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Migrating from VMware to OpenStack

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Executive Overview

Cloud computing is now a central piece of enterprise IT estates. According to IDC[1] the share of cloud environments in overall IT infrastructure spend is fast approaching the 50% mark. As IT estates grow and become more complex, CAPEX and OPEX can increase substantially, serving as a catalyst for an ongoing challenge organisations face - to economise infrastructure expenditure.

One strategy enterprises can adopt in order to reduce infrastructure costs is to move away from expensive proprietary technologies to open source platforms. This allows organisations to not only rein in costs, but also to gain more control over their infrastructure.

This paper explores migrating to an open source cloud computing platform - OpenStack - and comparing it with vRealize - the proprietary virtualisation platform from VMware. Moreover, this paper provides an analysis of an organisation with a medium-sized estate of VMs and physical machines, detailing how migrating from VMware to OpenStack can result in up to 92% cost savings.

Included as an example in this comparison is Canonical's Charmed OpenStack which delivers economic and efficiency benefits by leveraging Juju for application modelling - together with Canonical engineering team's expertise - to ease the pain of deployment, migration, operations management and support.

Canonical has experience building 100's of private clouds over the last five years across an array of industries, including telecommunications, financial services, public sector and retail. Canonical is the publisher of Ubuntu, the leading open source operating system across public and OpenStack clouds.

[1] IDC Worldwide Quarterly Worldwide Cloud Infrastructure Tracker

Comparing VMware and OpenStack

The simple economics of utilising proprietary software vendors for private cloud management has forced enterprises to explore other options. Open source technologies provide an alternative solution for building and managing cloud infrastructure economically and at scale.

Here we look at the proprietary offering, VMware, and its open source alternative, OpenStack, and examine the benefits and challenges that are linked to each. Also introduced in this section is an economical and efficient open source solution, Canonical's Charmed OpenStack distribution.

VMware

VMware's vRealize suite is an enterprise virtualisation platform. vRealize supports both virtual machines and containers and comes in standard, advanced and enterprise flavours. The differences are only in the components offered.

Benefits:

VMware's vRealize suite is a hybrid cloud management platform that helps IT developers quickly build applications in any flavour of cloud with both secure and consistent operations, thus speeding up IT services delivery. It supports both VMs and containers and provides a comprehensive management stack for public and private clouds, multiple hypervisors and physical infrastructure. Developers can consume resources through Application Program Interfaces (APIs), command line interface (CLI) and catalogs. In addition, developers can use their own tools of choice for application development.

Challenges:

When enterprises began exploring options to reduce TCO by shifting from monolithic, legacy systems to virtualised infrastructure, VMware was the most commonly used platform available at the start of this virtualisation wave.

However, the costs associated with the lock-in nature of VMware's licensing and support, and the per-CPU licensing model can actually result in many enterprises seeing their TCO inflate over time.

OpenStack

OpenStack is an open source private cloud computing platform which can be used to manage distributed compute, network and storage resources. It is usually deployed as an infrastructure as a service (IaaS) model. It allows enterprises to build and manage an automated cloud infrastructure.

Benefits:

An open source technology solution like OpenStack gives users flexibility with customisation capabilities, lock-in avoidance and broader developer contributions. Proprietary cloud and virtualisation platforms, on the other hand, tie enterprises to vendors and come with recurring licensing fees which can make it an expensive option.

Challenges:

OpenStack is not just a simple plug-and-play technology. It is a complex ecosystem that enables flexibility for application management and configuration. Whilst this has its advantages, it can also make deployments and operations complex, requiring OpenStack expertise. OpenStack and KVM hypervisor, for example, come free of charge, but they require specific skills to configure them which enterprises may not have in-house.

This complexity comes from the fact that OpenStack is made up of various interconnected services. This is what makes deployment difficult and operational management even more complex. OpenStack upgrades, for example, have become so arduous that many OpenStack vendors have discontinued support - leaving customers with no option but to re-deploy.

Charmed OpenStack distribution

While there are many OpenStack distributions available, what differentiates Charmed OpenStack from others is the usage of Juju charms for OpenStack deployment and operations. By using a model-driven approach which focuses on what needs to be achieved as opposed to concentrating on how it can be done, teams can simply define their ultimate requirements and let Juju take care of the rest. This enables teams to focus on leveraging the business value brought by OpenStack rather than struggling with its deployment and operations, and thus, bring the costs down.

Canonical's Charmed OpenStack distribution offers a powerful, reliable and production-grade delivery for OpenStack on Ubuntu. Enterprises can run Charmed OpenStack on top of certified hardware.

