INFINIDAT
FEDERAL

InfiniBox and VMware Integration

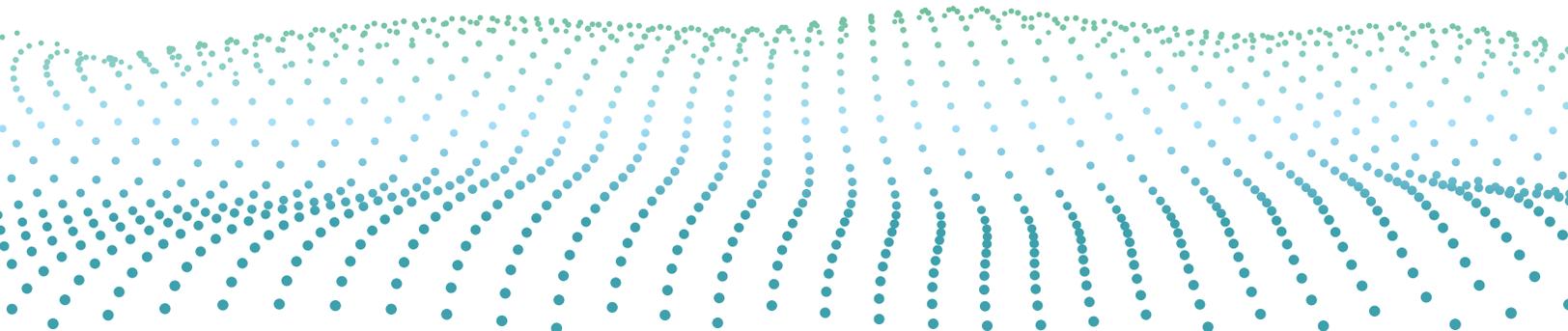# Table of Contents

INFINIDAT
FEDERAL

Introduction

Virtualization is the standard approach in enterprise IT environments to consolidate servers, enhance business continuity, and improve business agility. VMware provides a platform for server administrators to reduce their Total Cost of Ownership (TCO) and improve the application development process. However, as improvements have been made with server technology, storage technology has become the bottleneck. Traditional storage solutions can't keep pace with thousands of virtual machines demanding maximum IOPS along with high bandwidth at the lowest latency, and media-centric storage architectures become prohibitively expensive at enterprise scale.

InfiniBox removes the storage bottleneck for VMware environments, without compromising TCO or availability. The InfiniBox enterprise storage array delivers unmatched performance, 100% availability, and class-leading economics at petabyte scale. Infinidat Federal offers a comprehensive set of VMware integrations and capabilities at no extra cost to our customers.

This white paper is written for VMware virtual infrastructure (VI) administrators and storage administrators as an introduction to InfiniBox storage integrations and capabilities for VMware products, including classic vSphere and vCenter platforms as well as the vRealize portfolio, Tanzu Kubernetes Grid (TKG), and VMware Cloud Foundation (VCF).

INFINIDAT
FEDERAL

VMware Terminology

Virtual machine (VM): a representation of a physical server in software. A virtual machine has its own set of virtual hardware on which an operating system and applications are loaded. The operating system sees a consistent, normalized set of hardware regardless of the actual underlying physical hardware components.

Software-defined datacenter (SDDC): a cloud architecture pioneered by VMware that facilitates virtualization of server, network, and storage resources, with automated policy-driven automation.

vSphere ESXi: the VMware hypervisor software that runs on physical servers, allowing processor, memory, storage, networking, and other resources to be provisioned to virtual machines.

vCenter Server: a central management tool for vSphere environments that runs on a dedicated VM or a separate Windows-based server.

vSphere Client: an HTML5-based graphical user interface (GUI) for vCenter Server.

Virtual machine file system (VMFS): one of the classic datastore types supported by vSphere ESXi, a clustered file system that encapsulates storage for VMs. Deployed on standard block storage systems (Fibre Channel or iSCSI).

vSphere APIs for Array Integration (VAAI): VMware extensions to standard SCSI protocols that improve operational efficiency.

vStorage APIs for Storage Awareness (VASA): a set of APIs that enable vCenter to recognize the capabilities of storage arrays, facilitating storage policy-based management (SPBM), Virtual Volumes (vVols), and other functionality.

Storage Policy-Based Management (SPBM): a VMware mechanism to help align storage with VM demands as part of a broader SDDC.

vSphere Virtual Volumes (vVols): a newer datastore type supported by vSphere ESXi, corresponding to a storage container that is managed by the backend storage array. Storage systems must implement specific integrations for vVols, including providing VMware-specific protocol endpoints managed out-of-band by a VASA provider.

vSphere Metro Storage Cluster (vMSC): a high availability "stretched cluster" reference architecture that provides active/active workload mobility and DR across metro regions, available from selected VMware storage partners as part of the VMware Partner Verified and Supported Products (PVSP) program.

VMware Site Recovery Manager (SRM): a business continuity and disaster recovery solution for VMware vSphere servers providing VM-aware automation of emergency and planned failover/failback scenarios between data centers, incorporating either server or storage-based datastore replication.

VMware vRealize Suite: a VMware cloud management solution that integrates products providing automation, operations, log analytics, and lifecycle management, including:

▶ vRealize Operations – software that facilitates SDDC planning, optimization, and monitoring
▶ vRealize Log Insight – centralized tool for log management, visibility, and analytics

VMware Tanzu Kubernetes Grid (TKG): an enterprise-ready runtime for Kubernetes (k8s) containers, available as independent software (Tanzu Kubernetes Grid – Integrated Edition) or as part of vSphere with Tanzu (from vSphere 7 onwards).

VMware Cloud Foundation: the hybrid cloud platform for managing VMs and orchestrating containers, leveraging vSphere, vCenter, Tanzu, and other VMware technologies to deliver consistent, secure infrastructure and operations across private and public cloud.

VMware Cloud Solutions Lab: a VMware-managed environment that brings together hardware, software, and implementation partners to test new workloads and build joint solutions for customers.

INFINIDAT
FEDERAL

InfiniBox vSphere Integrations

Most Infinidat Federal customers are highly virtualized, and they want storage to be easy to consume in those environments. As a result, our VMware integrations start with the core foundation of modern virtualized environments: vSphere. Traditional storage provisioning in vSphere typically tasks the virtual infrastructure administrator with storage-centric responsibilities such as:

▶ Determining the correct datastore on which to initially place virtual disks for a VM

▶ Continuously monitoring datastores for capacity consumption and performance/latency characteristics

▶ Ensuring that a VM remains backed by a suitable storage resource throughout its lifecycle

▶ Aligning data protection and high availability requirements with underlying infrastructure

Working within the vSphere storage framework, the strategies Infinidat Federal devised to insulate virtual infrastructure administrators from complex storage management tasks, suboptimal performance, and physical resource allocation chores include:

▶ Enabling storage resource-awareness by attaching features and profiling attributes to the storage objects

▶ Helping virtual infrastructure administrators make the correct storage provisioning decision for each virtual machine or even fully automate the intelligent deployment of virtual machine storage

▶ Removing time-consuming and repetitive storage-related tasks, including the need for repetitive physical capacity provisioning

Infinidat Federal recognizes that organizations vary in their assignment of virtual infrastructure administrator and storage administrator responsibilities. In all cases, the storage administrator can still manage overall storage system use, set up separate pools for different VMware deployments, and even restrict virtual infrastructure administrators' ability to make changes within VMware administrative interfaces if desired.

Enhancements to the VI administrator experience are delivered by InfiniBox vCenter and vSphere integrations, such as Host PowerTools for VMware, vStorage APIs for Array Integration (VAAI), VMware Virtual Volumes (vVols), and the vSphere Metro Storage Cluster (vMSC) reference architecture.

