

Modern Private Cloud with VMware Cloud Foundation 9 on Lenovo ThinkSystem and ThinkAgile

Solution Brief

For years, enterprise infrastructure strategy meant choosing between two models. Public cloud offered rapid service delivery and operational agility, while on-premises environments offered stronger security, data sovereignty, cost predictability, and long-term governance.

That balance is shifting. Organizations are increasingly adopting a "Private Cloud First" strategy for core enterprise workloads, and the growth of AI is accelerating the trend. AI workloads need high-speed, scalable, and highly reliable infrastructure to maintain predictable performance and low latency, and they depend on fast access to sensitive enterprise data.

VMware Cloud Foundation 9, paired with the latest Lenovo ThinkAgile and ThinkSystem V3/V4 platforms powered by AMD EPYC and Intel Xeon 6 processors, gives organizations a practical path to deliver that private cloud at enterprise scale.



Figure 1. ThinkAgile VX650 V4 (top) and VX630 V4 (bottom)

Business Challenge

Many organizations moved workloads to public cloud for speed and a low cost of entry, only to find that long-term operating costs are highly variable and difficult to govern. Meanwhile, infrastructure teams must support a growing mix of virtual machines, containers, and AI services, often on separate platforms with separate tools and skills.

With tighter budgets and rising regulatory scrutiny, IT leaders are reassessing where core workloads should run, driven by several pressures:

- **Unpredictable spending:** Data movement and egress charges, premium storage tiers, and continuously growing analytics and AI datasets make cloud bills hard to forecast.
- **Expanded security risk:** Distributing sensitive data across external platforms widens the attack surface and complicates compliance with frameworks such as PCI-DSS, HIPAA, and GDPR.
- **Operational silos:** Separate infrastructure for virtual machines, containers, and storage creates fragmented tooling, inconsistent processes, and duplicated effort.

- **Ransomware exposure:** Protecting production data requires frequent, fast snapshots and an isolated recovery environment, which many environments cannot deliver without performance penalties.
- **AI readiness:** AI and retrieval-augmented generation (RAG) workloads demand GPU access, low-latency storage, and strict data governance that general-purpose infrastructure struggles to provide.

Organizations need the self-service agility of public cloud without surrendering control over data location, cost, and security policy.

Solution

VMware Cloud Foundation 9 transforms the data center from a collection of isolated systems into a unified private cloud platform. It integrates compute, storage, networking, automation, and lifecycle management into a single software-defined stack, so virtual machines, Kubernetes workloads, and AI services run on shared infrastructure under one operating model. Lenovo provides the validated infrastructure foundation beneath it, from ThinkAgile VX V3/V4 and FX V4 hyperconverged systems to ThinkSystem V3/V4 servers and ThinkSystem Storage, together with the lifecycle tooling and support services that keep the platform running at enterprise scale.

Lenovo infrastructure

- **Lenovo ThinkAgile VX V4 and FX V4** hyperconverged platforms and **ThinkSystem V4** servers powered by Intel Xeon 6 processors
- **Lenovo ThinkAgile VX V3** and **ThinkSystem V3** servers powered by 4th and 5th Gen AMD EPYC processors
- **Lenovo ThinkSystem DE, DM, DG, and DS Storage** for SAN and NAS environments

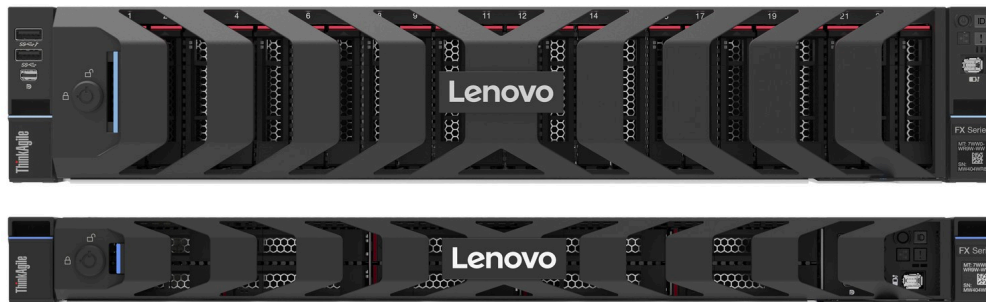


Figure 2. ThinkAgile FX650 V4 (top) and FX630 V4 (bottom) designed for flexible hyperconverged infrastructure

