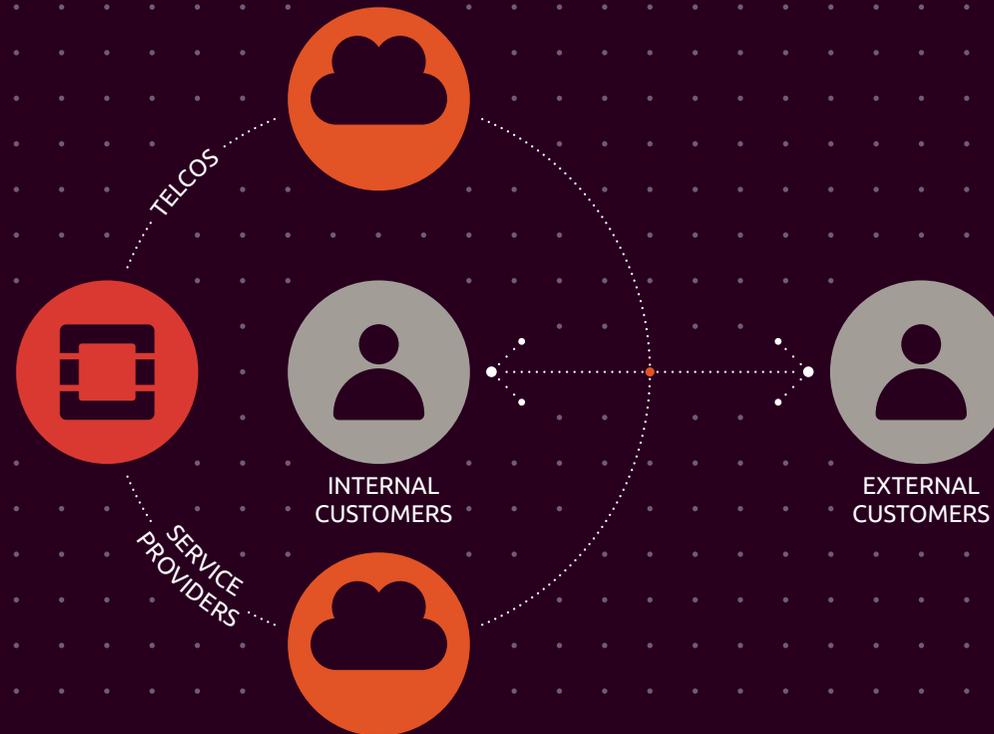


eBOOK

# How Ubuntu OpenStack makes the cloud work for telcos and service providers

Maximising margins, minimising risk and speeding up time-to-revenue



# Is this ebook right for me?

This ebook explains how Ubuntu OpenStack can help telcos and other providers to deliver cloud-based services to both internal and external customers successfully.

If you're involved in technology, business operations or service design in any organisation that fits that description, this ebook is for you. Rather than going into hands-on technical detail, it offers a valuable overview of the tools that make Ubuntu OpenStack so powerful and – importantly – an outline of their benefits in the real world.

**Ubuntu OpenStack works.**

In this ebook, we explain how to use Ubuntu OpenStack for:



**PUBLIC  
INFRASTRUCTURE  
AS A SERVICE**



**PRIVATE  
INFRASTRUCTURE  
AS A SERVICE**



**NETWORK  
FUNCTION  
VIRTUALISATION**

# For the love of OpenStack

Ubuntu OpenStack brings together the work of the OpenStack community and that of global software vendor Canonical, the company behind Ubuntu, the leader in cloud and scale out technologies. At Canonical, we have been contributing to the OpenStack project since the very beginning. Today, Ubuntu and OpenStack are inextricably linked. They even share a release cycle.

In recent years, Ubuntu OpenStack has become the undisputed platform of choice for OpenStack users, with 55% of OpenStack deployments taking place on Ubuntu, and 7 out of 8 OpenStack 'super-users' choosing Ubuntu, according to the OpenStack Foundation.

Today, there's no more reliable, scalable or easily managed route to a carrier-grade OpenStack cloud.