Charmed OpenStack uses MAAS for infrastructure provisioning and Juju for all application modeling. Along with OpenStack, Kubernetes clusters can be deployed on top to optimise performance and extend the flexibility. Enterprises can choose to run their workloads inside of virtual machines or containers. Charmed OpenStack can run compute, network and storage services on the same shared hardware. This reduces hardware footprint and costs in both purchasing and maintaining hardware. Using a hyper-converged architecture, it allows enterprises to use the same hardware across the entire data centre and benefit from a unified, distributed approach to infrastructure provisioning and service orchestration.

Migrating to OpenStack

Migrating from VMware to OpenStack provides greater infrastructure flexibility and lower operational costs.

Organisations are facing the following challenges when evaluating the OpenStack distribution to be used:

- **Economics** – making sure that the OpenStack distribution they choose really helps to reduce CapEx and OpEx
- **Technology choices** - making sure that required technologies, such as Software Defined Networking (SDN) of their choice, are supported
- **Velocity of development and innovation** - how quickly upstream features and projects are adopted
- **Day-N operations** - how to efficiently operate OpenStack post-deployment
- **Upgrades** - how predictable the release cadence and upgrade path are.

Explained in the sections below is how Charmed OpenStack helps enterprises to meet these challenges head on.

Challenge 1: Economics – reducing CapEx and OpEx

For any enterprise, infrastructure economics are pivotal. One of the key reasons for OpenStack adoption is the cost benefit associated with a more streamlined and open infrastructure that enterprises have found nearly impossible to achieve with VMware.

In the cost comparison scenario below, an organisation with a medium-sized estate of VMs and physical machines can achieve up to 92% in savings if migrating away from VMware to Charmed OpenStack, and that is with consulting, training and support services included.

It is important to mention that migrating from VMware to Openstack does not always guarantee a cost reduction. This cost reduction can be ensured, however, by choosing an OpenStack distribution that can be operated economically.

Charmed OpenStack is more economical than VMware vRealize and other OpenStack distributions for 3 key reasons.

1. As OpenStack is an open source project, there are no licensing costs associated with its usage.

2. While VMware uses a per-CPU support and subscription model, Charmed OpenStack uses a per-node support and subscription model, bringing the operational costs down and adding pricing predictability.

3. Charmed OpenStack uses Juju charms for its deployment and operations which significantly simplifies the entire process and in turn, reduces CAPEX and OPEX. The entire adoption process is reduced to just a few weeks, with deployment time taking only a few hours, reducing time to value. The operational overhead over the product lifetime is also reduced, which again reduces OPEX and accelerates return on investment.

VMware vs Charmed OpenStack cost comparison scenario

Take 2,500 VMs and 50 physical machines with 4 CPUs per server using the TCO Return of Investment calculator, designed to evaluate the costs associated with VMware vRealize adoption. The beauty of Charmed OpenStack is that it is fully open source, so there are no licensing costs as with proprietary software deployments.

Building Charmed OpenStack using Canonical's Private Cloud Build professional services package costs in the region of $75,000 to $150,000. The Ubuntu Advantage for Infrastructure Advanced support package and training needs to be factored in at $75,000 and $21,500 respectively. This results in $171,500 - $246,500 in total. In turn, the same environment based on VMware vRealize results in $2,075,250, This calculation uses VMware's TCO comparison calculator.

	vmware	CANONICAL
Licenses	$1,289,000	$0
Professional Services	$437,000	$75,000 - $150,000
Training	$27,000	$21,500
Support Subscription	$322,250	$75,000
Total	**$2,075,250**	**$171,500 - $246,500**

Challenge 2: Technology choices

No two businesses are the same. Technological choice enables enterprises to choose the solutions that best suit their needs.

With so many companies devoting resources to OpenStack, together with Canonical's own development efforts, Charmed OpenStack benefits from greater technology options than VMware and other OpenStack distributions. This is particularly relevant in terms of SDN and storage solutions, hypervisors and integration, and migration tools.

With VMware, for example, enterprises can only use VMware NSX, VMware's software defined networking (SDN) platform. Canonical, meanwhile, delivers OVN out of the box with Charmed Openstack, but users can integrate it with any SDN that is available in the market and supported by upstream.

Using Ubuntu and a wide range of Canonical's management tools, Yahoo! Japan has been able to reduce both CAPEX and OPEX costs while successfully building and operating a large scale IaaS environment.

Challenge 3: Velocity of development and innovation

With proprietary offerings like VMware, the speed of development and innovation is dependent on the vendor, locking customers into their product roadmap.

The diverse OpenStack community, on the other hand, is constantly innovating. Enterprises can stay at the cutting edge of technology with an open source approach, which allows for accelerated development and lowered costs. Choice, however, is a possibility, not an obligation - so enterprises can adopt at their own pace.

Canonical is a proud participant in the community of innovation around OpenStack. As an example, Canonical's Microstack solves the problem of small-form factor OpenStack. MicroStack provides an easy way to develop and test OpenStack workloads on a workstation or VM.

