



OpenNebula versus OpenStack: Competitive Pricing Review

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Scope

This report presents a detailed comparison of OpenNebula with the two main OpenStack enterprise distributions, namely Red Hat OpenStack Platform and Canonical's Charmed OpenStack. It compares the pricing of OpenNebula and OpenStack cloud management platforms, and highlights OpenNebula's key differentiators that are asked about most frequently. OpenNebula exceeds the cloud management requirements of most enterprise and service provider users, and in the particular case analyzed, it can result in up to 25% and 80% cost savings compared with Canonical OpenStack and Red Hat OpenStack respectively. We show how OpenNebula not only benefits the business's value thanks to its lower capital and operational costs, but also provides increased flexibility and simplicity of use, as well as multiple features not offered by OpenStack. These include native support for both VMs and containers without requiring additional management layers, automatic provision of remote clusters for simple Multi-site, Hybrid and Edge cloud computing, and broader hypervisor support (from fully virtualized to system containers and serverless deployments).

What is OpenStack?

OpenStack¹ is a set of software components that provide common services for cloud infrastructure. It controls large pools of compute, storage, and networking resources, all managed through APIs or a dashboard. Beyond standard infrastructure-as-a-service functionality, additional components provide orchestration, fault management and service management, amongst other services, to ensure high availability of user applications. OpenStack is controlled by a foundation driven by many vendors focused on building their own OpenStack-based cloud product.²

OpenStack comprises many subprojects with different levels of maturity that require complex integration to achieve a functional cloud infrastructure, currently comprising more than 30 software components. Any organization interested in using OpenStack, and requiring commercial support and enterprise maturity, is generally recommended (by the vendors running the project) to deploy one of the several enterprise distributions rather than the 'vanilla' version. These enterprise-grade distributions incorporate different versions of the OpenStack components with extended features, custom enhancements and integrations that erode their compatibility and interoperability. Moreover, various OpenStack distributions rely on components and tools which are not open source. For example, OpenStack vendors may use their

¹ <https://www.OpenStack.org>

² In October 2019, SUSE—a founding member and platinum sponsor of the OpenStack Foundation, and the first vendor to launch a commercially supported OpenStack distribution—announced its decision to discontinue sales and support for SUSE OpenStack Cloud: <https://www.suse.com/c/suse-doubles-down-on-application-delivery-to-meet-customer-needs/>

proprietary tools to install and operate OpenStack. This results in vendor lock-in and prevents users from leveraging the benefits of open source software.

The two most widely used OpenStack distributions³ in the market are Red Hat OpenStack Platform and Canonical's Charmed OpenStack.

Red Hat OpenStack Platform⁴ is a commercial OpenStack distribution offered by Red Hat. Red Hat OpenStack Platform is primarily based on the TripleO (OpenStack on OpenStack) upstream project but requires the use of Red Hat's proprietary components in order to get support. TripleO aims to use the same technologies to deploy OpenStack itself that OpenStack uses to provision Virtual Machines. The platform follows the same conservative approach as RHEL, providing support for the latest OpenStack release with a significant delay for ensuring stability. **In April 2020, Red Hat announced that their future for virtualization is OpenShift and they are providing tools to enable migration of workloads from OpenStack.**⁵

Canonical's Charmed OpenStack⁶ is a 100% open source OpenStack distribution. The distribution is fully based on the OpenStack Charms upstream project and always becomes available within two weeks of the upstream release for the latest features and bug fixes while ensuring stability through constant testing and patching. For enterprise customers looking for commercial support, Canonical offers consulting, support, and fully managed services for Charmed OpenStack.

What is OpenNebula?