HOST POWERTOOLS FOR VMWARE

Host PowerTools™ for VMware (HPT-VM) is a virtual appliance that integrates storage capabilities with VMware vCenter/vSphere management tools, providing the following benefits to virtual infrastructure administrators:

▶ Self-service storage provisioning, with an optional read-only mode for customers who prefer to provide only storage visibility to their VMware teams

▶ Automated storage best practices compliance

▶ Simplified process for VM backup and recovery

▶ vSphere Metro Storage Cluster (vMSC) support

▶ Simplified vSphere Virtual Volumes (vVols) deployment

Customers can get started with Host PowerTools for VMware by downloading the OVF from **https://repo.infinidat.com**. No login is required to download the software, which is freely available for all customers. Deploy Host PowerTools for VMware via the vSphere client for each vCenter instance.
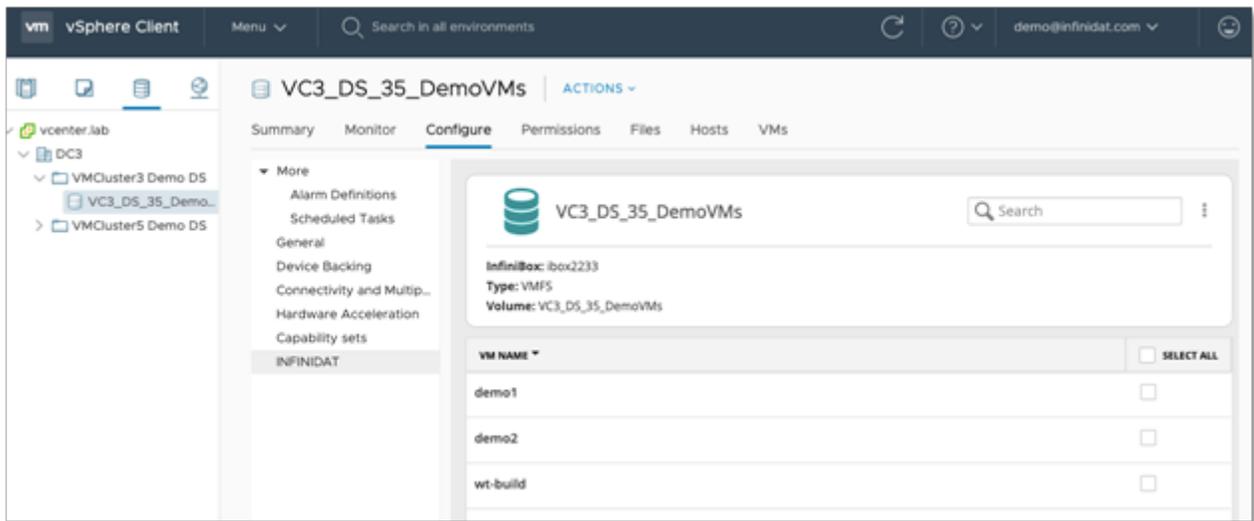
INFINIDAT
FEDERAL

FIGURE 1 - Host PowerTools for VMware configuration options within vSphere client – datastore view.
Older vSphere client versions may display a separate INFINIDAT tab with the same functionality.

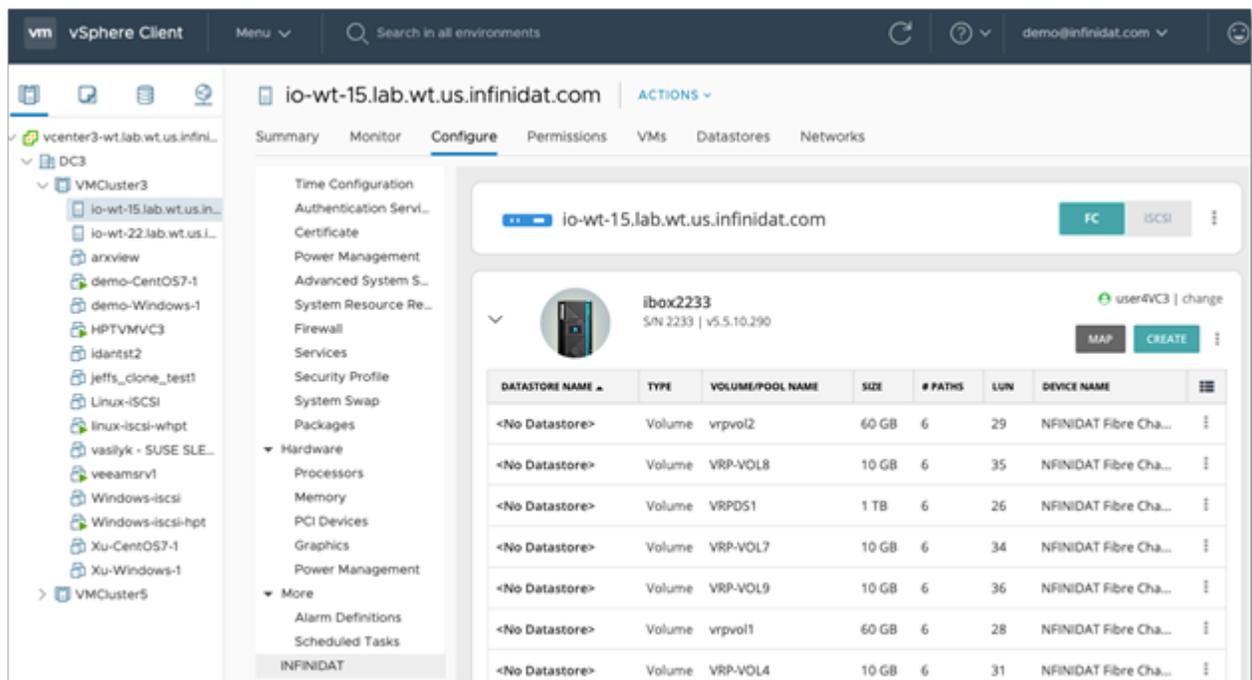Host PowerTools for VMware supports Fibre Channel (FC) and iSCSI protocols.

FIGURE 2 - Host PowerTools for VMware configuration options within vSphere client – host view.
Older vSphere client versions may display a separate INFINIDAT tab with the same functionality.

BEST PRACTICES MADE SIMPLE WITH HOST POWERTOOLS FOR VMWARE

Instead of reading endless pages of best practices documentation and then spending hours configuring vSphere hosts, Host PowerTools for VMware offers one-click setup according to current best practices by simply clicking "**Prepare Cluster**" or "**Prepare Host**" as appropriate.
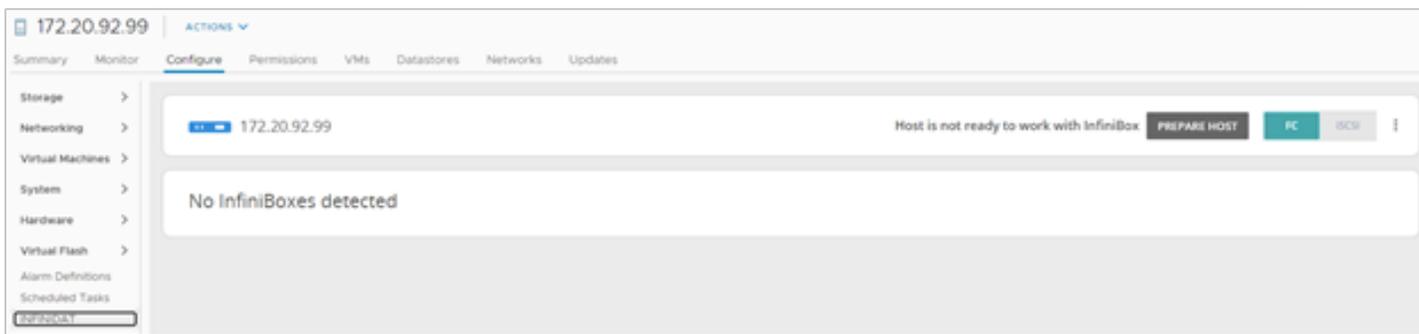
INFINIDAT
FEDERAL

FIGURE 3 - Prepare host or prepare cluster

This preparation process will create a claiming rule for InfiniBox storage.

InfiniBox leverages the native VMware ESXi multipath I/O capabilities. As part of the preparation process, Host PowerTools for VMware configures an ALUA arrangement with round-robin path selection and TPGS. See Figure 4 below for details of the claiming rule, which may be updated from time to time with new functionality. With other vendors, virtual infrastructure admins must run a VMware-based cli command in order to set up similar rules.

KEY	VALUE FOR VSPHERE 6.7 AND BELOW	VALUE FOR VSPHERE 6.7U1 AND ABOVE
Vendor	NFINIDAT	NFINIDAT
Product	InfiniBox	InfiniBox
Storage Array Type	VMW_SATP_ALUA	VMW_SATP_ALUA
Path Selection Policy	VMW_PSP_RR	VMW_PSP_RR
Path Selection Policy Options	iops=1	policy=latency
Claim Options	tpgs_on	tpgs_on

FIGURE 4 - Claiming rules

Cluster or Host readiness will check if the InfiniBox claiming rule exists, along with other best practices. If it does not exist, then it will be created, as shown in Figure 5 below.
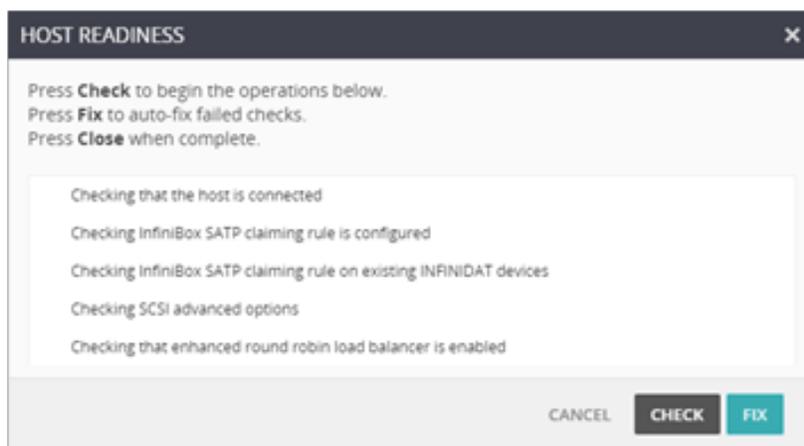

FIGURE 5 - Host PowerTools for VMware host readiness check

INFINIDAT
FEDERAL

Once the claiming rule is created, Host PowerTools for VMware will review existing InfiniBox volumes to see if they need to be added to the claiming rule. This two-click process will ensure that your hosts or clusters are following InfiniBox VMware best practices and verify that any InfiniBox volume possibly provisioned prior to creating the claiming policy will leverage the new rule.