## Six reasons to choose Ubuntu OpenStack

- 1 It offers a complete toolset for the deployment and easy management of your OpenStack cloud.
- 2 Entirely open source and certified it offers both technology and business freedom
- 3 It has been developed by engineers who number among the world's foremost OpenStack experts.
- 4 It has been designed specifically to deliver the scalability and reliability that telcos and service providers need.
- 5 Ubuntu and OpenStack are a proven combination, Ubuntu having been the original reference operating system for OpenStack and remaining the number one OS for production OpenStack deployments.
- 6 Canonical routinely provides hands-on support to telcos and service providers, delivered directly by engineers who work on both the Ubuntu and OpenStack projects.
- 7 Canonical has worked on the design and deployment of OpenStack clouds with seven of the world's top ten service providers.



# Meet the authors



**Chris Kenyon**

**Senior Vice President,  
Cloud Sales & Business  
Development**

Chris is responsible for the commercial success of Ubuntu in both public and private cloud. He is responsible for Canonical's direct and channel business around Ubuntu Openstack as well as Canonical's global partnerships with the likes of IBM, HP, Cisco, Dell, Amazon Web Services, Microsoft Azure. The Canonical Telco Cloud practice has been involved in hundred's of OpenStack projects.

Follow Chris on Twitter: [@ChrisKenyonEU](#)



**Mark Baker**

**Product Manager,  
Ubuntu OpenStack**

Mark is tasked with making sure the development of Ubuntu OpenStack is driven by the needs of its users in the enterprise and among service providers and mobile network operators. This necessitates close involvement with the management and development of OpenStack.

Follow Mark on Twitter: [@markabaker](#)



# Contents

The vision and the reality	6
It could all be so different	6
Case study: Deutsche Telecom	7
What exactly is Ubuntu OpenStack?	8
The two key components of the platform	8
World-leading OpenStack tools	9
World-leading OpenStack services	13
Why Canonical and Ubuntu?	14
Reference architecture and deployment methodology	15
Conclusion	16
About Canonical	17



# The vision and the reality

The cloud promises instantly-available computing resources that can be accessed by anyone with an internet connection. The result will transform the business of providing technology services to consumers and businesses.

## **That's the vision, at least.**

The reality is somewhat more complex. So complex, in fact, that the cloud can become difficult to deliver cost-effectively. Whilst OpenStack is now established as the de facto open cloud platform, making it possible to develop carrier-grade value-added services without spending millions on software and consulting, the project is hard.

The many OpenStack components are not all interoperable without intimate knowledge of the code. If the wrong technology decisions are made at the outset, even the most commercially promising project could become a costly failure.

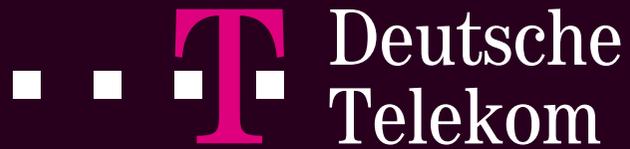
## **It could all be so different**

Ubuntu OpenStack has been developed to ensure that any telco or service provider can deliver an OpenStack cloud with the performance, scalability and reliability necessary to meet customer SLA requirements.

By deploying Ubuntu OpenStack cloud infrastructure, you can increase revenue from commodity compute and storage services, while harnessing the cloud to generate higher volumes of broadband traffic across your networks, increasing core revenues in the process.

And all this, without the familiar problems of proprietary software: costly, forced upgrade cycles, growing licensing bills as your operations scale and the inability to port workloads between platforms in the future.





## Case study: Deutsche Telekom

Famous for its T-Mobile brand, Deutsche Telekom is one of Europe's largest mobile network operators.

When the company approached Canonical, it was in the process of building a public cloud based on OpenStack, for the delivery of apps such as Office 365, Box and iMeet to its business users. But with OpenStack's components changing fast, it was looking increasingly unlikely that the team would hit their deadline.

A subscription to Canonical's Ubuntu Advantage Availability Zone Service allowed them to benefit from support across their entire stack, from the underlying Ubuntu Server (with its hypervisor, networking and storage being particularly heavily utilised) through the OpenStack layer (including the Nova, Swift, Keystone and Horizon components in conjunction with Ceph) and all the way up to the Ubuntu Guest layer, on which many of the SaaS apps were running.