From Canonical's experience building 100's of OpenStack clouds, combining the best tools from various open source projects results in the best possible cloud. Canonical's OpenStack reference architecture uses Ceph for storage, ELK for logging and Nagios, and Prometheus for monitoring.Canonical also adopts upstream OpenStack projects as soon as they get mature and production-ready.

Quick access to the upstream innovation of open source results in a competitive advantage for those using OpenStack, in particular Charmed OpenStack.

Challenge 4: Enhancing operational efficiencies post-deployment

All organisations look to scale and reduce infrastructure complexity in a bid to increase productivity. This can be achieved with quality, operational tooling that enables quick deployments of enterprise-scale clouds.

Juju charms can significantly simplify application deployments and accelerate daily operational tasks such as scaling out the OpenStack cluster, resulting in lower maintenance, less human resource requirements – and, therefore, reduced OPEX.

Juju is an open source application modelling tool utilised to model and build an OpenStack cloud, reducing the deployment time from days to hours. By relying on charms, Juju provides operations automation and service orchestration capabilities.

What is a charm?
A charm is a collection of scripts and metadata which contains all the logic required to install, configure, interconnect and operate applications. Charms can be written in any language that can run on Ubuntu, such as Python or Bash. Charms are available for hundreds of applications including Kubernetes, Ceph as well as OpenStack. Canonical-maintained charms can be downloaded from the Charm Hub.

In turn, Juju charms, as outlined in the box out above, are collections of scripts for deploying and operating software. With event handling built in, they declare interfaces that fit charms for other services. This is the basis for forming relationships. This drastically reduces the operational complexity in environments consisting of various inter-connected services, such as OpenStack.

By implementing the entire logic of a certain process across various charms, they can simplify specific services deployment and management tasks, including automating complex operations such as OpenStack upgrades.

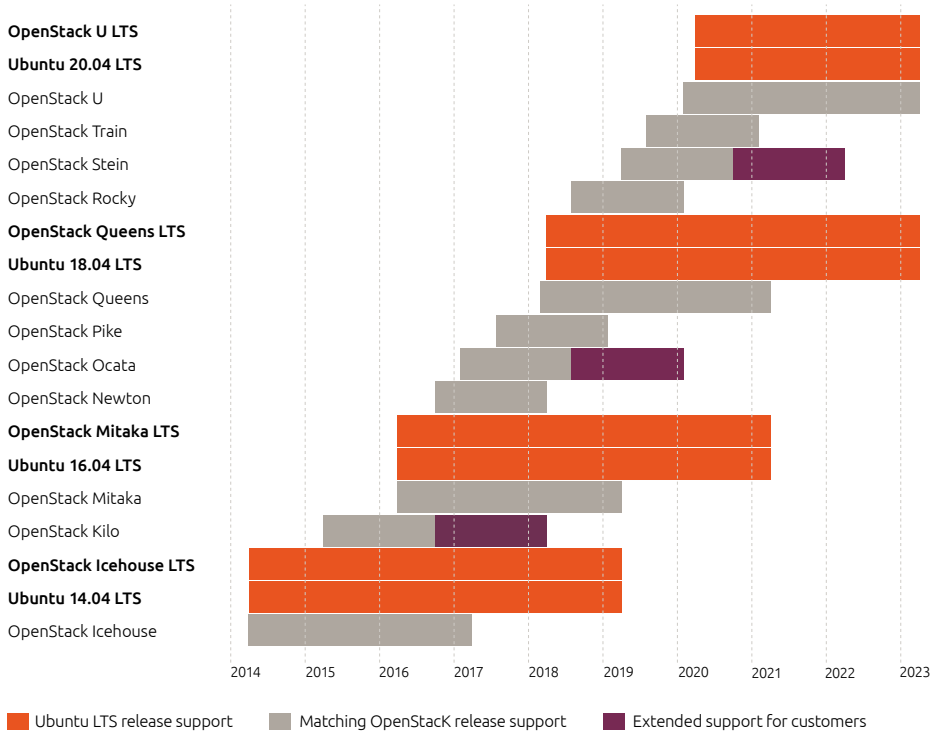
Charms are community vetted and open source. OpenStack charms have been fully vetted by the Canonical team.

Challenge 5: Predictable release cadence and upgrade path

With a proprietary solution, enterprises are tied to a specific vendor's release cadence and upgrade model, which can constrain business advancement and innovation. An unpredictable upgrade path also makes it impossible for enterprises to plan their IT roadmap.

This is applicable to both VMware vRealize and OpenStack distributions on the market.

Compared to other OpenStack distributions, Charmed OpenStack users benefit from a highly predictable, transparent release cadence - outlined below.



