VMware Cloud Foundation Deployment vs Bare Metal Deployment

for Modern Workloads

Myths vs Reality of bare metal deployment model

Myth 1

"Bare metal eliminates the overhead of virtualization."

Reality

Bare metal requires VMs to run on top of a virtualization layer. Contrary to its name, this is not a true bare metal deployment with respect to virtualization.

Myth 2

"Bare metal yields better performance than virtualized infrastructure."

Reality

vSphere virtualized performance is 90%–100%[3] that of bare metal, depending on workload type, while offering substantial advantages in manageability, security, and availability.

Myth 3

"Bare metal is essential to reap the benefits of direct hardware access."

Reality

vSphere provides advanced performance tuning and device pass-through capabilities, enabling it to deliver the same, or better, outcomes as direct hardware access in bare metal deployments.

Modern enterprises want a single platform for running and managing VMs and containers. According to Forrester, over 80% of the respondents said they expected to see significant or even transformational benefits from consolidation to a single platform in multiple areas [1,2].

For running traditional and modern workloads side-by-side on-premises, there are two widely discussed deployment options today:

Running Kubernetes stack on bare metal hardware- In this model, the competitors propose running VMs and containers on bare metal hardware leveraging KubeVirt/KVM based approach. BUT, this is NOT a TRUE "BARE METAL" DEPLOYMENT as the VMs run on top of a virtualization layer.

Running Kubernetes stack on VMware vSphere/VMware Cloud Foundation- Broadcom proposes an option of running VMs and containers on VMware vSphere or VMware Cloud Foundation leveraging vSphere Kubernetes Service (VKS) as a container orchestration platform. This is a widely adopted option today. Majority of K8s deployments run on vSphere or VCF. Even hyperscalars like AWS, Microsoft Azure, Google Cloud etc. run containers on top of VMs instead of bare metal.

Now, let's compare both the options.

Bare Metal Deployment Model for Modern Workloads:

Challenges of bare metal deployment model:

- **KubeVirt is not enterprise-ready and will be disruptive:**
  KubeVirt is a relatively new technology and is not recommended to manage large scale VM-based environments in production
- **Large scale clusters introduce operational inflexibility:**
  Operational inflexibility becomes a challenge at large scale (>100 nodes), leading to typical "noisy neighbor" problems.
- **Less secure:**
  Bare metal models have limited isolation levels and less advanced security features. Large scale clusters create larger blast radius, increasing the potential impact of service disruptions.

1. Forrester Opportunity Snapshot commissioned by Broadcom based on a global survey of 216 IT decision makers (October 2025)
2. Increased scalability (87%); increased application team agility (84%); accelerated DevOps processes (86%); simplified management of different IT infrastructure (83%); enhanced resource utilization (81%); seamless workload portability (81%); increased security and compliance (83%); flexible IT infrastructure for both traditional and cloud-native applications (82%); simplified deployment (82%)
3. vSphere virtualized performance may even exceed that of bare metal for certain workloads, for example, those architected to scale out

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Myth 4

"Bare metal provides enterprise-grade functionality for containers and VMs alike."

Reality

Some vendors' bare metal deployments rely on KubeVirt for virtualization, an immature open-source technology not recommended for enterprise production workloads[4].

- **Suboptimal resource utilization:** Large node sizes result in underutilized clusters with islands of stranded compute capacity.
- **Costly and inefficient scaling:** Scaling up a K8s cluster is a far less flexible process than in VMware's virtualized environment, requiring additional hardware and manual configuration.
- **Major skills, process, and migration issues:** Steep learning curve for infrastructure teams, requiring significant retraining and adaptation; migration will be costly and time-consuming, without guarantee of success.

Hypervisor based Deployment Model for Modern Workloads:

With vSphere- a gold standard for compute virtualization for the last 20+ years and VMware cloud foundation- industry's first fully integrated private cloud infrastructure-as-a-service platform, you can resolve the challenges of bare metal deployment.

Advantages of running Kubernetes stack on vSphere/ VMware Cloud Foundation:

1. Operational Simplicity:
   - By abstracting physical hardware, vSphere allows users to focus on managing VMs without needing deep technical knowledge of server infrastructure.
   - vCenter and VCF Operations deliver centralized management, automated workflows, resource pooling , end-to-end visibility, monitoring, and troubleshooting for Kubernetes clusters to streamline IT operations and simplify administrative tasks.
2. Simplified Scaling:
   - Adding new VM worker nodes to a K8s cluster can be done in seconds In bare metal deployment, it takes 20-30 mins to add a new bare metal host and if no server is available, the process could take days/weeks to procure/set up the hardware.
3. Greater Isolation and Enhanced Security:
   - vSphere provides robust security with powerful features such as VM encryption, Key Management Service (KMS), and Secure Boot.
   - VCF provides ability to run multiple isolated Kubernetes clusters via vSphere Namespaces; each environment can have its own network policies, security control, and access restrictions
   - Also, VCF provides integrated data encryption for both storage and network traffic and data is encrypted at rest and in transit
4. High Resilience:
   - vSphere provides built-in capabilities such as HA, vMotion, and DRS to enhance the resilience of both VMs and containers

4. For a discussion of KubeVirt's challenges, see "Gartner, "KubeVirt Will Require Radical Changes to Traditional I&O" Report Reprint."

Customer story

"Through this containerization process, First Bank has successfully built a more agile and more resilient cloud native platform. It has enhanced the usability and flexibility of our applications and has laid a solid foundation for large-scale adoption in the future. This result is a critical step in our journey towards our core values as an enterprise—which is the vision to make our products and service processes software defined, data driven, and AI enabled[5]"

Dr. Pei-Wen Liu, Executive Vice President and Chief Information Security Officer, First Bank

Resources

- VMware Cloud Foundation Website
- DZone: Virtualized Containers vs. Bare Metal: The Winner Is...
- Cloud Native Now: "The Largest Cloud Providers Hardly Need Bare Metal Like They Do VM

5. "Noisy Neighbor" Mitigation:
   - Granular resource allocation controls prevent one VM from excessively consuming resources and impacting the performance of other VMs on the same host.
6. "Nosy Neighbor" Mitigation:
   - vSphere's powerful tenancy model and approach to deploying K8s clusters enables customers to limit the scope of a potential service disruption to their applications.
7. Cost Efficiency :
   - VCF allows you to consolidate infrastructure into a unified platform with need for separate clusters and hardware for different use cases and also offers better VM density, thus lowering CapEx
8. Flexibility to deploy multiple K8S versions across infrastructure stack
   - Unlike single K8S version for entire cluster in bare metal deployment, VCF gives more flexibility to deploy multiple versions of Kubernetes within a cluster, up to n-2
   - It enables upgrades to happen granularly and independently, so different teams can run different versions based on their needs, and is significantly less disruptive

Quick Comparison

	Running K8S stack on vSphere/VCF	Running third party K8S stack on Bare Metal
VM Density	1.5x More VMs	
Performance	62% better performance	
VM Boot Time	2-3 mins	20-30 mins
Scalability	Scale in seconds	Scaling is time consuming, may involve long hardware procurement cycles
Security	6 security levels	2 security levels
Resiliency	Zero downtime with live migration offered by vMotion	Significant downtime, No live migration support
TCO	~38% Lower TCO over 3 years	

5. First Commercial Bank Accelerates Private Cloud Innovation with VMware Cloud Foundation

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