MinIO Object Storage on VMware Cloud Foundation with Tanzu

High performance, cloud native object storage with the VMware vSAN Data Persistence platform

vmware

MINIO

BENEFITS OF MINIO OBJECT STORAGE ON VMWARE CLOUD FOUNDATION WITH TANZU

- Seamless hybrid cloud capability out of the box
- Rich portfolio of pre-integrated, cloud native applications on Day 1
- Best in class performance from MinIO expands the types of workloads
- Superior feature set for security and resiliency ensure data is protected in flight and at rest
- Combination of power and simplicity ensure superior TCO and scalability

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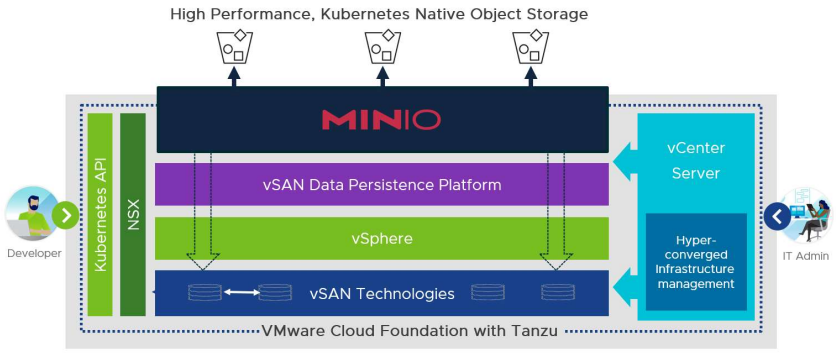
The enterprise is undergoing an exceptional period of change. Driven by the relentless growth of data, the emergence of Kubernetes and the demands of the hybrid cloud, both IT and DevOps teams face challenges that are both massive and, inherently cross disciplinary. MinIO and VMware have partnered to design a framework that brings cloud native object storage directly into the heart of VMware vSphere® through the development of the VMware vSAN™ Data Persistence platform. This integration pairs MinIO's cloud native application ecosystem with VMware's IT customer base accelerating app modernization.

The vSAN Data Persistence platform provides a framework for VMware partners that offer modern stateful services to integrate with the underlying virtual infrastructure, allowing you to run stateful services with high velocity scaling, simplified IT operations, and optimized TCO. You can deploy a stateful service alongside traditional applications on a regular vSAN cluster with vSAN-SNA (vSAN Support for Shared Nothing Architecture) policy, or deploy it on a dedicated vSAN cluster with VMware vSAN Direct Configuration™, a technology enabling direct access to the underlying direct-attached hardware which can be optimized for the application needs. Both options benefit from optimal storage efficiency for stateful services by leveraging service-level replication, as well as unified management of services in VMware vCenter®.

Through the Data Persistence platform, MinIO gains access to the underlying storage hardware via vSAN Direct Configuration. This enables IT administrators to provision peta-scale infrastructure with a few clicks in the vCenter interface. Through vSAN Direct Configuration, MinIO can run at READ/WRITE speeds approaching their bare metal benchmarks[1]. Further, because MinIO can operate at the supervisor cluster level of vSphere, directly on top of vSAN Direct datastores, enterprises can create extremely large scale object storage clusters with minimal friction. MinIO Object Storage is fully integrated with vSphere Day 2 workflows. For IT admins, managing MinIO Object Storage is as easy as managing VMs.

As a result, IT admins will be able to provision high-performance, multi-tenant object storage for a range of applications and use cases and across internal and external stakeholders – directly from the vCenter interface, thereby accelerating the adoption of object storage and digital transformation.

Solution Architecture



1. MinIO High Performance Object Storage White Paper, October 2020

By deeply integrating Kubernetes into the heart of VMware with VMware Cloud Foundation™ with VMware Tanzu™, VMware introduced the concept of a supervisor cluster in vSphere. This cluster orchestrates networking, ESXi and storage and hosts the modern stateful services. Administrators can provision guest Kubernetes clusters on top alongside traditional VMs and vSphere pods.

Key Benefits

- **Object Storage Deployment Made Simple – As Easy as Deploying VMs**

  With the introduction of the Data Persistence platform, IT admins can now deploy high-performance, multi-tenant object storage without having to know how to spell Kubernetes. Because this functionality is embedded seamlessly into vCenter – they can do so with just a few clicks. IT admins can have granular insights into the health, compliance, and capacity of MinIO object storage as well as storage for traditional apps, all within a single pane of glass. With MinIO object storage awareness built into the underlying virtual infrastructure, IT admins can easily keep MinIO object storage up and running during IT operations such as planned maintenance and lifecycle management.

- **Integration with Thousands of Cloud Native Apps – Day 1**

  MinIO was born in the cloud and has thousands of existing integrations with other cloud native or S3 compatible applications. Those applications become available to the Data Persistence platform users on Day One and can run unmodified. This brings immense value to the overall ecosystem and will build bridges between IT, DevOps, Application developers and other key software stakeholders.

- **Hybrid Cloud, Multi Cloud, Any Cloud**

  To deliver against enterprises' goal of building, running, managing, connecting, and protecting any app on any cloud and across clouds, there has to be consistency with regard to the infrastructure, operations and developer experiences.

