VMware vSphere®

The enterprise workload engine to optimize your IT infrastructure

VMware vSphere At a glance

vSphere provides an enterprise grade platform that helps keep pace with technological innovation to support modern, AI and traditional workloads

vSphere helps to extract the maximum performance for workloads via easier management of underlying infrastructure, dynamically load balancing of workloads and freeing up CPUs to do more by offloading infrastructure functions

vSphere provides the best intrinsically secure platform to enforce security across the entire infrastructure stack

Deliver a future-ready private cloud infrastructure

VMware vSphere with VCF 9.1 is the enterprise workload engine that modernizes compute infrastructure with a future-ready, scalable infrastructure and simplified management that allows organizations to reduce TCO, maximize utilization and extract the maximum value from their current server investments and hardware footprint, rather than requiring a total refresh of their infrastructure. vSphere provides a powerful foundation for modern AI workloads with easy self-service access to infrastructure services and a built-in Kubernetes runtime, with upstream conformant certified Kubernetes distributions to run containers consistently alongside VMs. vSphere enables an intrinsically secure platform extending support for data-in-use, detecting real-time threats. While enforcing regulatory compliance of security configurations and industry best practices out-of-the-box.

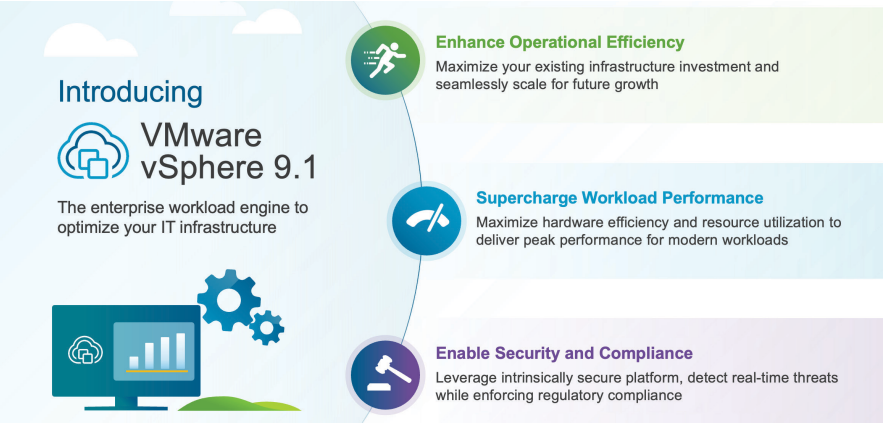

Figure 1: Drive towards a successful path to private cloud infrastructure with vSphere

Overcoming IT complexity with a resilient, secure and future-proof infrastructure

Building a private cloud for infrastructure is a key focus of many organizations today, yet its progress is often hindered by the complexity of existing infrastructure environments. While IT environments have always been intricate, the rapid evolution of hardware technologies and software development has further amplified this complexity. At the same time, organizations must continue supporting traditional applications built on legacy three-tier, siloed architectures, even as modern applications increasingly rely on containerization and microservices.

Enhance Operational Efficiency

Simplifies provisioning and deployment making it easy for organizations to get started on their modernization journey and adopt private cloud

Reduces complexity and simplified lifecycle management enabling IT admins to operate their infrastructure efficiently

Reduces TCO, and maximizes utilization to make the most out of current investments

Organizations struggle to optimize TCO (Total Cost of Ownership) while maximizing utilization of underutilized resources, ensuring high availability, and scaling to meet the demanding performance needs of AI and modern workloads—from GPU deployments to the prohibitively high memory costs of data-intensive applications. Security adds another layer of complexity, requiring protection built into the core infrastructure by default with consistent enforcement across dynamic VM and Kubernetes environments, strict access controls, and most critically, protection for data-in-use during active processing, a gap traditional encryption leaves vulnerable.

To address these challenges, IT organizations must embrace a unified approach—integrating legacy and modern technologies, closing skill gaps, optimizing resource utilization, and implementing scalable management solutions. By simplifying management processes, enabling efficient lifecycle management, and maintaining cost-conscious strategies, businesses can enhance agility, improve operational efficiency, and drive towards a successful path to private cloud infrastructure. Learn how vSphere helps meet these challenges today.

Key Features and Capabilities

Simplified Operations

vSphere makes it easy for VI admins and Cloud admins to operate their infrastructure efficiently.

- vSphere provides faster, easier lifecycle management via pre-staging ESX images, remediating hosts in parallel as well as by applying updates in parallel across clusters.
- vSphere can manage infrastructure images to patch, update, or upgrade clusters using a desired state model.
- vSphere can reduce maintenance windows and drastically reduce overall operation time for critical vCenter patches via quick patching and reduced downtime upgrades.