VMware Cloud Foundation 9

- **vSAN Express Storage Architecture (ESA):** an NVMe-optimized data path with compression and global deduplication that do not penalize performance, plus native snapshots up to 100x faster than previous generations.
- **Flexible principal storage:** native Fibre Channel and NFS v3 support, with converged workflows that bring existing iSCSI, NFS v4.1, and NVMe over Fabrics investments into VCF.
- **Memory Tiering over NVMe:** extends physical memory with local NVMe to raise VM density without fully populating DRAM on every server.
- **Unified operations and automation:** a single operations console, fleet-scale lifecycle management, self-service catalogs, and YAML-based Policy as Code.
- **Zero Trust security:** FIPS-compliant cryptography, encryption and certificate monitoring, and automated compliance drift detection.

Lenovo value

- **Integrated lifecycle management:** Lenovo XClarity Integrator for VMware vCenter delivers firmware and driver updates through vSphere Lifecycle Manager, so hardware and software are patched in one coordinated workflow.
- **Validated configurations:** ThinkAgile VX V3/V4 systems ship as vSAN certified, pre-validated configurations that reduce deployment risk and time.
- **Hardware root of trust:** the Lenovo XClarity Controller provides firmware protection and secure boot, extending Zero Trust from the silicon up.
- **Flexible consumption:** Lenovo TruScale offers pay-as-you-go economics, bringing cloud-style cost models to infrastructure the organization controls.
- **Single point of support:** Lenovo Premier Support and Lenovo Professional Services cover design, deployment, and ongoing support for the combined hardware and software stack.

Use Cases

The following scenarios show how organizations put VMware Cloud Foundation 9 and Lenovo infrastructure to work. Each one addresses a challenge described above, from runaway cloud costs and operational silos to AI readiness and regulatory pressure, using the same unified platform and operating model.

- **Consolidating enterprise workloads onto a private cloud**
Organizations repatriating core applications from public cloud, or modernizing aging vSphere estates, can consolidate onto VCF running on ThinkAgile VX V3/V4 and FX V4. Applications can share workload domains to maximize utilization or run in dedicated domains where performance requires it, while converged workflows bring existing ThinkSystem Storage arrays into the VCF operating model during migration. vSAN File Services supports up to 500 file shares per cluster, removing the need for separate third-party file systems. The result is one platform with consistent operations and predictable costs.
- **Standardizing Kubernetes alongside virtual machines**
Platform teams running containers on separate infrastructure can move them onto the same VCF fleet as their virtual machines. VMware Kubernetes Service (VKS) and the vSphere Supervisor share common networking, security, monitoring, and lifecycle workflows. VCF Operations provides dashboards for cluster, namespace, node, and container health, and VPC-style networking lets application teams self-provision isolated segments, firewall rules, NAT, and load balancing under centralized governance.
- **Private AI with retrieval-augmented generation**
Enterprises that want to apply AI to sensitive data without sending it off-premises can build VMware Private AI on ThinkAgile VX V3/V4 and FX V4 infrastructure. VCF 9 reserves and assigns GPU resources for predictable accelerator access, and vSAN ESA provides the low-latency NVMe storage that RAG pipelines, vector databases, and inference services depend on. AI blueprints package development environments for self-service deployment, and shared model services let multiple business units consume centralized models with data isolation intact.

- **Industry verticals**

Data sovereignty, compliance monitoring, and isolated cyber recovery make the platform a strong fit for regulated industries:

- **Financial services:** PCI-DSS compliance monitoring, in-house control of customer and transaction data, and rapid ransomware recovery with frequent snapshots.
- **Healthcare and life sciences:** HIPAA-aligned governance and private AI on sensitive clinical data without moving it to public cloud.
- **Public sector and government:** data sovereignty, FIPS-compliant cryptography, and isolated recovery environments with no public cloud dependency.
- **European and multinational organizations:** GDPR compliance and direct control over where data resides.

