VMware vSphere Foundation

The enterprise-class hyperconverged infrastructure (HCI) solution

vSphere Foundation benefits

77% gain in operational efficiency

20% reduction in issue resolution time

5x reduction in relative downtime

100% reduction in last-minute hardware costs

Source: Results are for a composite organization based on interviewed customers. The Total Economic Impact™ Of VMware Cloud Foundation Operations, a commissioned study conducted by Forrester Consulting on behalf of VMware, published April 2024.

Platform Value Highlights

Boost operational efficiency

- **Up to 40% lower server TCO** achieved by expanding memory capacity with high-performance NVMe.
- **Under 5 minutes** for vCenter maintenance windows with zero service interruption.
- **Zero-touch imaging** and automated host discovery for instant infrastructure scaling.
- **Up to 60% reduction** in troubleshooting effort through automated, full-stack proactive diagnostic insights

Today's organizations need to solve for ever-growing environmental complexity. Infrastructure sprawl, exponential data growth, and operational inconsistency increase costs and stifle innovation. Your modern organization needs a modern solution that transforms current infrastructure and optimizes the overall data center.

VMware vSphere® Foundation is the workload platform that delivers an enterprise-class hyperconverged infrastructure (HCI) solution that combines compute and storage virtualization with built in Kubernetes management and intelligent operations to run both virtual machines (VMs) and containers on the same platform. VMware vSphere Foundation simplifies workflows, improves operational efficiency, enhances workload performance, strengthens security, and accelerates innovation by enabling faster deployment of new applications. With scalable, resilient infrastructure designed to support cloud-native and traditional workloads, vSphere Foundation empowers IT teams to optimize operations, scale seamlessly, and future proofing infrastructure to meet evolving business demands.

In addition, vSphere Foundation includes VMware vSAN™, the only native HCI solution for vSphere. VMware vSAN abstracts and aggregates locally attached disks in a vSphere cluster, enabling seamless provisioning and management through VMware vCenter for simplified operations.

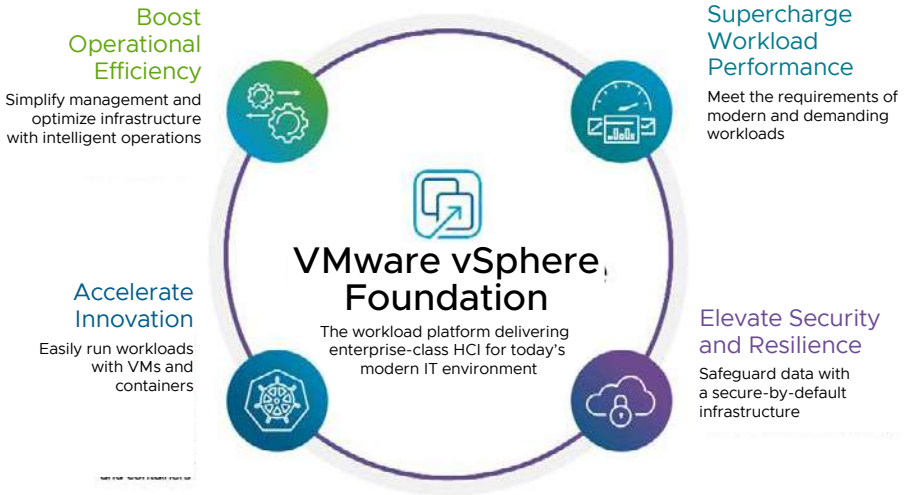

Figure 1: How vSphere Foundation helps optimize your IT infrastructure.

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Platform Value Highlights (continued)

Supercharge workload performance

- **Up to 65% faster** end-to-end migration times by removing sequential migration bottlenecks.
- **Up to 70% less source CPU** usage by offloading encrypted migrations to Intel QAT hardware.
- **Up to 39% lower storage TCO** compared to external arrays through performance-optimized data reduction.
- **Up to 68% performance gains on four-socket systems** via NUMA-optimized, topology aware scheduling.
- **Maximize hardware ROI** by sharing high-performance ESA storage across mixed-storage environments.

Accelerate innovation

- **Self-service access** to integrated Kubernetes runtimes to accelerate application delivery for DevOps teams.
- **Unified management** by integrating Kubernetes directly into the vSphere control plane for simplified orchestration.
- **Independent upgrades** for Supervisor clusters to provide rapid access to new Kubernetes features.
- **Unified automation** via a consistent SDK providing standardized APIs across all infrastructure components.