Infinidat Federal recommends registering all clusters or datacenters via Host PowerTools for VMware to minimize potential errors, ensure compliance with current best practices, and speed up the provisioning process. For more information about Host PowerTools for VMware, please contact Infinidat Federal at sales@infinidatfederal.com.

SELF-SERVICE PROVISIONING VIA HOST POWERTOOLS FOR VMWARE

Many clients leverage InfiniBox pool administrator functionality to allow virtual infrastructure admins to manage their own storage. Storage administrators can assign the Pool Administrator role to an InfiniBox user or group. The storage admin will create a pool on the InfiniBox and assign the Pool Administrator role to the virtual infrastructure admin(s). The VI admins can now provision storage to clusters/ hosts as required from that pool.

Host PowerTools for VMware adds an InfiniBox entry to the vSphere client as seen in Figure 6 below. The InfiniBox options are also available at the cluster, server, and VM levels for the Hosts and Cluster views; the Datastores view; and in the VM folder view.

If the virtual infrastructure admin is working at the cluster level, they can provision storage to the entire cluster. If the VI admin is working at the server level, then storage will only be provisioned to that server. At the VM level, the options for an individual VM change. In addition to metadata such as the volume name, datastore name, and InfiniBox information, options for an individual VM include:

▶ Enabling VM snapshots
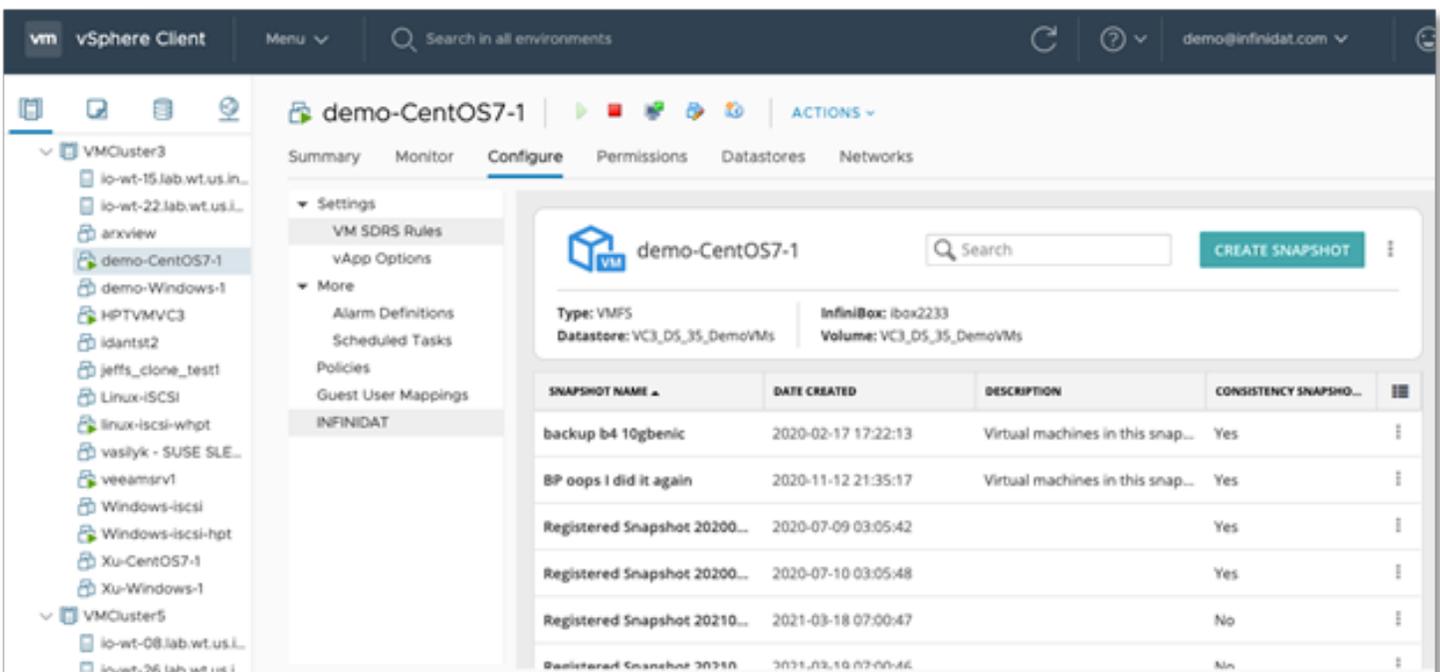▶ Restoring a VM from a snapshot
▶ Exposing a VM

FIGURE 6 - Host PowerTools for VMware configuration options within vSphere client – VM view.
Older vSphere client versions may display a separate INFINIDAT tab with the same functionality.

INFINIDAT
FEDERAL

INDIVIDUAL VM SNAPSHOTS VIA HOST POWERTOOLS FOR VMWARE

InfiniBox InfiniSnap snapshots can be used to back up and restore virtual machines. Snapshots reflect the content of a volume at a chosen point in time. InfiniSnap snapshots are extremely scalable with no performance penalty, leveraging a redirect-on-write offload mechanism within the storage platform. In contrast, VMware host-based snapshots are built with a copy-on-write mechanism, which causes more IO upon deletion of a snapshot that contains many changes. InfiniSnap integration into VMware enables users to easily take consistent snapshots and maintain them for an unlimited amount of time without performance penalties.

Host PowerTools for VMware enables granular snapshots at the VM level, enabling virtual infrastructure admins to restore a single VM directly from the INFINIDAT panel in the vSphere client. Other storage platforms often provide snapshot functionality at the datastore level, not for individual VMs.

To create a snapshot via Host PowerTools for VMware, after selecting a VM in the vSphere client, select "**Create Snapshot**" in the INFINIDAT configuration panel for your desired VM. This yields a prompt with some simple options.

The "Perform VMware consistency snapshot" option enables Host PowerTools for VMware to orchestrate with vCenter to create a VMware-based snapshot for application-level crash consistency, while creating an InfiniSnap-based snapshot at the same time to preserve the crash-consistent data.

The InfiniBox array-based snapshot is synced with the VMware-based snapshot to ensure the snapshot has a VMware-consistent state—see Figure 7. After those actions are done, the VMware-based snapshot is deleted and only the superior InfiniSnap-based snapshot remains. This allows virtual infrastructure admins to create a VMware consistent backup without the overhead of VMware snapshots.
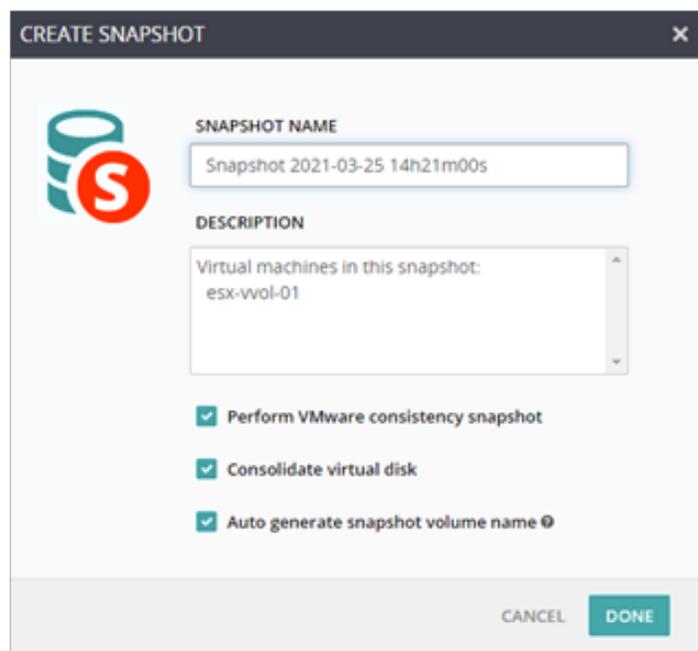

FIGURE 7 - Create snapshot

Empowering the virtual infrastructure administrator to create ad-hoc snapshots/restore points before changes are made to VMs improves Recovery Time Objectives (RTO) and Recovery Point Objectives (RPO). For example, suppose the VI admin wants to install a service pack. They can take a snapshot before installing the service pack – with zero cost or overhead – and then if there are any issues with the installation or the operation of the service pack, they can quickly restore the VM as it was when the snapshot was taken, versus taking time and potentially losing data while waiting for restoration from longer-term backups.

