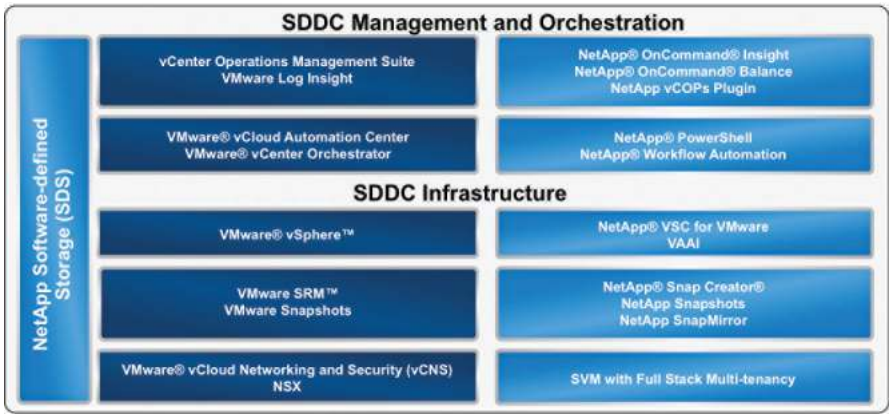

Figure 1) Overview of the NetApp storage solution for VMware Private Cloud.

The Right Storage Infrastructure is Paramount

The storage platform is a key element of the infrastructure layer. Storage efficiency, a unified architecture, HA, multiprotocol capability, ease of management, integration with VMware vCloud® Suite, and enterprise backup and DR capability are all earmarks of cloud-enabled storage. The NetApp Unified Storage Architecture extends all of the efficiencies and flexibility already available for VMware vSphere® virtualized environments to VMware vCloud Suite, enabling companies to more efficiently realize the full benefits of cloud computing.

More Efficient IT

The NetApp solution for VMware Private Cloud features the NetApp Unified Storage Architecture and the Data ONTAP® architecture, the world's number-one storage operating system. Both technologies span all NetApp storage systems for simplified management and smooth, nearly unlimited scalability. Our single, unified storage platform supports multiple protocols (FC, FCoE, iSCSI, NFS, CIFS) and diverse workloads to meet changing requirements without requiring forklift upgrades. Multiprotocol access to a single pool of storage brings simplicity and flexibility to your VMware vCloud Suite services. NetApp storage efficiencies also include built-in deduplication, thin provisioning, space-efficient Snapshot™ backups, and zero-cost virtual machine cloning. Together they can reduce storage requirements by 50% or more in VMware environments.

The solution also offers NetApp technology integration at multiple layers of the VMware vCloud Suite, enhancing operational efficiencies with automated monitoring, backup, disaster recovery, provisioning, and more.

Faster Response to the Business

The integration of NetApp Virtual Storage Console (VSC) with the VMware vCenter server management platform enables VMware administrators to manage and execute shared storage activities from a single console. You can provision storage and server resources and clone VMs within minutes for rapid response to business needs. NetApp storage resources can also be automatically expanded from within a VMware vCenter server based on intelligent policies to accommodate new vApps or grow existing ones. VSC also enables integrated data protection capabilities for simplified backup and recovery.

NetApp OnCommand® Insight and Balance products complement the VMware vCenter Operations (vCO) Management Suite™. Together they provide end-to-end monitoring, cost reporting, and visibility into service paths and resource usage for virtual machines, physical hosts, and storage, including datastores, volumes, and LUNs. These important service analytics help you avoid bottlenecks, optimize performance, and plan capacity for smart resource procurement and proactive service-level management.

Streamlined Management and Orchestration

NetApp open APIs and Windows PowerShell™ extensibility enable our technologies to be easily integrated with VMware at a higher abstraction layer. For example, custom workflows for automated storage and virtual machine provisioning, cloning, and data protection can be driven by your cloud management software without exposing the complexity of the underlying operations.

WFA extends the value of NetApp storage through integration with vCloud Automation Center™ (vCAC) to create a storage services catalog that presents modular workflows as catalog items that can be used to initiate advanced storage capabilities such as provision, migrate, and decommission storage with single-click automation using vCAC.

You can also make these capabilities directly available to users of IT resources, thus enabling users to request and gain

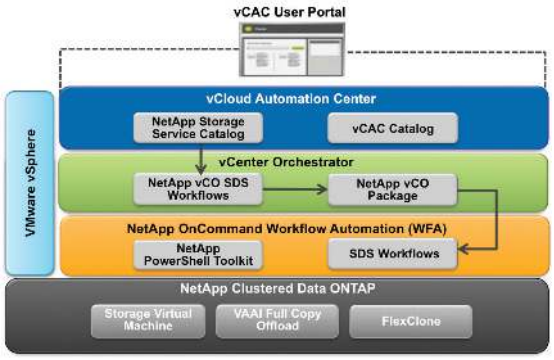

Figure 2) Software-defined storage with NetApp and VMware.