OpenNebula⁷ is a **simple, but powerful, open source solution to build and manage Enterprise Clouds**. It combines virtualization and container technologies with 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 and Docker Hub ecosystems 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:** 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 Packet (Equinix Metal).
- **Any Virtualization:** Integrate multiple types of virtualization technologies to meet your workload needs, including VMware and KVM Virtual Machines for fully virtualized clouds, LXD system containers for containerized clouds, and Firecracker microVMs for serverless deployments.
- **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 OpenNebula Subscription

OpenNebula subscriptions⁸ provide the assurance of having the OpenNebula experts steadily involved, under SLA guidelines—standard 9-to-5 or premium 24/7—backing your cloud. On top of this, they unlock additional benefits for corporate users, including gaining access to an enterprise repository with

³ <https://ubuntu.com/engage/redhat-openstack-comparison-whitepaper>

⁴ <https://www.redhat.com/en/technologies/linux-platforms/openstack-platform>

⁵ <https://www.openshift.com/blog/blog-openshift-virtualization-whats-new-with-virtualization-from-red-hat>

⁶ <https://ubuntu.com/openstack>

⁷ <https://support.opennebula.pro/hc/en-us/articles/360036935791-OpenNebula-Overview-Datasheet>

⁸ <https://support.opennebula.pro/hc/en-us/articles/208381403-OpenNebula-Subscription-Guide>

maintenance and LTS versions of the OpenNebula Enterprise Edition and Enterprise Tools, exclusive Knowledge Base contents and notifications about critical issues, as well as access to advanced professional services provided by OpenNebula consultants and engineers.

Simple Case Subscription Pricing Review

Both OpenNebula and the two OpenStack vendors analysed in this review require a commercial subscription to provide enterprise support. In the case of Red Hat, the subscription is needed even for the simple usage of their distribution. In all cases, the pricing depends on the number of worker nodes (hypervisors) in the cloud infrastructure:

- Although Red Hat's pricing for OpenStack is not publicly available, an estimated price of a Red Hat OpenStack Platform subscription unit is \$5,000 **per socket-pair**.⁹ In addition, all nodes in the cluster have to be covered with an RHEL subscription at the price of \$1,299 per socket-pair.
- Canonical uses a per-host pricing model, regardless of the number of CPUs inside the host.¹⁰ The price of the Ubuntu Advantage for Infrastructure subscription is \$750 for a Standard SLA and \$1,500 for an Advanced SLA, **per host**. It includes support for Ubuntu.
- OpenNebula uses a per-host pricing model, regardless of the number of CPUs inside the host.¹¹ The price of the OpenNebula subscription is \$500 for a Standard SLA and \$800 for a Premium SLA, **per host**. It includes support for the Operating System (Ubuntu or CentOS) at the hosts.

There is an additional cost for the cloud Front-end. The price of a single Front-end deployment in OpenNebula is \$6,250 for a Standard SLA and \$10,000 for a Premium SLA per instance. The price of the Front-end deployment in OpenStack depends on the number of hosts required. The minimum requirement to install an OpenStack Front-end is six hosts.¹²

Per-host pricing provides more transparency and control over the total costs, compared to a more complex per-socket-pair pricing model. A per-socket-pair pricing model means that a separate subscription increment is needed for every two CPUs. As a result, the cost increases as the workload grows. A per-host pricing, on the other hand, allows cloud admins to just switch to more powerful hardware instead of having to purchase additional subscriptions as the workload grows.

As a simple case study, we will compare the one-year total cost of the subscription required to build a private cloud on a single cluster with 10 servers, each having one socket with two CPUs, and covered with Premium level support. Prices below are list prices only. OpenNebula applies discounts depending on volume, length of contract, and other factors.

| | Red Hat OpenStack | Canonical OpenStack | OpenNebula |
|------------------|-------------------|---------------------|-----------------|
| Front-end | \$37,800 | \$9,000 | \$10,000 |
| 10 x 2-CPU hosts | \$63,000 | \$15,000 | \$8,000 |
| TOTAL | \$100,800 | \$24,000 | \$18,000 |

This simple case study reveals **savings of more than \$6K and \$80K by using OpenNebula** to build your cloud instead of Canonical OpenStack and Red Hat OpenStack respectively. And if you are using servers