- Every six months there is an interim release of OpenStack which Canonical supports for eighteen months.

- Every two years there is a Long Term Supported (LTS) version of OpenStack released which Canonical supports for five years.

Canonical aligns with the OpenStack release cadence to provide a predictable upgrade path for organisations through Ubuntu, upstream OpenStack and OpenStack Charms.

Upgrading OpenStack can be difficult and time consuming without the right expertise and tooling. Juju charms, however, is a solution for streamlined OpenStack upgrades.

The OpenStack Charms Project focuses on making OpenStack deployable, maintainable and upgradable. By outsourcing the entire logic to charms, Canonical's Charmed OpenStack distribution is the only OpenStack distribution which supports OpenStack upgrades.

Alignment with the OpenStack release cadence and the ease-of-upgrade capability with Juju charms takes the perceived complexity out of OpenStack upgrades, serving as one of the key differentiators for Charmed OpenStack compared to other distributions.

Helping you migrate to OpenStack

Enterprises wanting to move from VMware to Charmed OpenStack should put a carefully planned migration strategy in place. This is something that Canonical can help with.

For migration, workloads should be ideally re-designed in a cloud-native fashion based on a microservices architecture. This ensures high availability of services and native adoption in the cloud environment. It is not a must, however, as the existing workloads can just be moved from one platform to the other.

The OpenStack environment itself is built on another set of servers or in a dedicated data centre. For a period of time, the two environments run in parallel so that testing can be carried out in an isolated environment before the migrated site is made primary. It also allows the enterprise to see how business applications will run on the new platform before switching to it.

Migration partners

Canonical recommends two main migration partners when customers move to Openstack - Cloudbase Solutions and Hystax.

Cloudbase Solutions

Coriolis from Cloudbase Solutions is designed for fully-automated lift and shift migrations at scale. Every VM is treated as a black box, so no preparation is needed to move them from source to destination.

hystax

Hystax

Haystax Acura is another product that can be used for cloud migration across platforms, including from VMware to Charmed OpenStack, and provides a predictable way of lifting and shifting workloads. Acura replicates IT workloads and enables enterprises to test migrations and failovers against an isolated environment on a target site without affecting production workloads. Processes happen in real-time and do not require any downtime until an enterprise is ready to switch across to the new platform.

Charmed OpenStack - Consulting, Support and Managed Services

As with most cloud computing platforms, in-house teams will require an understanding of OpenStack before and after it is deployed.

OpenStack adoption is usually a complex process. Some common mistakes made during the design phase may result with a lot of re-work during further phases. Although Juju charms significantly simplify the deployment process, organisations still have to spend some time learning Juju. For those who do not want to go through the OpenStack adoption process on their own, Canonical provides the consulting services. A dedicated team of cloud experts will build the cloud for you.

But a successful deployment is just the beginning of the journey. In order to assist its customers with ongoing OpenStack operations, Canonical offers a consolidated support offering for open source infrastructure called Ubuntu Advantage for Infrastructure. It comes in three different variants: essential, standard and advanced and provides critical security patches, 24/7 support and production-grade SLAs for maximum uptime and stability. UA Infrastructure covers not only OpenStack, but also Kubernetes, Ceph, Swift and MAAS.

For enterprises that want to outsource the entire operations process, Canonical provides a fully managed Charmed OpenStack service, either hosted on-site or in a Canonical data centre. All operational tasks are off-loaded to Canonical in what is a fully-managed cloud. This provides enterprises with access to Canonical's team of global experts and frees up internal IT teams to focus on core business objectives.

Canonical's Charmed OpenStack on Ubuntu has been selected by BT to facilitate the delivery of BT's full 5G Core network. This open source cloud-based approach will ensure that BT can quickly deploy new services, and increase capacity to stay ahead of customer demand driven by 5G and FTTP.

Conclusion

Migrating from VMware to OpenStack can have significant economic benefits for any enterprise and will improve both infrastructure flexibility, business agility and the bottom line. But in making the move to an OpenStack distribution it is essential that organisations ensure the OpenStack distribution they choose is easily deployable, maintainable, upgradable and cost effective.

Charmed OpenStack reduces overall TCO compared to VMware and other OpenStack distributions, while enhancing infrastructure efficiencies, processes and productivity. Moving from a VMware virtualised environment to Charmed OpenStack by using cloud migration tools, such as Coriolis or Accura provides a neat lift and shift migration.

Charmed OpenStack enables enterprises to reduce costs, increase IT service delivery and take advantage of technology choices without being locked in.

Whether enterprises need a robust platform for critical business applications or want to achieve high availability at reduced cost, Charmed OpenStack is a future-proofed way forward.

More resources:

Lessons learned from 100+ private cloud builds

From VMware to Charmed Openstack

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