INFINIDAT
FEDERAL

RESTORING INDIVIDUAL VMS VIA HOST POWERTOOLS FOR VMWARE

Single-VM restore has been difficult to accomplish with traditional block storage arrays. Most traditional block storage arrays can either only offer entire data center restore, or require additional software to achieve single-VM granularity. Host PowerTools for VMware provides this functionality as part of the InfiniBox solution without any additional software or licenses required, offering virtual infrastructure admins two powerful ways to restore a virtual machine: **Restore**, and **Expose**.

Restore allows VI admins to restore a VM to a datastore by leveraging vStorage APIs for Array Integration (VAAI, discussed later in this document). Restore copies the virtual machine to the designated target datastore and add the VM to the vCenter inventory. This can take a considerable amount of time if the virtual machine is very large.

Expose allows VI admins to restore a VM quickly regardless of the VM size. Expose will mount a writable snapshot as a new datastore and add the VM to the vCenter inventory. This process normally completes in minutes, regardless of the size of the VM. At that point, the customer can run the VM and choose a later time to migrate the exposed VM to a production datastore.

Figure 8 shows a selected restore point, allowing the virtual infrastructure administrator to choose to restore or expose the VM.
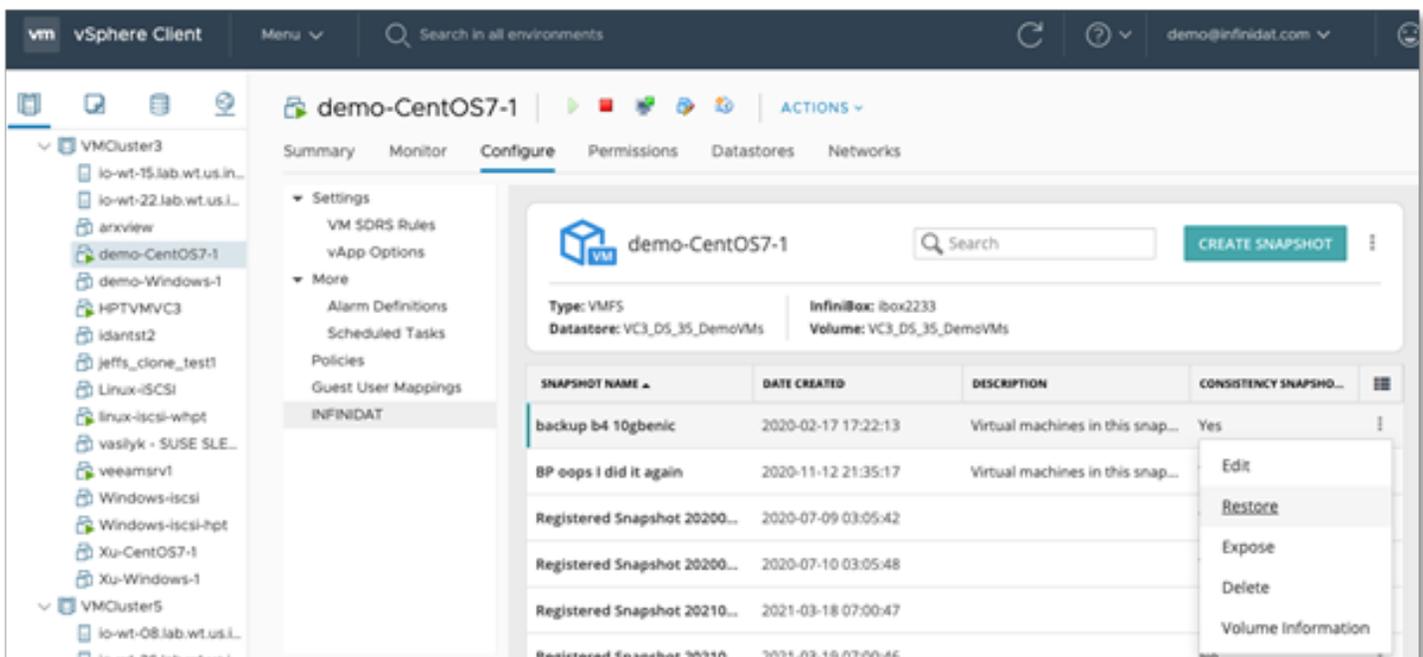

FIGURE 8 - Snapshots available for restore

Selecting **Restore Snapshot** will prompt the virtual infrastructure admin for the following information:

▶ **RESTORED VM NAME** – Host PowerTools for VMware will add "-restore" to the original VM name since VMware requires VMs to have unique names in inventory.
▶ **TARGET HOST** – where the restored virtual machine will get its CPU and RAM resources
▶ **TARGET DATASTORE** – where the VM will be copied to. Clicking " … " will let the Admin pick any available datastore on the same InfiniBox as the target.
▶ **TARGET FOLDER** – the folder where the VM will be deployed within the vSphere client

INFINIDAT
FEDERAL

FIGURE 9 - Restore snapshot

Selecting **Expose Snapshot** will prompt the virtual infrastructure admin for the following information:

▶ **EXPOSED VM NAME** – Host PowerTools for VMware will add "-restore" to the original VM name since VMware
   requires VMs to have unique names in inventory
▶ **TARGET HOST** – where the restored VMs will get their CPU and RAM resources
▶ **TARGET FOLDER** – the folder where the VM will be deployed within the vSphere client

FIGURE 10 - Expose snapshot

VSTORAGE APIS FOR ARRAY INTEGRATION (VAAI)

To improve various aspects of VM operations, InfiniBox implements the following vStorage APIs for Array Integration (VAAI) SCSI primitives for block storage:

▶ **ATOMIC TEST & SET (ATS)** – used during creation and locking of files on a VMFS volume accessed by multiple ESXi hosts
▶ **CLONE BLOCKS / FULL COPY / XCOPY** – used to copy or migrate data within the same physical storage array
▶ **ZERO BLOCKS / WRITE SAME** – used to zero out disk regions
▶ **BLOCK DELETE** – allows space to be reclaimed using the SCSI UNMAP feature

INFINIDAT
FEDERAL

These enhancements leverage the native, optimized capabilities of InfiniBox storage systems rather than emulation or higher-overhead mechanisms within vSphere. No configuration is required to enable and use these functions, although administrators can review the instructions in the following VMware Knowledge Base article to confirm the capabilities are active: https://kb.vmware.com/s/article/1021976.

VMWARE VIRTUAL VOLUMES (VVOLS)

Host PowerTools for VMware capabilities discussed earlier go a long way toward filling the gap between virtual infrastructure administrators and storage administrators.

VMware introduced the concept of vSphere Virtual Volumes (vVols) to further reduce barriers and administrative overheads associated with those traditional silos. vVols marries the core tenants of the VMware software-defined storage vision, underpinned by storage policy-based management (SPBM), with the native advanced capabilities provided by external storage arrays, including snapshots and replication functions.

As shown in Figure 11 below, vVols implementations are built with vStorage APIs for Storage Awareness (VASA) providers for out-of-band management, including SPBM implementation. Data traffic is routed through a Protocol Endpoint (PE) providing access to a Storage Container (SC) which corresponds to a vSphere datastore. For more about vVols in general, visit: https://www.vmware.com/products/vsphere/virtual-volumes.html
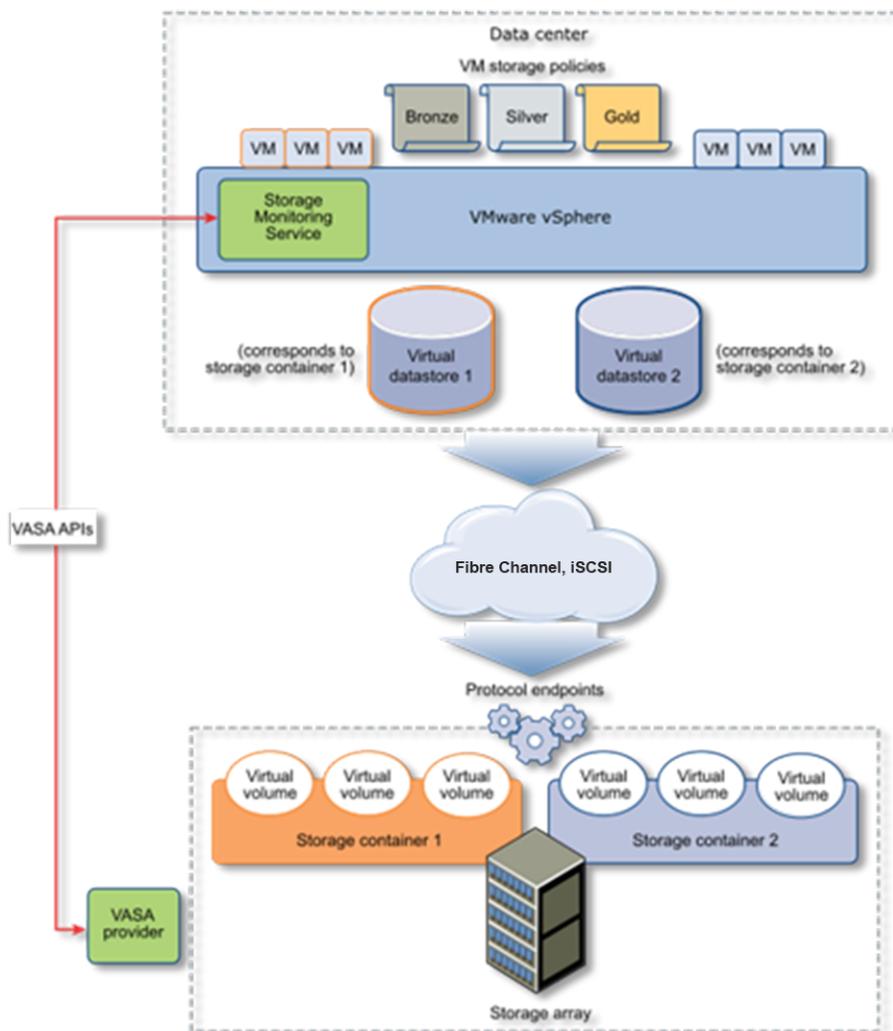