Key features and capabilities

Enhanced operational efficiency

- **vSphere Foundation Installer** – Automate vSphere Foundation deployment to streamline operations, reduce complexity, and ensure a consistent, optimized infrastructure at scale.
- **vSphere Foundation Health and Diagnostics** – Gain single-pane-of-glass visibility into vSphere Foundation health along with enhanced diagnostics and proactive monitoring to simplify troubleshooting.
- **Enhanced memory monitoring and remediation** – Achieve better workload placement by factoring in memory statistics on bandwidth, latency, and miss rates.
- **Lifecycle management** – Manage infrastructure images to patch, update, or upgrade clusters using a desired state model.
- **Green metrics** – Understand power consumed by workloads, infrastructure services, and idling time, at the host level. Discover ways to optimize power usage.
- **Intelligent alerts** – Expedite troubleshooting with intelligent clustering of alerts across a timeline.
- **vSphere Foundation Storage Operations and vSAN Performance Management** – Streamline storage operations with a unified view of storage health, inventory, performance and costs, plus real-time usage and capacity tracking to optimize resource planning.
- **vSAN Degraded Disk Handling (DDH)** – This feature proactively detects disk failures, automates data relocation to healthy disks, and raises alerts when manual intervention is required, minimizing risk to the vSAN environment and ensuring availability.
- **vSphere Lifecycle Manager (vLCM) for heterogenous vSAN clusters** – Support for multi-OEM servers in a single vSAN cluster enables seamless cluster expansion with next-gen hardware and ensures consistent lifecycle management across mixed-server generations.
- **vSAN Native Snapshots** – Enable rapid backup and recovery with space-efficient, high-speed snapshots.
- **vSAN Storage Based Policy Management (SPBM)** – Streamline storage deployment with automated, policy-driven provisioning.
- **Enhanced NVMe Memory Tiering** – Modernize infrastructure economics by expanding memory capacity up to 4x while reducing server TCO by up to 40%.
- **Quick Patching for vCenter** – Slash maintenance windows to under 5 minutes and eliminating the ‘Maintenance Tax’ on IT productivity.
- **vSphere Elastic Provisioning** – Scale infrastructure instantly with automated host discovery and zero-touch imaging for rapid capacity consumption.
- **Proactive Diagnostic Insights** – Reduce administrative troubleshooting effort by up to 60% through automated, full-stack diagnostic analysis and guided remediation.

Platform Value Highlights (continued)

Elevate security and resilience

- **Up to 80% of patches** delivered with zero downtime for all modern, TPM-enabled hardware hosts.
- **Up to 70% lower effort** through automated VM tagging and flexible GFS snapshot scheduling.
- **Up to 27% lower TCO** by standardizing site-level resilience across any primary storage vendor.
- **Automated site-level updates** to expedite maintenance and return stretched clusters to high availability.
- **Superior data protection** through TLS 1.3 and FIPS 140-3 validated cryptography for enhanced regulatory compliance.

vSphere Foundation components

- VMware vSphere® Enterprise Plus
- VMware vCenter® Standard
- vSphere Kubernetes Service (VKS)
- VMware Cloud Foundation® Operations
- VMware vSAN (include .25 TiB per core)
- Plus, available Advanced Services

- **vSphere Configuration Profiles Enhancements** – Eliminate configuration drift through automated, full-stack configuration management to ensure system-wide architectural consistency.
- **Real-Time Infrastructure Observability** – Identify transient performance spikes instantly with 2-second high-fidelity telemetry for mission-critical stability.

Elevated security and business continuity

- **Agile security with Live Patching for VMware ESX™** – Apply essential patches without taking hosts offline or evacuating VMs, maintaining continuous operations.
- **TLS 1.3 support** – Accelerate setup times and improve security with a unique session key for each session and a simplified cipher suite.
- **FIPS 140-2 compliance** – Implementation of FIPS-compliant cryptographic modules in the vSphere Foundation stack ensures compliance with U.S. government security standards.
- **Identity federation with Microsoft Active Directory, Microsoft Entra ID (formerly Azure AD), ADFS, PingFederate and Okta** – Secure access and account management.
- **Virtual machine encryption** – Data-at-rest encryption for virtual machine data and disks.
- **vSphere trust authority** – Remote attestation for sensitive workloads.
- **TPM 2.0 support and virtual TPM** – Supports TPM 2.0 hardware modules and adds virtual TPM devices to shield guest OS from operator or in-guest attacks.
- **Single sign-on with vCenter-hosted VMware idenitity broker** – IT admins can access any vSphere Foundation component with a single sign-on.
- **Centralized license and entitlement management** – For better understanding of license usage.
- **Comprehensive vSAN security** – Including built-in data-at-rest and data-in-transit encryption.
- **vSAN to vSAN Replication** – Enables asynchronous replication of vSAN Data Protection snapshots across vSAN ESA datastores to simplify recovery, failover and fallback.
- **High availability** – VMs automatically restart following physical machine failure.
- **Fault tolerance** – Provides continuous availability of any application in the event of a hardware failure with no data loss or downtime.
- **vMotion** – Enables live migration of virtual machines with no disruption to users or loss of service, eliminating the need to schedule application downtime for planned server maintenance. Storage vMotion avoids downtime for planned storage maintenance.
- **VMware vSphere Replication™** – Efficient, array-agnostic replication of VM data over the LAN or WAN, including replication at the VM level.