Live patching for ESX, now turned on by default, enables zero downtime, and now with support for TPM-enabled hosts, for a vast majority of security patches.

Enhanced Workload Performance

- With a broad ecosystem of supported GPUs, vSphere significantly enhances workload performance, especially for modern AI workloads
- vSphere now supports AMD Turin/Venice and Intel Sapphire Rapids processors, scaling up to 960 cores per socket for unmatched performance.
- Distributed Resource SchedulerTM (DRS) enables automatic load balancing of resources allocated to workloads in a vSphere cluster. Storage DRS optimizes VM data placement as the VM is created and used over time.
- Parallel processing for vMotions invoked by DRS, encrypted vMotion offload to Intel QAT introduces more efficient and better workload rebalancing across clusters.

Supercharge Workload Performance

Delivers a single platform for running VMs and containers with consistent tools with a built-in Kubernetes runtime and a wide variety of cloud services

Delivers a future-ready, scalable infrastructure with support for the latest hardware accelerators, GPUs

Improves performance and resource utilization of workloads, and enabling efficient sharing of precious hardware resources

- Updated topology-aware resource scheduling optimizes scheduling algorithms for next-generation high-density processors, providing significant performance gains for a wide variety of workloads

Kubernetes runtime and Supervisor services

- One API to provision and manage both VMs and containers: A single, consistent API allows users to create, deploy, and manage both VMs and Kubernetes clusters
- Self-service access to cloud services with governance: Through a role-based access model, platform engineers can leverage self-service capabilities to provision infrastructure resources (compute, storage, and networking) on demand.
- Upstream conformant Certified Kubernetes Release independent from vSphere: VCF runs a fully upstream conformant Kubernetes distribution that is certified by Cloud Native Computing Foundation (CNCF). Kubernetes clusters and the vSphere Kubernetes.
- Flexibility to enable OS FIPS Mode: With vSphere Kubernetes Service 3.3, it introduces a new configuration option for enabling FIPS mode at the OS level.
- Cluster Autoscaler: Clusters can now scale up from zero and down to zero worker nodes when using VKr versions 1.31.4 and later.

Improved Efficiency

- Advanced memory tiering with NVMe, especially for data intensive workloads, helps in better workload and VM consolidation, improving CPU utilization while lowering TCO. vSphere removes the reboot requirement for turning on memory tiering and introduces UI notifications to easily identify eligible clusters and workloads. It also expands support to previously unsupported VM types and introduces RAID 1 mirroring for more resiliency.
- Multi-instance GPU and virtual GPU support along with heterogeneous vGPU profiles enables better sharing of precious GPU resources improving utilization and further reducing TCO.

Increased Business Continuity

- High Availability with vSphere automatically restarts your VMs 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. vSphere reduces downtime for GenAI and inferencing workloads with accelerated vMotion leveraging Intel's Quick Assist Technology (QAT) to offload encryption, decryption, and compression tasks. Storage vMotion avoids downtime for planned storage maintenance.

Enables Security and Compliance

Intrinsically secure platform with built-in out-of-the-box security configurations

Ensures confidentiality at every layer of the infrastructure stack, including data-in-use

Enables security and high availability addressing real-time threats, while ensuring regulatory compliance

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Built-in Security

- Identity federation with Microsoft Entra ID (formerly Azure AD), ADFS and Okta: Secure access and account management.
- Virtual Machine Encryption: Data-at-rest encryption for virtual machine data and disks.
- Confidential Computing: Hardware-based memory encryption and integrity using Intel TDX and AMD SEV-SNP, providing encryption and protection for data-in-use, isolating workloads from the infrastructure stack to create secure Trust Domains and Confidential VMs.
- EDR Integration: Secure, supported framework allowing third-party EDR agents to integrate directly into the ESX hypervisor, enabling leading EDR platforms to natively analyze process, file, and network events for suspicious activity right at the foundational layer for granular, high-fidelity visibility into guest OS behavior and workload activity.
- File Integrity Monitoring: Native FIM APIs that allow administrators and security tools to query the integrity of installed files and system configurations, either on-demand or via scheduled scans.
- Secure by default with TLS 1.3: vSphere now supports TLS 1.3 protocol by default, with capability to fallback on TLS 1.2 to support legacy product integration.
- Out of the box FIPS Compliance: vSphere now runs in FIPS-compliant mode by default, utilizing FIPS 140-2 certified cryptographic modules as recommended by the U.S. government.

Learn More

Get more detail about product capabilities, new features as well access to useful resources by visiting VMware vSphere product and resources pages.

Learn how you can leverage VMware vSphere as part of VMware Cloud Foundation and VMware vSphere Foundation, by visiting the product pages.

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