⁹ <https://ubuntu.com/openstack>

¹⁰ <https://ubuntu.com/pricing/infra>

¹¹ <https://support.opennebula.pro/hc/en-us/articles/208381403-OpenNebula-Subscription-Guide>

¹² <https://ubuntu.com/openstack/install>

with more than two CPUs, or building a cloud with more than 10 servers, you will see that **the savings increase even more dramatically**. For example, in that same scenario but using four CPU servers (two socket-pairs), savings would be more than \$160,000 per year compared with Red Hat OpenStack. The costs associated with the lock-in nature of Red Hat's licensing and support, and the per-CPU licensing model, can actually result in many enterprises seeing their TCO inflate significantly over time.

Consulting Services

Although the simplicity and flexibility of creating an enterprise private cloud using OpenNebula cannot be matched by any competitor in 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**¹³ that provides a well-tuned working implementation of OpenNebula on the reference architecture, 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 \$6,250 for small-scale infrastructures.

OpenStack is known to be a complex system. Red Hat's approach towards consulting for OpenStack is to engage with potential customers through a Solution Delivery Framework which consists of three stages: discover, design, and deploy. An estimated price of Red Hat OpenStack Platform delivery is \$10,000 per week of engagement with a Red Hat consultant.¹⁴ Canonical offers the Private Cloud Build service,¹⁵ which includes cloud delivery based on reference architecture and certified hardware options, at a fixed price of \$75,000.

Managed Services

Many mid-size and small businesses do not have the resources, knowledge, or experience to manage their cloud infrastructure. Even if they have resources and expertise, they prefer their teams to focus on business workloads rather than infrastructure management. OpenNebula Systems operates many private OpenNebula clouds on behalf of customers. Our **Cloud Managed Services**¹⁶ help you maximize the uptime and the value of your solution. OpenNebula Systems takes care of the entire OpenNebula lifecycle—design, deployment, 24/7 health monitoring, alerting, troubleshooting, maintenance, and upgrades—so you don't have to.

Our Cloud Managed Services are offered as an extension to the OpenNebula Subscription as the cumulative cost of both Subscription and Managed OpenNebula at \$1,750 per host. While Red Hat does not offer cloud managed services, Canonical offers managed services at the cumulative cost of Subscription and Managed OpenStack of \$5,775 per host.¹⁷

Key Differentiators

Subscription Costs → Compared with Canonical OpenStack and Red Hat OpenStack, OpenNebula delivers a much lower support subscription cost with 25% and 80% cost savings respectively.

Maintenance Costs → An organization needs to evaluate how many employees are required to operate the cloud, which will impact its ongoing OpEx costs. OpenStack is known to be a complex system that requires dedicated human resources to maintain it. Significant resources are also required to operate an OpenStack

¹³ <https://support.opennebula.pro/hc/en-us/articles/360000202703-Deployment-Services-Guide>

¹⁴ <https://ubuntu.com/engage/redhat-openstack-comparison-whitepaper>

¹⁵ <https://ubuntu.com/openstack/consulting>

¹⁶ <https://support.opennebula.pro/hc/en-us/articles/360052934231-Managed-Services-Guide>

¹⁷ <https://ubuntu.com/openstack/managed>

cloud. Several studies show that even a small-scale OpenStack cloud requires multiple dedicated FTEs.¹⁸ OpenNebula, on the other hand, is very easy to install, upgrade, and maintain. You do not need an army of administrators to build and maintain your cloud. Your cloud will run for years with little maintenance. We have users running very large-scale clouds with thousands of hosts managed by a single administrator.

