OpenNebula versus Proxmox: Competitive Product Review

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Scope

This report compares the technical features of OpenNebula and Proxmox VE as cloud management platforms, focusing on OpenNebula's key differentiators that are most frequently highlighted in consultations. OpenNebula's capabilities are far better suited to meeting the virtualization and cloud management requirements of most enterprise and service provider users. In the specific case analyzed, it also delivers significant cost savings. We demonstrate how OpenNebula not only enhances business value by reducing capital and operational costs but also offers unmatched flexibility with no vendor lock-in. It provides ease of use and includes several features not available in Proxmox VE, such as: scalability and federation, multi-tenancy, integration and automation, cloud orchestration and provisioning features, multi-VM auto-scaling, multi-site and hybrid cloud capabilities, hardware-agnostic design, and comprehensive support services.

What is Proxmox?

Proxmox Virtual Environment (Proxmox VE), developed by Proxmox Server Solutions GmbH, integrates two virtualization technologies: Kernel-based Virtual Machine (KVM) for full virtualization and Linux Containers (LXC) for lightweight container-based virtualization. It features a web-based interface that enables system administrators to create, deploy, and manage Virtual Machines within small-scale infrastructures organized in a single cluster.

While Proxmox VE is a capable and popular open-source virtualization platform, it suffers from **notable limitations for enterprise-scale and complex environments**.

- Its scalability is constrained, offering limited support for large clusters and multi-site deployments.
- The platform lacks advanced features such as robust multi-tenancy, hybrid cloud integration, and sophisticated automation and orchestration tools.
- Networking and storage options are relatively basic, and rely on third-party tools for many advanced functionalities.
- Proxmox does not provide comprehensive enterprise-grade support globally and 24x7, professional services, or enhanced security features.
- Its narrower ecosystem and integration options make it less suited for organizations requiring high scalability, flexibility, and robust multi-cloud management when compared to platforms like OpenNebula.

What is OpenNebula?

OpenNebula[1] is a **simple, but powerful, open source solution to build and manage Enterprise Clouds**. It combines existing virtualization with advanced features for multi-tenancy, automatic provision and elasticity to offer on-demand applications and services.

OpenNebula provides a single, feature-rich and flexible platform with **unified management of IT infrastructure and applications** that **avoids vendor lock-in** and **reduces complexity, resource consumption and operational costs**. OpenNebula manages:

- **Any Application**: Combine containerized applications from Kubernetes with Virtual Machine workloads in a common shared environment to offer the best of both worlds: mature virtualization technology and orchestration of application containers.
- **Any Infrastructure**: Open cloud architecture to orchestrate compute, storage, and networking driven by software.
- **Any Cloud**: Unlock the power of a true hybrid, edge and multi-cloud platform by combining your private cloud with infrastructure resources from third-party virtual and bare-metal cloud providers such as AWS and Equinix Metal, and manage all cloud operations under a single control panel and interoperable layer.
- **Any Time**: Add and remove new clusters automatically in order to meet peaks in demand, or to implement fault tolerance strategies or latency requirements.

Value of an OpenNebula Subscription

OpenNebula subscriptions[2] provide the assurance of counting on OpenNebula's experts steadily involved, under SLA guidelines—Standard 9-to-5 or Premium 24/7—in providing support for your cloud. On top of this, they unlock additional benefits for corporate users, such as access to an enterprise repository with maintenance and LTS versions of the OpenNebula Enterprise Edition and Enterprise Tools, access to the Knowledge Base, notifications about critical issues, and exclusive services provided by OpenNebula consultants and engineers.

When comparing OpenNebula subscriptions to Proxmox, **Proxmox subscriptions come with four significant limitations**:

- ✔ Even at the premium level, Proxmox **support is limited to business hours** and does not provide global or 24/7 support.
- ✔ The business **9x5 support is limited to the European time zone** (CEST/CET).
- ✔ Subscriptions are **billed per CPU socket** rather than per server, unlike OpenNebula.
- ✔ For the Standard and Basic subscription tiers, the **number of annual support tickets is restricted to 10 and 3** respectively, further limiting the level of assistance available.

Simple Case Pricing Review

As a simple case study, we will compare the annual cost of licensing and 24x7 support for the software needed to build a private cloud on a single cluster with 10 servers, each with four CPUs. The prices shown below are list prices (Proxmox and OpenNebula[3]) only. Discounts would apply depending on volume, length of contract and other factors.