When issues were identified, Canonical found solutions and relayed them back to Deutsche Telekom. While the team there continued to work on their cloud, Canonical created hot fixes for genuine bugs, working with the OpenStack community to push them into the main packages.

Deutsche Telekom's OpenStack cloud launched on time. It has now been delivering revenue for more than two years, with a major upgrade coming soon.



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# What exactly is Ubuntu OpenStack?

In essence, Ubuntu OpenStack is a combination of Ubuntu Server, an established Linux-based open source operating system, and the various open source components that make up the OpenStack cloud platform. But there is much more to it than that. Canonical has spent years developing a suite of deployment and management tools for cloud and distributed computing. These tools have been refined over many iterations to maximise their compatibility with OpenStack. Today, there is no faster way to deploy an OpenStack cloud and no easier way to manage one.

## The two key components of the platform

### 1. OpenStack itself

OpenStack is the world's leading open-source cloud platform. It provides all the components needed to build and deploy an operational open-source cloud, from compute, storage and network components to a management dashboard and integrated usage metering engine. OpenStack has been created to meet telco and service provider requirements for service automation, scalability and high-availability computing.



### 2. The Ubuntu Server operating system

Ubuntu is the most widely used developer platform for building open-source clouds. It was the original reference operating system for the OpenStack project and today, it is the most popular guest operating system on the world's leading public cloud platforms. In sharing its release cycle with OpenStack, Ubuntu ensures that all the latest OpenStack features are supported on Ubuntu, as they are released. Long Term Support releases of Ubuntu are supported by Canonical for a minimum of five years.

# World-leading OpenStack tools

Ubuntu OpenStack includes unique tools for speeding up OpenStack deployments in the datacentre, configuring physical and virtual machines, and deploying and scaling your services. It means you can bring your cloud to market faster, automating service delivery to maximise revenues from cloud-based services.

Let's take a look at each of the key tools in turn.

The screenshot shows the Landscape web interface. The top navigation bar includes the 'landscape' logo, 'Standalone Account', 'Computers', 'OpenStack Beta', 'Juju', a notification bell with '0', the user name 'Stan Peterson', and a 'Logout' button. The main heading is 'Set up your OpenStack cloud within minutes'. Below this is a sub-heading: 'The easiest way to deploy, monitor and manage your OpenStack cloud. The fully automated installer uses machines provisioned by MAAS to deliver a production-ready environment in minutes. Built using Juju orchestration technology, it automates nearly a hundred OpenStack best practices in a few key choices.'

The interface is divided into three main sections: 'Setup', 'Configure & Install', and 'Monitor'.

- Setup:** Contains two sections: 'Compute' with 'KVM (for kernel-based Virtual Machine) is a full virtualization solution for Linux' and 'Network' with 'Open vSwitch (Open vSwitch is a multilayer virtual switch enabling network automation)'. Each has a corresponding icon.
- Configure & Install:** Features a table of 'Availability zones' and a summary of 'Nodes' and 'Cores'.

Availability zones	Nodes	Cores
region-1 Default	13	17
region-2 Second	20	12
region-3 Third	18	5

Summary: 13/49 Nodes, 17/52 Cores. An 'Add availability zone' button is visible below the table.

- Monitor:** Displays a 'Storage allocation' chart with the title 'Outage in 44 days'. The chart shows a significant spike in storage usage over a period of 44 days, with a 'Today' label at the end of the timeline.