Software Upgrades → While OpenNebula can be upgraded in a simple and automated way, OpenStack upgrades are known to be very complex. This is because OpenStack consists of various interconnected components which have to work together to provide the service to users. The upgrade procedure has to be executed very carefully since a single misstep results in a failure of the entire process. Various OpenStack vendors have never supported OpenStack upgrades, forcing their customers to re-deploy. Red Hat provides a very complex and time-consuming manual procedure which users can use to upgrade their cloud. Canonical's Charmed OpenStack can be upgraded in an automated way.

Licensing → While OpenNebula and Canonical's Charmed OpenStack are 100% open source, Red Hat packages their OpenStack Platform with a proprietary installer. This installer, called Red Hat OpenStack Platform Director, provides an additional layer on top of TripleO and requires a subscription to be purchased. This means that organizations have to cover all of their environments, including production, development, and staging, with the subscription. OpenNebula does not require a subscription for the software to be usable, which means that organizations can try it and operate a fully-functional OpenNebula cloud free of charge for as long as they need. For enterprise customers, OpenNebula provides an enterprise subscription, managed services and professional services if needed. Organizations can also decide which environments to cover with the subscription, which may result in substantial cost savings as usually not all environments require full support.

Multi-Hypervisor Support → While Canonical OpenStack and Red Hat OpenStack only support KVM, OpenNebula integrates multiple types of virtualization technologies to meet your workload needs, including VMware and KVM Virtual Machines for fully virtualized clouds, LXC system containers for container clouds, and Firecracker microVMs for serverless deployments.

Virtual Machines and Containers → While OpenNebula can easily combine application containers with traditional Virtual Machine workloads,¹⁹ OpenStack requires a managed Kubernetes platform running on top. This adds an extra control layer that ends up increasing management complexity, resource consumption, and associated costs. Red Hat's approach is to encourage its customers to run an OpenShift PaaS solution, which uses Kubernetes underneath but is not open source and is only available by purchasing an additional license.

Multi-site, Hybrid and Edge → OpenNebula offers a True Hybrid Cloud Architecture²⁰ and the automatic provision tools that are necessary to easily grow your private cloud with resources on remote cloud and edge locations. OpenStack, on the other hand, does not provide any integration capabilities with public clouds or edge locations 'out of the box'. It is simply not designed for this purpose. Their approach is to use a PaaS platform, like Kubernetes or OpenShift, to achieve interoperability and portability across cloud and edge locations.

¹⁸ https://www.suse.com/media/report/the_total_economic_impact_of_suse_openstack_cloud_report.pdf

¹⁹ <https://opennebula.io/mastering-containers>

²⁰ <https://opennebula.io/true-hybrid/>

Summary

In this report, we have performed a detailed comparison between OpenNebula and Red Hat OpenStack Platform and Canonical's Charmed OpenStack. Choosing the right cloud management platform is crucial, especially in times of uncertainty and rapid change. A wrong decision may result in severe delays, long-term vendor lock-in situations and an increased TCO. We have demonstrated that using OpenNebula has **significant economic benefits** for any enterprise and brings a clear **reduction in complexity, resource consumption and operational costs**. OpenNebula also provides 'out of the box' a number of innovative features not offered by OpenStack. These include native support for both VMs and containers without adding extra management layers, automatic provision of remote clusters for simple Multi-Cloud, Hybrid and Edge Computing, and broader hypervisor support. Have a look at our **Case Studies**²¹ 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**,²² our deployment tool for quickly installing an OpenNebula Front-end inside a Virtual Machine or a physical host, and then adding remote Edge Clusters based on KVM, LXC or Firecracker.

miniONE

LET US HELP YOU DESIGN, BUILD, AND OPERATE YOUR CLOUD



CONSULTING & ENGINEERING

Our experts will help you design, integrate, build, and operate an OpenNebula cloud infrastructure



OPENNEBULA SUBSCRIPTION

Get access to our Enterprise Edition and to our support and exclusive services for Corporate Users



MANAGED SERVICES

Our team of experts can fully manage and administer your OpenNebula cloud for you

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²¹ <https://opennebula.io/case-studies/>

²² <http://minione.opennebula.io>