[1] https://support.opennebula.pro/hc/en-us/articles/360036935791-OpenNebula-Overview-Datasheet
[2] https://support.opennebula.pro/hc/en-us/articles/208381403-OpenNebula-Subscription-Guide
[3] https://support.opennebula.pro/hc/en-us/articles/208381403-OpenNebula-Subscription-Guide

Firstly let us evaluate the annual cost of the complete stack with **OpenNebula's** full-featured distribution. OpenNebula uses a per-host pricing model, regardless of the number of CPUs inside the host.[4] OpenNebula subscriptions include support for the KVM hypervisor and the Operating System (Ubuntu or AlmaLinux) in the managed nodes, as well as the network stack and OpenNebula's distributed storage solution.

OpenNebula Platform Infrastructure	Average Annual Cost
10 **OpenNebula - Managed Nodes** - Premium SLA	€8.800
1 **OpenNebula - Single Front-end** - Premium SLA	€11.000
TOTAL	**€19.800**

OpenNebula provides a variety of ways for Virtual Machines and containers to access storage. It supports multiple traditional storage models including NAS, SAN, NFS, iSCSI, and Fiber Channel (FC), which allow virtualized applications to access storage resources in the same way as they would on a regular physical machine. Additionally, it supports distributed Software-Defined Storage (SDS) models such as Ceph, GlusterFS, StorPool and LINSTOR, which allow you to create and scale elastic pools of storage and hyperconverged deployments.

OpenNebula also provides, out of the box, its own hyperconverged Kubernetes platform, **OneKE**.[5] Certified by the Cloud Native Computing Foundation (CNCF), OneKE is available for download from the OpenNebula Marketplace. With OneKE you can deploy—within minutes—a High-Availability (HA) multi-master cluster ready for production environments. OneKE supports Longhorn distributed storage as well as multiple Container Network Interface (CNI) plugins, and includes integrated solutions to handle ingress traffic and load balancing for services deployed on-premises.

The following table provides an estimate of Proxmox's pricing for Premium support level at the current date.

Product	Cost per CPU and Year
Proxmox VE Premium	€4.080 per CPU socket

For a sample infrastructure environment consisting of servers with 4 CPUs, the associated costs would be:

Product	Cost Calculation x 10 hosts	Annual Cost
Proxmox VE Premium	€1.020 x 4 x 10	€40.800

And the table below compares the annual costs for 10 servers:

Proxmox	Annual Cost	OpenNebula	Annual Cost
10 **Managed Hosts**	€40.800	**Front-end** + 10 **Managed Hosts**	€19.850

[4] https://support.opennebula.pro/hc/en-us/articles/208381403-OpenNebula-Subscription-Guide
[5] https://support.opennebula.pro/hc/en-us/articles/6554989538717-Enterprise-Kubernetes-Made-Simple-White-Paper

This comparison highlights the cost-effectiveness of OpenNebula, especially in larger deployments. OpenNebula's comprehensive enterprise features and flexibility, combined with its lower capital and operational costs, make it a compelling choice for enterprises looking to achieve significant savings. Additionally, Proxmox's Premium support lacks 24/7 coverage and only provides support within business hours CEST/CET in Europe, which may not meet the needs of enterprises requiring production-ready support. This limitation further underscores the advantages of OpenNebula for enterprise environments.

This case study reveals savings of more than **€20K (x2**) by using OpenNebula to build your cloud. And if you are using servers with more than four CPUs, or building a cloud with more than 10 servers, you will see that **the savings increase dramatically**. For example, in the same case using 8-CPU servers, the savings would increase to more than **€60K per year (x4)**.

Consulting Services

Although the simplicity and flexibility of creating an enterprise private cloud using OpenNebula cannot be matched by any competitor on the market, some customers with no previous experience with OpenNebula may need assistance with designing and deploying their cloud. OpenNebula Systems offers a **Cloud Deployment Service**[6] that provides a well-tuned working implementation of OpenNebula on the reference architecture, as well as sample Virtual Machines to evaluate features and reference material for post review—Architecture Design Report, Implementation Guide, and a Verification Checklist. Time and pricing depend on the size, heterogeneity, and complexity of the infrastructure, starting with a minimum of three days for the Engineering Phase and €12.000 for small-scale infrastructures.

Key Differentiators

Lower TCO→ OpenNebula delivers a lower Total Cost of Ownership (TCO) and helps to reduce operational expenditure (OpEx) budget pressure and concerns. OpenNebula's full open-source nature and efficient resource management contribute to significant cost savings.

Flexibility→ OpenNebula's modular architecture allows for greater flexibility and customization, making it adaptable to complex, multi-tenant environments. This makes it a great choice for enterprises or organizations seeking to isolate workloads from each other. Proxmox, while flexible, is more streamlined and may be better suited for smaller-scale virtualization needs.