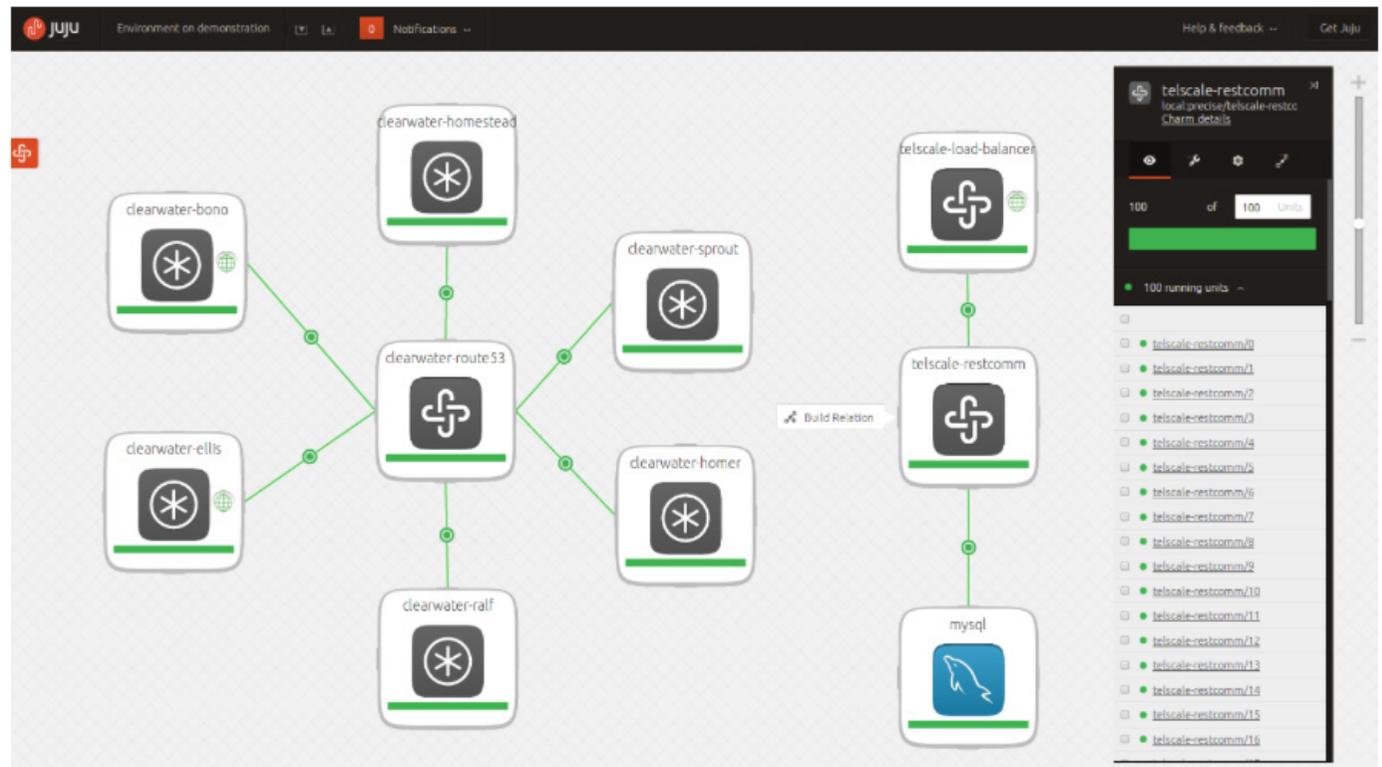
Landscape provisions your production-ready environment and monitors machine and service utilisation



## Juju

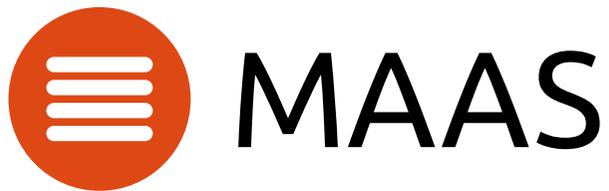
Juju is Ubuntu's service orchestration tool. It enables you to deploy OpenStack – or any workload you want to run on top of it – in minutes. It then manages that deployment, ensuring that its configuration updates in line with any changes to the infrastructure around it.

Juju Charms are available for every common cloud workload and downloadable from the Juju Charm Store. Typically written by the originators of the application, they encapsulate all key configuration information for the service in question, ensuring it is always deployed in line with industry best practice, which boosts quality, security and performance for your customers.