  MinIO not only provides a complete cloud native object storage system that can be deployed on any cloud infrastructure to convert them into an S3 compatible object storage service, but it also provides seamless interoperability with VMware vSAN™. This enables applications to access data on their existing storage platform without migrating the data over. Both cloud native applications and traditional enterprise applications can co-exist.

- **High Performance Object Storage for Any App**

  MinIO has built its reputation in the private cloud as the world's fastest object store. It is why its catalog of cloud native applications is so large – because workloads once deemed too demanding for object storage now run easily. Through the vSAN Direct architecture MinIO gains direct access to the underlying drives in JBOD/JBOF mode while delegating key storage functions (erasure coding, bit-rot protection, encryption key management) to MinIO – enhancing performance further. VMware remains focused on the physical to virtual block layer, unifying the management of storage for both traditional and cloud native apps, such as provisioning, isolation, health and capacity monitoring, and failure handling. This ensures MinIO can support its full application catalog, and puts application developers and IT admins on the same page, speaking the same language.

Primary Use Cases

Given MinIO's performance and scalability attributes, it can address a broad range of use cases, resulting in superior return on investment. These use cases can be categorized as follows:

Backup/Snapshots/Archival – often considered the core object storage use cases, MinIO and VMware bring best in class performance to these tasks, ensuring that both backup and restore are done so accurately and quickly. Examples include Veeam, Commvault and Rubrik.

AI and ML - This is a new class of use cases for object storage and is enable by the combination of performance and scale that MinIO and VMware offer. In these examples, MinIO is the datastore for ML and AI data pipelines where training, inference reads/writes occur. Examples include TensorFlow, H2o.ai, Spark, Presto and Flink.

Web/Mobile Cloud Native Application Development - Object storage is the storage class of the cloud. As a result, it is the default storage type for the tens of thousands of internally developed applications (consumer and enterprise) where performance and scale are important. By offering a RESTful API, MinIO is designed for containerization and orchestration – just like the cloud native applications it supports. Examples include UnitedHealth, Box.com, Raytheon and Space X.

Analytics – The default architecture for modern analytics platforms is to use an S3 endpoint for your data. This is the ultimate test of performance at scale as many of these instances are 50 PB or more in size and carry the expectation of a "warm" tier at a minimum and "hot" tier in performance-oriented environments. Examples include Splunk SmartStores, Vertica EON mode and Teradata NOS.

Artifact Stores – The cloud native world has created a new class of storage use cases, that of artifact storage. These instances can grow quickly and require high throughput, making them excellent for MinIO on VMware Cloud Foundation with Tanzu. Examples include Docker Registries like Harbor, Cloud Foundry Artifact Stores and applications like Concourse.

Takeaway

- MinIO on VMware Cloud Foundation with Tanzu through the Data Persistence platform integration unites IT admins and DevOps and accelerates app modernization.
- Through the vSAN Direct Configuration integration, MinIO can deliver best-in-class performance – expanding the number and types of applications that can run on VMware.
- MinIO and VMware are leaders in the hybrid cloud, providing a consistent, performant experience whether in the private cloud or the public cloud.
- By combining power and simplicity with true software-defined storage, MinIO and VMware offer superior manageability, hardware choice and, ultimately total cost of ownership.

For more details, stay tuned for the complete solution reference architecture.

Core Component Introduction

MinIO Object Storage

MinIO is a high-performance, Kubernetes-native object storage suite. MinIO's open source, software-defined, Amazon S3 compatible object storage system is optimized for

the private cloud while running on more than 5 million public cloud IPs. Enterprises use MinIO to deliver against ML/AI, analytics, backup and archival workloads - all from a single platform.

VMware Cloud Foundation with Tanzu

VMware Cloud Foundation with Tanzu is the best way to deploy Kubernetes at scale. VMware Cloud Foundation is a ubiquitous hybrid cloud platform for both traditional enterprise apps and modern apps, providing a complete set of secure software-defined services for compute, storage, network security, Kubernetes management, and cloud management. VMware Cloud Foundation with Tanzu automates full-stack deployment and operation of Kubernetes clusters through integration with VMware Tanzu Kubernetes Grid.

VMware vSAN

vSAN is a key component in VMware Cloud Foundation. vSAN is the market leader in hyperconverged Infrastructure (HCI), enables low cost and high-performance next-generation HCI solutions, converges traditional IT infrastructure silos onto industry-standard servers and virtualizes physical infrastructure to help customers easily evolve their infrastructure without risk, improve TCO over traditional resource silos, and scale to tomorrow with support for new hardware, applications, and cloud strategies.

Resources

- See the VMware *solutions page at Min.io* for more information.
- Discover more about Cloud Native Storage in vSphere and vSAN on *the website*.
- Check out VMware Cloud Foundation with Tanzu on *the website*.
- Visit the *Cloud Foundation Tech Zone* for more demos and deep dives of VMware Cloud Foundation with Tanzu, vSphere and vSAN.
- Keep posted on the latest and greatest of VMware Cloud Foundation via VMware Cloud Foundation *Blog*, *Twitter*, and *YouTube*.

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