Workloads

A VCF deployment consists of one management domain and one or more workload domains. Applications can share a workload domain or be isolated in a dedicated one, based on performance and operational requirements, to maximize resource utilization. Grouping applications with similar profiles in the same domain, such as memory-intensive databases using Memory Tiering over NVMe, further improves efficiency. Each workload domain can use the storage design that best fits its applications:

- **Management domain:** four ThinkAgile VX V3/V4 or FX V4 nodes on vSAN HCI running VCF management services; it can also host applications in smaller deployments.
- **HCI workload domain:** four ThinkAgile VX V3/V4 or FX V4 nodes with east-west vSAN traffic isolated from application and management traffic.
- **HCI plus Ethernet SAN workload domain:** ThinkAgile VX V3/V4 or FX V4 nodes combined with external ThinkSystem Storage over iSCSI and NFS, so applications can use vSAN, external block and file storage, or both.
- **Compute-only workload domain with vSAN storage cluster:** ThinkAgile VX V4 compute nodes consuming an independent vSAN storage cluster, so compute and storage capacity scale independently.
- **Fibre Channel SAN workload domain:** four ThinkSystem V3/V4 rack servers attached to ThinkSystem Storage over a dedicated FC fabric, with Ethernet reserved for VM and management traffic.

Validated workload profiles include databases, analytics, Kubernetes, AI and inference, and mission-critical applications. vSAN client and back-end traffic can be isolated on 10, 25, or 100GbE paths, and rack-aware placement protects each domain against single-rack failures.

Business Outcome

Combining VMware Cloud Foundation 9 with Lenovo ThinkAgile VX V3/V4 and FX V4 systems, ThinkSystem V3/V4 servers, and ThinkSystem Storage delivers measurable gains in storage efficiency, cyber resilience, and operational productivity, while keeping costs predictable and data under the organization's control. Key outcomes include:

- **Lower storage TCO:** VCF licensing includes 1 TiB of raw vSAN capacity for every licensed core, and cluster-wide global deduplication improves the effective ratio as nodes are added.
- **Stronger ransomware defense:** native vSAN ESA snapshots run up to 100x faster than previous generations, allowing protection intervals as frequent as every 15 minutes without degrading production databases. ThinkAgile VX V3/V4 nodes can form an isolated recovery environment for cyber recovery with no public cloud dependency.

- **Higher VM density:** Memory Tiering over NVMe increases consolidation without maximum DRAM population on every server.
- **Reduced operational effort:** fleet-wide lifecycle, licensing, observability, and compliance management through one console.
- **Data sovereignty and cost predictability:** workloads, including AI, stay on infrastructure the organization controls.

Specific TCO and performance figures for this configuration have not been published. Contact your Lenovo representative for a sizing and TCO assessment tailored to your environment.

Conclusion

VMware Cloud Foundation 9 addresses the traditional challenges of private cloud by unifying virtualization, software-defined storage, networking, automation, lifecycle management, and Kubernetes in a single operating framework. Lenovo ThinkAgile VX V3/V4 and FX V4 systems, ThinkSystem V3/V4 servers, and ThinkSystem Storage provide the validated foundation to run it at scale. Together they give organizations a repeatable path to modernize private cloud operations, standardize Kubernetes, keep control of their data, and prepare for AI-enabled applications.

For More Information

To learn more about VMware Cloud Foundation on Lenovo ThinkAgile and ThinkSystem, contact your Lenovo representative or Lenovo Business Partner, or visit the resources below.

References:

- ThinkAgile VX Series:
<https://lenovopress.lenovo.com/datasheet/ds0104>
- ThinkAgile FX Series:
<https://lenovopress.lenovo.com/datasheet/ds0203>
- Multi-Vendor Hyperconverged Infrastructure with Lenovo ThinkAgile FX V4 (LP2520):
<https://lenovopress.com/lp2520>
- ThinkAgile VX for VMware vSAN Storage Clusters:
<https://lenovopress.lenovo.com/lp2422>
- Reference Architecture: Disaggregated Solutions for VMware with ThinkAgile VX and ThinkSystem Storage:
<https://lenovopress.lenovo.com/lp2201>
- Deployment Guide: VMware Cloud Foundation on Lenovo ThinkAgile VX and FX:
<https://lenovopress.lenovo.com/lp1581>
- VMware Cloud Foundation:
<https://www.vmware.com/products/cloud-infrastructure/vmware-cloud-foundation>

Authors

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Related product families

Product families related to this document are the following:

- [Intel Alliance](#)
- [ThinkAgile FX Series](#)
- [ThinkAgile VX Series for VMware](#)
- [VMware Alliance](#)

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