FIGURE 11 - General vVols architecture

Source: https://docs.vmware.com/en/VMware-vSphere/7.0/com.vmware.vsphere.storage.doc/GUID-88742065-3650-42E3-B0C9-6C5496602DFB.html

INFINIDAT
FEDERAL

The InfiniBox vVols implementation is deeply integrated into InfiniBox software, with vVols as first-class dataset entities in the InfiniBox system, and a highly available vStorage APIs for Storage Awareness (VASA) provider embedded within each InfiniBox system. InfiniBox customers using vVols benefit from:

▶ Hundreds of thousands of vVols and up to 1,000 vVols Storage Containers per system for petabyte-scale multi-tenancy

▶ Native InfiniSnap integration as vVols managed snapshots

▶ VMware storage policy-based management (SPBM) integration

▶ Multiprotocol support with Fibre Channel and iSCSI

▶ Easy deployment using
   Host PowerTools for VMware

Host PowerTools for VMware makes InfiniBox vVols setup simple. Virtual infrastructure admins can simply create a new vVols datastore (Storage Container), directly in Host PowerTools for VMware, as shown in Figure 12 at right. This vVols datastore corresponds to a new InfiniBox pool.

After the VI admin has selected the datastore size, Host PowerTools will take care of the rest of the steps required to set up vVols access on both the InfiniBox and VMware sides, as shown in Figure 13 below.

Infinidat Federal recommends that clients use Host PowerTools for VMware to set up and manage vVols, because it minimizes work and potential misconfigurations on both the InfiniBox and VMware sides. However, instructions for manual vVols setup are also available.

Performance monitoring for vVols is available natively in the InfiniBox GUI, InfiniMetrics, InfiniVerse, or with the management pack for VMware vRealize Operations.

For more information about the InfiniBox vVols implementation, please contact Infinidat Federal at:
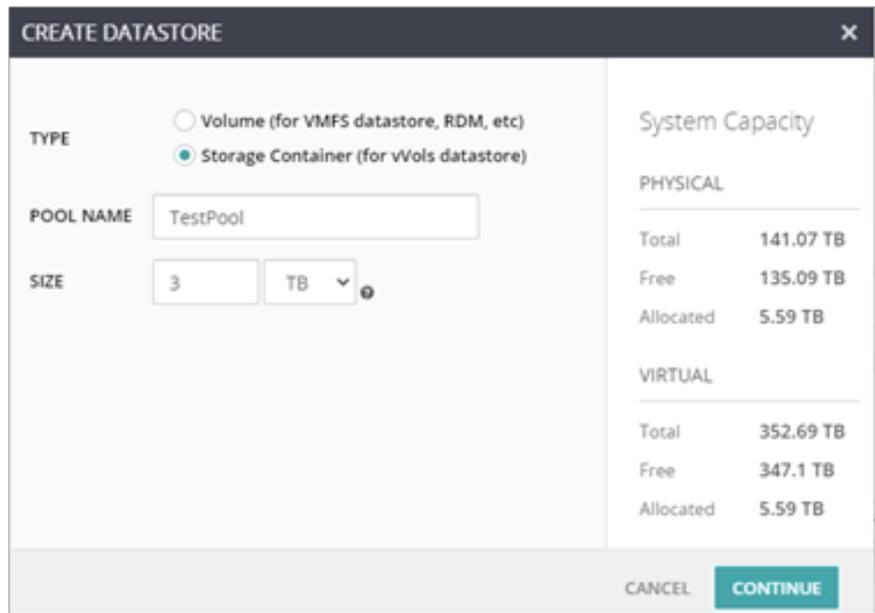sales@infinidatfederal.com

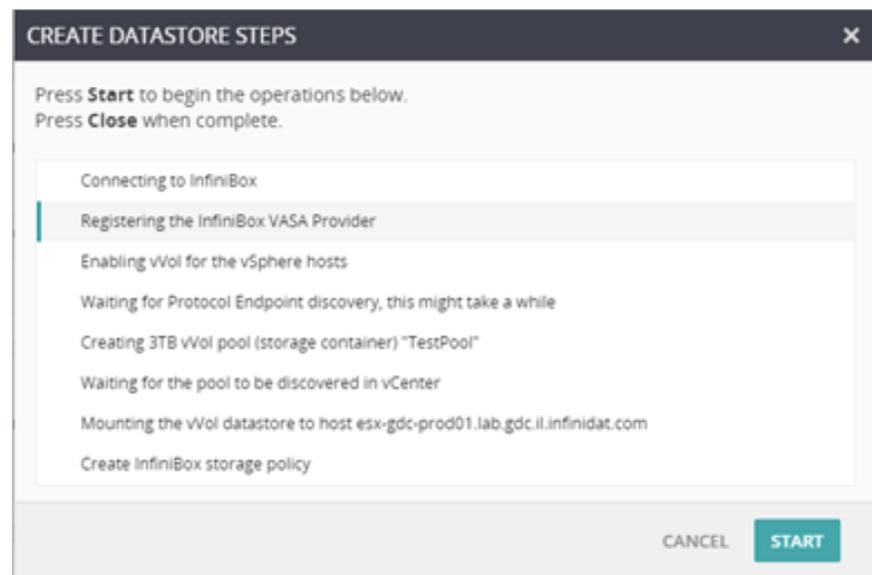FIGURE 12 - Creating a datastore in Host PowerTools for VMware

FIGURE 13 - Steps Host PowerTools for VMware takes to set up an InfiniBox vVols datastore

INFINIDAT
FEDERAL

VSPHERE METRO STORAGE CLUSTER (VMSC)

vSphere Metro Storage Cluster (vMSC) is a storage configuration that combines replication with array-based clustering for redundant VMware environments deployed across metro distances. The primary benefit of a stretched cluster model is that it enables fully active and workload-balanced datacenters to be used to their full potential, and it allows for an extremely fast recovery in the event of a host or even full site failure. vMSC requires at least active/active synchronous storage replication support, and a published reference architecture on the VMware Knowledge Base web site.

Customers who leverage vMSC with their InfiniBox systems can benefit from:

▶ Advanced InfiniBox replication capabilities with minimal latency overhead versus typical active/active sync solutions, and optional ability to replicate to a third site asynchronously

▶ Standard IP-based networking across sites - no need for a dedicated replication link

▶ Uniform or non-uniform host access pattern support

▶ VMware Site Recovery Manager (SRM) integration

▶ Easy setup and management through Host PowerTools for VMware

▶ InfiniBox vVols replication with SRM support for VMware-native disaster recovery