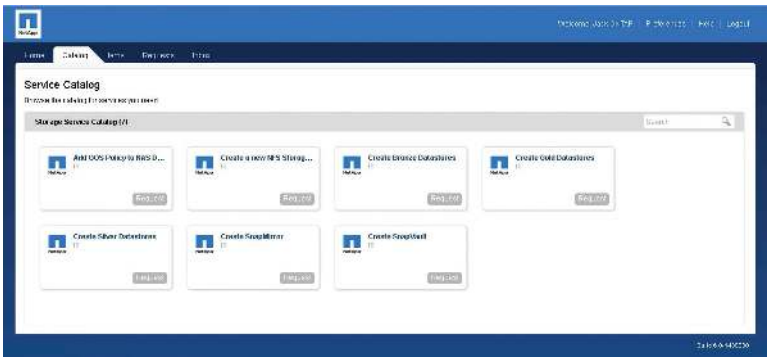

Figure 3) Using VMware vCAC and the NetApp Storage Service Catalog to manage SDS.

access to storage on an as-needed basis, with intervention by the storage administrator. The provisioning process is automated, saving considerable time and improving productivity.

In addition to using WFA's extensive library of built-in storage automation workflows, you can also rapidly create custom workflows in WFA through its WISIWIG editor to automate any service that exposes an API or PowerShell interface. WFA also exposes a web services interface for vCO to leverage. Working together, WFA and vCO can create a workflow to provide you with a fast, repeatable, and scalable process to clone vApps inside vCloud Automation Center, seamlessly extending NetApp capabilities into VMware private clouds.

Nondisruptive Operations

The NetApp clustered Data ONTAP operating system provides the scalability, flexibility, and efficiency needed for storage that VMware provides for servers. It supports a scale-out storage architecture based on virtual storage systems (Vservers) that can be expanded and moved on demand to deliver dynamic quality of service (QoS). Now you can eliminate planned downtime for maintenance, technology refreshes, software upgrades, and load balancing by moving data volumes to other storage nodes in the cluster without disrupting applications or users. Clustered Data ONTAP also addresses fast data growth with massive scalability, supporting up to 24 nodes and more than 50PB of storage with consistent management and near-linear performance.

Simplified, Integrated Data Protection

The NetApp solution for VMware Private Cloud includes integrated data protection capabilities for simplified backup and recovery. The NetApp Snap Creator™ framework enables instant, space-efficient, point-in-time backup copies to be scheduled, automatically created, and managed from a single interface. Snap Creator also supports application-consistent backups for multiple applications and databases on multiple operating systems and virtual environments, all managed with a single solution from a single interface.

For fast, integrated disaster recovery, NetApp developed the Storage Replication Adapter, which coordinates DR operations among NetApp SnapMirror®, NetApp FlexClone®, and VMware Site Recovery Manager™ technologies. In the event of site outages, you can recover entire virtual infrastructures, including VMs, applications, and data, in minutes.

Optimizing Security and Quality of Service for Multiple Tenants

The NetApp solution for VMware Private Cloud enables secure multi-tenancy (SMT) in shared IT infrastructures. It includes the capability to partition shared virtualized storage and server resources and securely isolate the partitions to meet the needs of individual tenants (applications, departments, business units, virtual data centers, or customers).

NetApp MultiStore® software, a key SMT component, complements VMware vCloud Networking and Security™ (vCNS) by enabling data for multiple tenants to reside on a single NetApp array. It simultaneously provides the ability to establish secure partitions and unique service levels for each tenant. Because each partition is treated as a separate virtual storage system, multi-tenancy can be used to improve both storage utilization and QoS management for each tenant residing on the array. Storage resources assigned to each tenant can also be dynamically resized to meet changing business demands without compromising security or SLAs. By extending security, flexibility, and service efficiencies across the server and storage infrastructure, secure multi-tenancy facilitates a dynamic shared cloud environment.

"Through our WhiteCloud Services on NetApp storage and VMware vCloud technologies, we can deliver a level of scalability and performance that, in reality, our customers simply couldn't afford if they invested in their own infrastructures."

Luke Norris
CEO, PeakColo

Agile Data Infrastructure

NetApp storage enables backup and recovery, storage analytics, storage orchestration, storage services management, and storage policy management from within vCenter. This tight-knit integration further increases manageability and control within the environment to reduce complexity, time, and effort. This enables you to more easily deploy an agile and scalable shared storage infrastructure for your VMware Private Cloud.

Minimizing Risk and Accelerating Results

The NetApp solution for VMware Private Cloud is a NetApp Verified Architecture (NVA), a thoroughly tested and integrated architecture that provides a seal of assurance for NetApp solutions. The NVA designation is intended to provide customers and partners with the highest level of confidence in deploying NetApp solutions. An NVA solution is backed by prescriptive deployment, testing, and operational procedures that minimize deployment risk and accelerate time to results.

Partnering for Your Success

The NetApp solution for VMware Private Cloud combines the best of storage, virtualization, and cloud technologies to help you boost IT efficiency and agility while reducing cost and complexity. It enables you to imple ment the core capabilities required for cloud computing, including automated on-demand provisioning, integrated data protection, and centralized cloud management. You can meet both SLA and security needs with secure multi-tenancy and provide always-on operations with clustered Data ONTAP for nondisruptive scalability and data mobility across clouds. Learn more at *netapp.com/us/solutions/cloud/vmware-cloud-infrastructure.aspx.*

About NetApp

NetApp creates innovative storage and data management solutions that deliver outstanding cost efficiency and accelerate business breakthroughs. The world's leading companies rely on our solutions to achieve better economics, speed, and scale of business. Discover our passion for helping companies around the world go further, faster at *www.netapp.com*.

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