Benefits of deploying HCI with VMware vSphere Foundation and VMware vSAN

- **365%** three-year ROI*
- **42%** more efficient infrastructure teams*
- **77%** faster storage deployments*
- **96%** less planned downtime*
- **Up to 4x** higher performance**
- **Up to 4x** greater compression**
- **Up to 70%** extra usable capacity**

* IDC Business Value White Paper, sponsored by VMware by Broadcom, The Business Value of VMware vSAN Storage for Hyperconverged Infrastructure, November 2024 IDC#US5270524

** With vSAN Express Storage Architecture on compatible devices.

- **Live Patching for TPM Enabled Hosts** – Enable zero-downtime security updates for up to 80% of security patches with non-disruptive support for the modern, TPM-enabled hardware fleet.
- **vSAN for Operational Recovery** – Reduce administrative effort by up to 70% through automated VM tagging and flexible snapshot scheduling.
- **vSAN for Disaster Recovery** – Achieve up to 27% lower TCO by standardizing site-level resilience across heterogeneous primary storage vendors with a native, software-defined replication target.
- **Site-Wide Maintenance Mode** – Expedite site-level operations and return to full high availability faster through automated maintenance workflows for stretched clusters.

Supercharged workload performance

- **Support large workloads with increased scale** – Monster VM capabilities now support up to 960 vCPUs and 16TB of memory.
- **NVMe Memory Tiering** – Utilizes NVMe as a second-tier memory and enhances performance by intelligently choosing which VM memory locations are stored in the NVMe device and which are stored in the faster dynamic random-access memory (DRAM) in the host.
- **Enhanced vGPU vMotion** – Allows for faster GPU memory transmission, leveraging offload accelerators and faster bandwidth networks to cut the vMotion time for GPU workloads by 6x.
- **Distributed Resource Scheduler™ (DRS)** – Provides load balancing of resources allocated to workloads in a vSphere cluster. Storage DRS optimizes VM data placement as it is created and used over time.
- **GPU workload flexibility** – Share GPU resources more effectively among different workloads with heterogeneous vGPU profiles.
- **vSAN traffic separation** – Scale compute and storage resources separately and boost vSAN storage cluster performance by up to 25%.
- **Stretched compute nodes for vSAN Storage Cluster Topology** – Synchronous replication for vSAN storage clusters extends resilience across compute and storage nodes.
- **Parallel Processing of DRS vMotion** – Achieve up to 65% faster end-to-end migration times by removing sequential bottlenecks to improve overall cluster responsiveness.
- **Encrypted vMotion with Intel QAT** – Protect data in transit with hardware-accelerated encryption that consumes up to 70% less source CPU during workload mobility.
- **Extended vSAN Deduplication and Compression** – Deliver up to 39% lower storage TCO through performance-optimized data reduction for business-critical applications.

Upgrade vSphere Foundation with Advanced Services

- **VMware vSAN™** – Expand the capacity of your HCI with the premier modern storage software for vSphere Foundation, delivering high performance and scalability with robust security and lower cost.
- **VMware Live Recovery for Cloud** – Confident cyber and disaster recovery to cloud isolated clean rooms with embedded network isolation, guided workflow automation and built-in validation tools.
- **Site Recovery Manager** – Fully orchestrated and automated disaster recovery at scale across on-premises VVF environments.
- **VMware Avi™ Load Balancer** – API-first and self-service driven platform providing load balancing, app security and analytics.
- **vSphere Topology Aware Scheduling** - Maximize high-density processor performance to deliver up to 68% gains on four-socket systems through NUMA-aware placement logic.
- **vSAN Storage Cluster Enhancements (ESA Sharing)** – Maximize hardware ROI by sharing high-performance ESA storage across mixed-storage environments and existing clusters.

Accelerated innovation for DevOps

- **Independent VKS** – vSphere Kubernetes Service (VKS) allows consumers such as DevOps and Platform Engineering teams to manage consistent, compliant and conformant Kubernetes clusters. This service is now an independent service and allows consumers to easily upgrade to the latest Kubernetes releases independent of vSphere releases.
- **Local Consumption Interface (LCI)** – Provides simplified self-service access to infrastructure via the vSphere Supervisor Services.
- **Improved automation with Open API 3.0 and Unified SDK** – Combining multiple individual SDKs into a unified package delivers a consistent, streamlined development and automation experience across vSphere Foundation components.
- **Speed time to value with minimal Day 0 Supervisor configuration** – Deploy basic Supervisor quickly with minimal inputs while retaining the flexibility to add advanced capabilities such as load balancing, workload zones, and control plane VMs.
- **Independently upgradable Supervisor for vSphere** – Decouple Supervisor from vCenter releases to enable Kubernetes upgrades without infrastructure updates.
- **Supervisor on VMware vSAN stretched clusters** – Deploy Supervisor on vSAN stretched clusters spanning two physical locations or sites.
- **Autoscaling for Kubernetes clusters** – Easily scale down or scale up your Kubernetes clusters/nodes.

Get started

Want to know more about how vSphere Foundation combines the enterprise workload engine with powerful analytics to help you get the most out of your infrastructure?

Visit www.vsphere-foundation.com today.

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