Scalability and Federation→ OpenNebula scales up to support large-scale cloud federation and multi-site deployments. It allows for the management of distributed clusters across multiple data centers, federating OpenNebula instances, and connecting to public cloud providers. Several organizations have leveraged OpenNebula for large-scale deployments, globally-distributed cloud federations, and single cloud instances scaling beyond 2.000 hosts. Proxmox, on the other hand, is designed for smaller-scale environments and does not offer the same level of scalability and federation.

Multi-Tenancy → OpenNebula provides robust support for multi-tenancy with Access Control Lists (ACLs), Virtual Data Centers (VDCs), quotas, accounting, and showback. This makes it an excellent option for organizations that need to isolate and manage resources for multiple users, customers, or departments within a single cloud infrastructure. Proxmox offers basic multi-tenancy features but lacks the comprehensive capabilities of OpenNebula.

Integration and Automation → OpenNebula focuses on interoperability and compatibility with various hardware and software components, allowing organizations to seamlessly integrate a wide range of

[6] https://support.opennebula.pro/hc/en-us/articles/360000202703-Deployment-Services-Guide

technologies. It features a powerful hooking system for integration and automation. Proxmox also offers integration capabilities but may not provide the same level of flexibility and compatibility as OpenNebula in more complex environments.

Enterprise-grade Features → OpenNebula offers enterprise-grade features such as advanced networking options, comprehensive identity and access management, robust monitoring and telemetry tools, and multi-VM applications with auto-scaling. These features are essential for organizations with stringent security, compliance, and performance requirements. Proxmox provides many enterprise features but may not match the depth and breadth of OpenNebula's offerings.

Cloud Management and Marketplace Features → OpenNebula includes extensive cloud orchestration and provisioning features, a self-service portal, and a marketplace for users. These features enhance user experience and streamline cloud management tasks. Proxmox, while offering a user-friendly interface and management tools, does not provide the same level of cloud-specific features.

Multi-Cloud Hybrid → Using a single OpenNebula instance, you can manage a distributed collection of clusters across multiple data centers, federate OpenNebula instances, and connect your cloud to public cloud providers. This capability is crucial for enterprises looking to implement hybrid and multi-cloud strategies. Proxmox is more limited in this regard and is better suited for single-site deployments.

Hardware Agnostic → OpenNebula is hardware agnostic, meaning it supports a wide range of hardware configurations without requiring specific vendor hardware. This flexibility allows organizations to use existing infrastructure and avoid vendor lock-in, making it easier to migrate from other platforms and integrate diverse hardware solutions.

Support Services → OpenNebula offers comprehensive 24x7 and 9x5 support services without limitations on the number of support tickets per year, ensuring that enterprises receive the help they need, when they need it. In contrast, Proxmox's support services are limited in terms of the number of support tickets per year and lack 24/7 support, providing assistance only within business hours CEST/CET.

Summary

Using OpenNebula to build clouds can bring **significant economic benefits** for any organization, enhancing infrastructure flexibility, business agility, and overall efficiency. OpenNebula provides the most in-demand management features to build clouds for enterprises and service providers, offering a comprehensive set of enterprise functionalities compared to other solutions like Proxmox VE.

OpenNebula's robust support for multi-tenancy, advanced networking options, comprehensive identity and access management, and extensive cloud orchestration features make it an ideal choice for complex, multi-tenant environments. Additionally, **OpenNebula's ability to manage distributed clusters across multiple data centers and connect to public cloud providers supports hybrid and multi-cloud strategies**, further enhancing its value for enterprise environments.

In contrast, while Proxmox VE is a great choice for smaller-scale deployments, labs, or environments with limited complexity, its limitations make it less ideal for enterprise-scale, hybrid cloud, or multi-tenant environments. For businesses requiring 24x7 support, scalability, advanced orchestration, hybrid cloud capabilities, and robust multi-tenancy, platforms like OpenNebula offer a more comprehensive solution.

By choosing OpenNebula, enterprises can achieve significant cost savings, greater flexibility, and enhanced control over their cloud infrastructure. Have a look at our **Case Studies**[7] to learn more from our users and customers about how they are putting OpenNebula to work.

Ready for a Test Drive?

You can evaluate OpenNebula and build a cloud in just a few minutes by using **miniONE**, our deployment tool for quickly installing an OpenNebula Front-end inside a Virtual Machine or a physical host, which you can then use to easily add resources such as remote clusters based on KVM, Virtual Machines and Kubernetes Clusters, on multiple cloud providers.

[7] https://opennebula.io/case-studies/

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