A typical two-site vMSC implementation architecture with InfiniBox is shown in Figure 14 below.
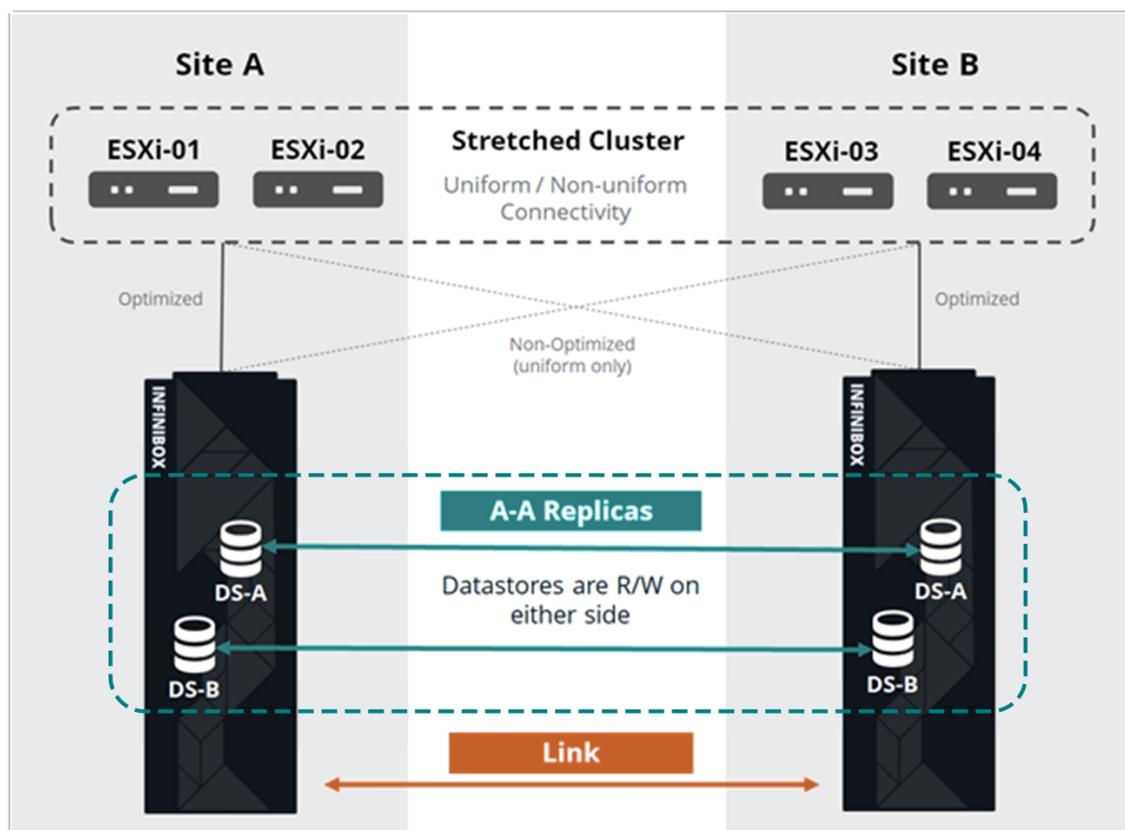

FIGURE 14 - vSphere Metro Storage Cluster (vMSC) typical deployment with InfiniBox

Host PowerTools for VMware provides end-to-end vMSC environment visibility, from volumes to datastores to InfiniBox systems, directly in the vSphere Client. HPT-VM users can also easily view and change Asymmetric Logical Unit Access (ALUA) state to ensure alignment with their physical deployment locations.
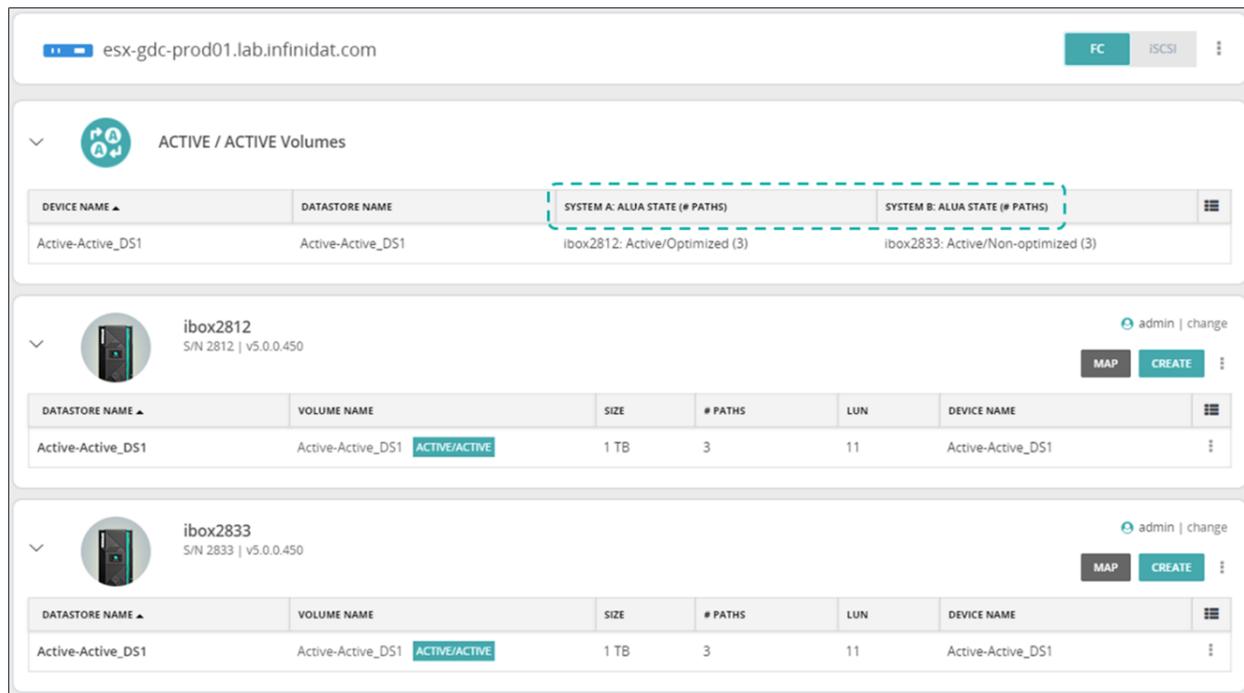
INFINIDAT
FEDERAL

FIGURE 15 - Active/active system management through Host PowerTools for VMware

vSphere Metro Storage Cluster is offered as part of the VMware Partner Verified and Supported Products (PVSP) program. More details can be found in the VMware Knowledge Base at: **https://kb.vmware.com/s/article/71047**.

VMware Site Recovery Manager (SRM) Integration

VMware Site Recovery Manager (SRM) is a disaster recovery and business continuity solution that automates the transfer of virtual machines to a local or remote recovery site. SRM works with vSphere software and operates as an extension of the vCenter Server.

SRM automates the recovery or migration of virtual machines between a protected site and a recovery site. The protected site is your primary site, where active production workloads are running. The recovery site is the data center location where you want to move your production workloads in the event of a service impact or disaster in your primary data center.

Virtual machines are activated in the recovery site in the event of a disaster or as part of a planned migration. Site Recovery Manager facilitates the clean shutdown of virtual machines and syncing of changes to the recovery site from the protected site for a planned migration.

SRM provides automated replication in two ways: vSphere Replication and Array-Based Replication (ABR). vSphere Replication is done from ESXi server to ESXi server in the hypervisor layer. Array-Based Replication leverages external storage array replication technology, controlled via SRM Storage Replication Adapters (SRAs) provided by storage vendors. Administrators must install an appropriate SRA on the Site Recovery Manager servers at the protected and recovery sites.
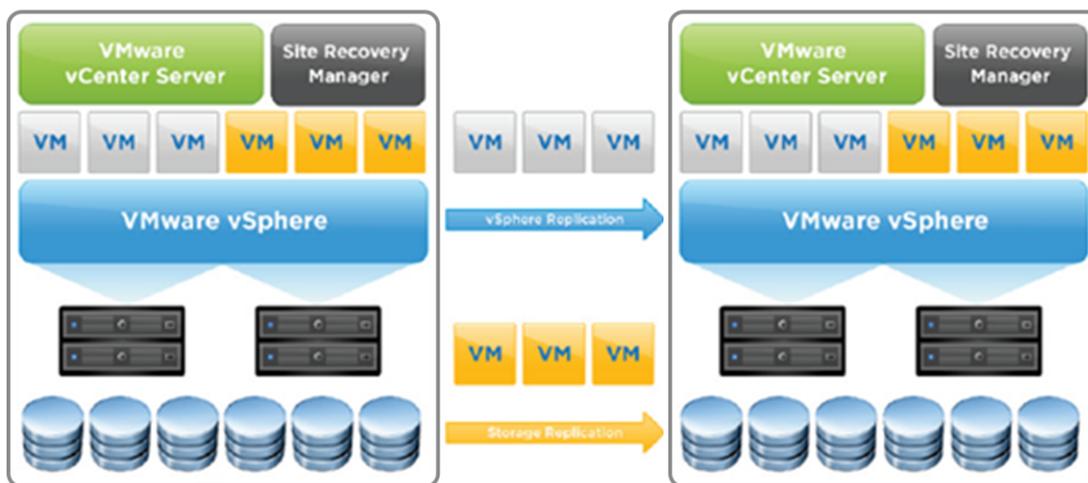
INFINIDAT
FEDERAL

FIGURE 16 - vSphere SRM Architecture

The InfiniBox Storage Replication Adapter is a software add-on that integrates with the VMware vCenter Site Recovery Manager (SRM) platform, enabling site-to-site failovers between InfiniBox systems that are deployed on remote sites. The InfiniBox SRA is free to use and can be downloaded from: https://repo.infinidat.com. Be sure to check the VMware Compatibility Guide at https://www.vmware.com/resources/compatibility/search.php?deviceCategory=sra&details=1&partner=436 to determine the correct SRA version to use with your InfiniBox and VMware SRM versions.

InfiniBox replication options include asynchronous, synchronous, active/active synchronous, and three-site configurations. InfiniBox replication is based on the innovative, high-performance InfiniSnap system using a specialized IP-based protocol. Replicas provide the same granularity as snapshots, in any location, helping IT meet all its geo-level recovery needs. Asynchronous RPO interval can be as low as four seconds, while synchronous configurations achieve RPO=0, and active/active synchronous configurations yield RPO=0 and RTO=0. Consistency groups are also supported. Replication functionality is included at no extra charge with every InfiniBox.

After the SRA is installed, add the Array Manager within SRM. The installed SRAs will be listed, as shown in Figure 17 below.
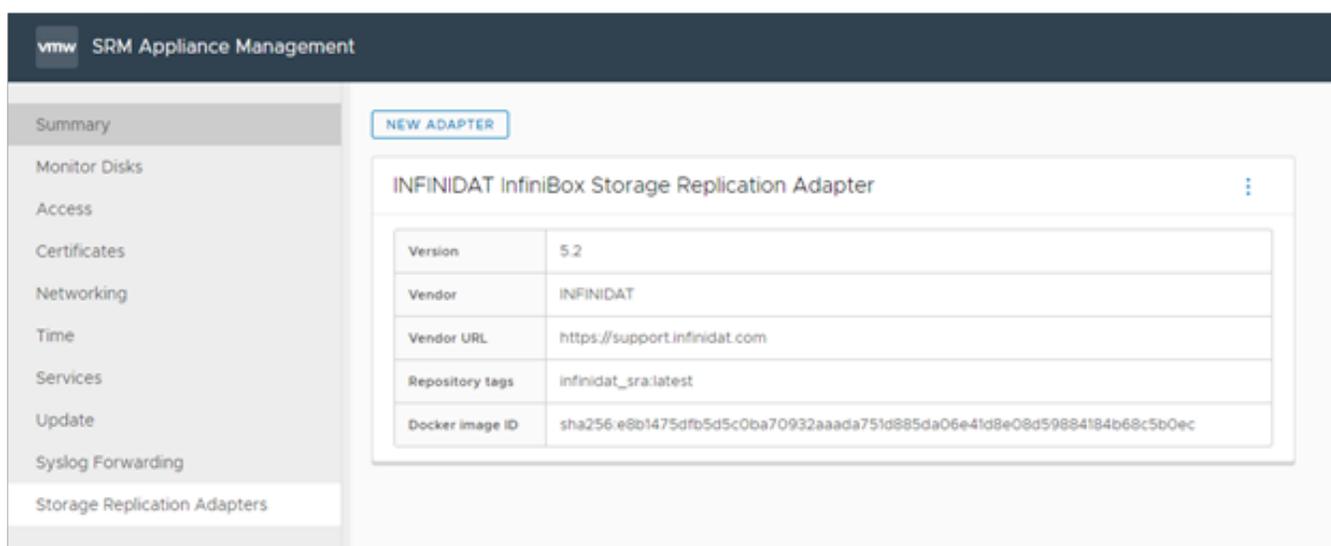

FIGURE 17 - InfiniBox Storage Replication Adapter

INFINIDAT
FEDERAL

The SRA will only require a display name, and InfiniBox credentials (username and password) as shown in Figure 18.

No further SRA configuration is required to leverage the InfiniBox SRA.

FIGURE 18 - Display name field

vRealize Suite Integrations

vRealize Log Insight

vRealize Log Insight provides intelligent log management for infrastructure and applications in any environment. This highly scalable log management solution provides intuitive, actionable dashboards, sophisticated analytics, and broad third-party extensibility. It provides deep operational visibility and faster troubleshooting across physical, virtual, and cloud environments.

InfiniBox integration is done using a lightweight plugin, called Content Pack. Content Packs add additional awareness to vRealize Log Insight through pre-defined information related to a specific product or set of logs.

The InfiniBox Content Pack for vRealize Log Insight provides customers with the capability to easily monitor and analyze InfiniBox storage arrays by converting InfiniBox event log messages into helpful insights. The Content Pack aggregates valuable information and intelligently organizes the data in 10 convenient dashboards. Each dashboard contains intuitive widgets and serves a different purpose. Content Packs can also be customized easily, allowing users to modify any dashboard and create views with their specific interests. The dashboards include:

▶ **Overview dashboard** – providing high-level visibility across multiple InfiniBox systems in a single pane
▶ **Activities dashboards** – showing a centralized view for different system activities – e.g. host & cluster events dashboard shown in Figure 19 on the following page:
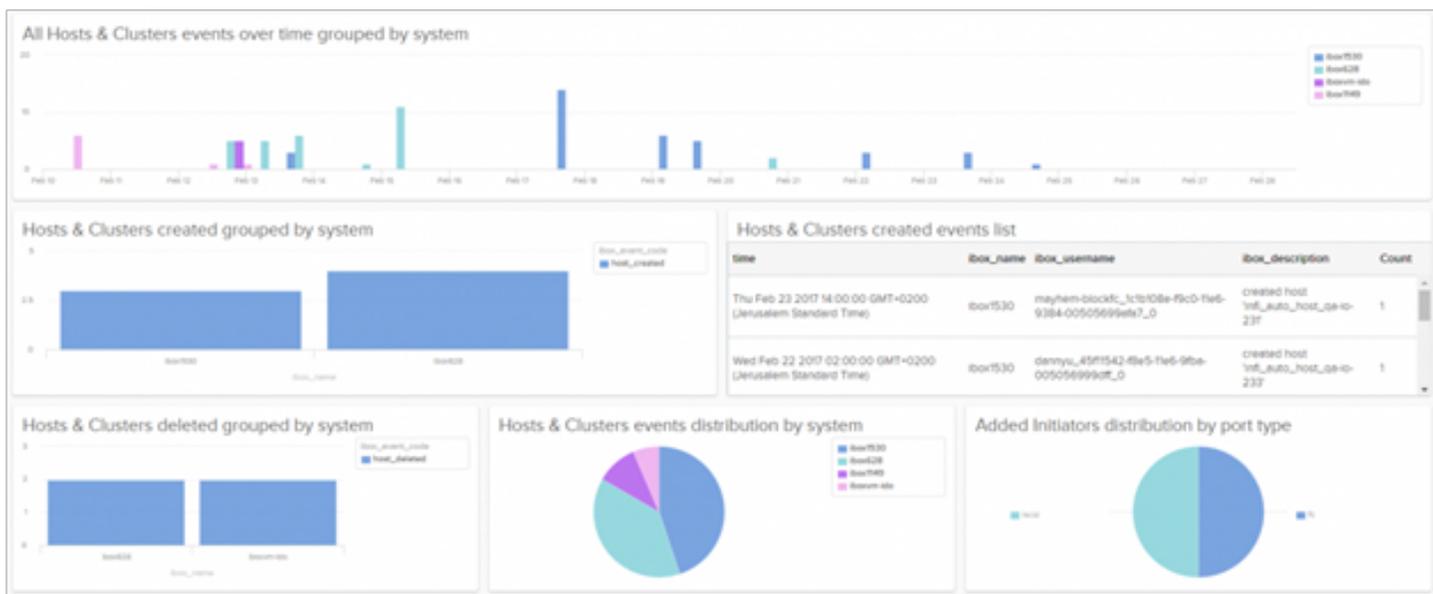
INFINIDAT
FEDERAL

FIGURE 19 - Centralized View

Troubleshooting dashboards provide comprehensive insights to quickly analyze problems – e.g. health monitoring dashboard shown in Figure 20.
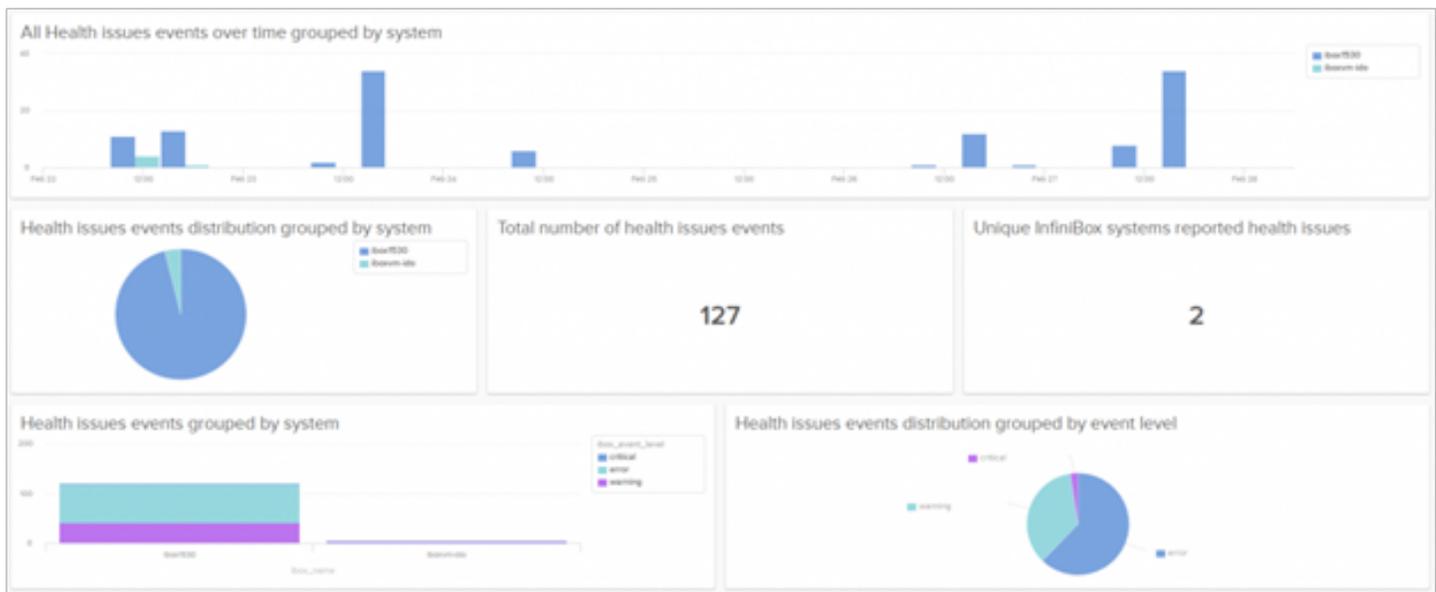

FIGURE 20 – Health Monitoring Dashboard

The InfiniBox Content Pack for vRealize Log Insight is available at no charge through VMware Marketplace at https://marketplace.cloud.vmware.com/services/details/infinidat-infinibox-content-pack?slug=true, or via the Content Pack Marketplace inside vRealize Log Insight.

Operations

vRealize Operations Manager (vROps) delivers intelligent operations management with application-to-storage visibility across physical, virtual, and cloud infrastructures. Using policy-based automation, IT teams can easily automate daily processes and improve operational efficiency.

INFINIDAT
FEDERAL

InfiniBox integration is done using a lightweight plugin called a Management Pack which extends the product's capabilities to adjacent technology domains such as storage, network, compute or applications.

The InfiniBox Management Pack for VMware vRealize Operations provides comprehensive monitoring and visibility into Infini-Box systems:

▶ Monitor the health, capacity, and performance of the InfiniBox resources on one unified platform.

▶ Gain end-to-end visibility across the stack, from the VM level to the corresponding InfiniBox resources.

▶ Help users understand the role of InfiniBox resources, such as pools, volumes, or filesystems, in the environment.

▶ Easily identify the relationships between the InfiniBox resources and their relationships with VMware entities such as datastores, virtual machines, and hosts.

▶ Quickly troubleshoot issues with resources impacted across the virtual infrastructure and the InfiniBox layers.

Figure 21 illustrates the items that are represented with the InfiniBox Management Pack for VMware vRealize Operations.
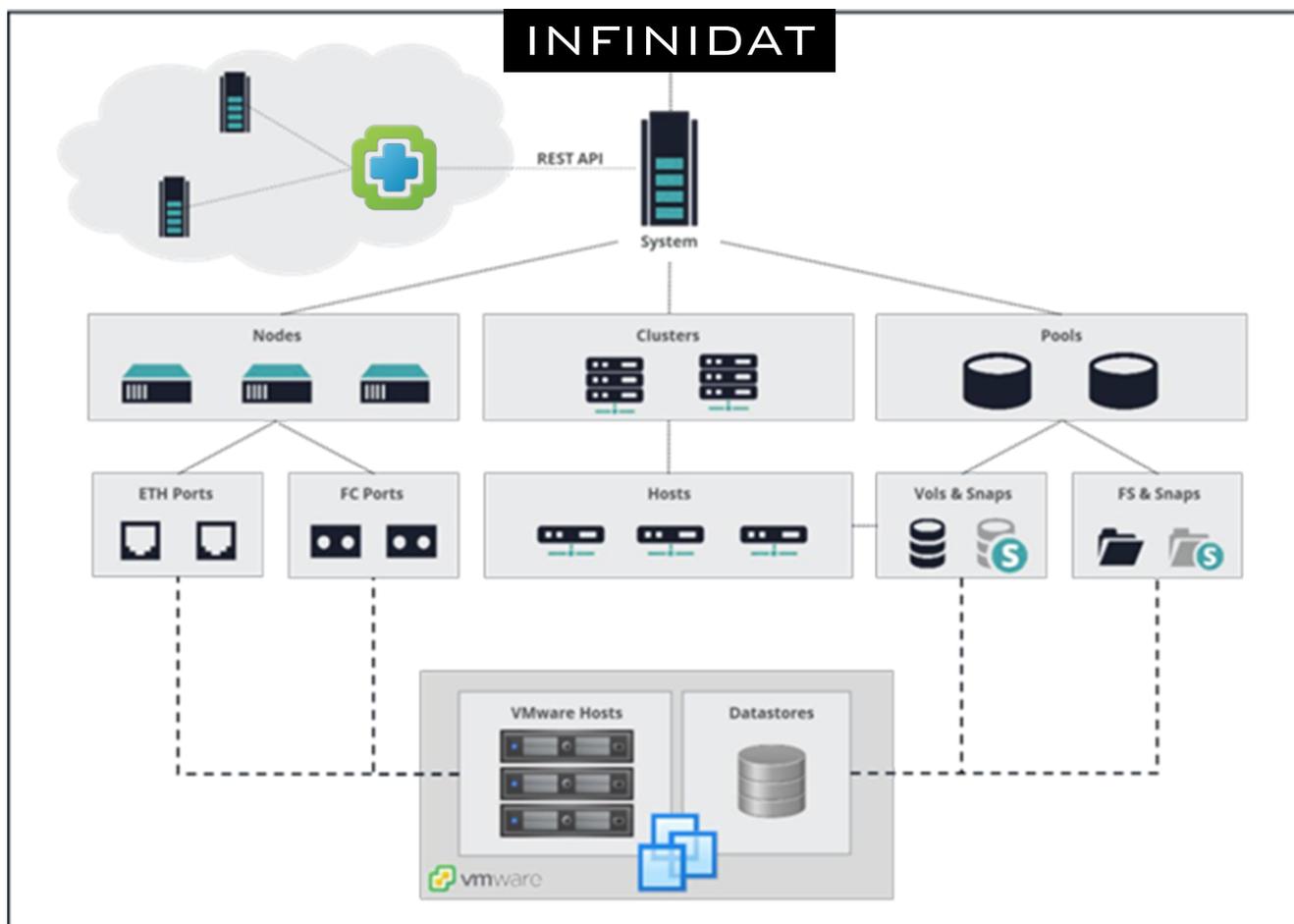

FIGURE 21 – InfiniBox Management Pack for VMware vRealize Operations

The InfiniBox Management Pack for vRealize Operations is free to use, and can be downloaded from https://repo.infinidat.com. Customers should check with their VMware representative to confirm they have the appropriate VMware vROps license that allows management pack usage.

INFINIDAT
FEDERAL

VMware Tanzu Kubernetes Grid (TKG)

Tanzu Kubernetes Grid is engineered to simplify installation and Day 2 operations of Kubernetes across enterprises. It is tightly integrated with vSphere and can be extended to run with consistency across public cloud and edge environments. InfiniBox storage can be used with TKG in two ways:

1. Via the Container Storage Interface (CSI) driver, similar to other supported container environments. This is only applicable for Tanzu Kubernetes Grid – Integrated Edition, which is the only TKG version that allows usage of general CSI drivers.

2. Via the vSphere Cloud Native Storage (CNS) integration. This applies to vSphere with Tanzu and can be used with InfiniBox backend storage either through traditional datastores or vVols.

The InfiniBox CSI driver is free to use, and can be accessed with other Tanzu-specific information on the VMware Marketplace: https://marketplace.cloud.vmware.com/services/details/infinidat-infinibox-container-storage-interface-csi-driver?slug=true.

VMware Cloud Foundation (VCF)

VMware Cloud Foundation (VCF) provides a complete set of highly secure software-defined services for compute, storage, network, security, Kubernetes, and cloud management, supporting both traditional enterprise and modern apps. InfiniBox storage can be used as Principal Storage within VCF, using either traditional vSphere datastores or vVols. There is no special configuration required to leverage InfiniBox storage as Principal Storage in VCF.

INFINIDAT
FEDERAL

Conclusion

Virtualization has become standard practice in enterprise environments enabling benefits such as server consolidation, lower TCO, and accelerated application development. However, VM storage administration becomes more complicated as environments grow to host thousands of virtual machines. Infinidat Federal's integrations with VMware aim to reduce this complexity and greatly simplify storage management for even the largest, multi-petabyte scale virtualized environments without compromising high performance, low latency, 100% availability, or class-leading economics. InfiniBox storage integrations and capabilities provide greater storage resource-awareness, help administrators make better storage provisioning decisions, and eliminate or automate many time-consuming or repetitive storage-related tasks. See additional resources or reach out to your account executive to learn more.

Additional Resources

▶ vSphere Documentation Center
https://docs.vmware.com/en/VMware-vSphere/index.html

▶ VMware Compatibility Guide
https://www.vmware.com/resources/compatibility/search.php

INFINIDAT
FEDERAL