An entire environment deployed using Juju in minutes

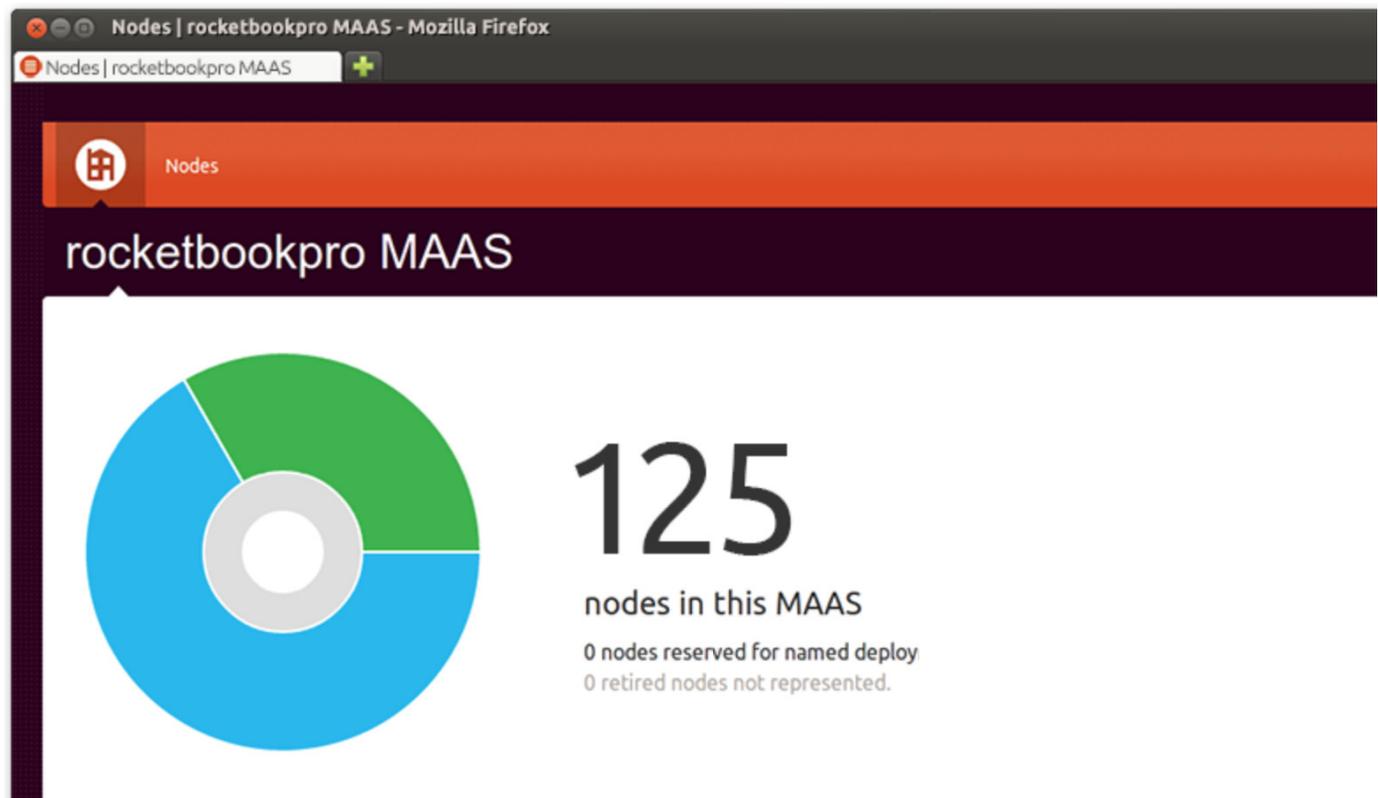




## Metal-as-a-Service (MAAS)

MAAS is a system for setting up the physical hardware base on which to run Ubuntu OpenStack. Once your servers are powered up and physically connected to the network, a few simple commands via MAAS will see them provisioned with all the Ubuntu Server packages they need, prior to the installation of OpenStack with Juju.

You can add, commission, update, deploy and recycle physical servers through a simple web interface, or decommission them when they're no longer needed. When commissioning a new server, MAAS can take care of hardware-specific tasks such as burn-in tests, firmware and RAID upgrades, as well as checking that all machines are certified to run Ubuntu.



MAAS provisions thousands of machines using a simple web UI



## Landscape

The Canonical Distribution of Ubuntu OpenStack guides you through all the steps necessary to configure, build and manage a working cloud on your hardware – and do so in minutes. There is simply no quicker way to create an OpenStack cloud.

Housed within the Landscape systems management service, it offers you a complete overview of your underlying infrastructure and complete control over how you build an Ubuntu OpenStack cloud on it.

OpenStack-aware monitoring in Landscape helps you track the continued availability of your cloud's computing, storage and network resources. It also helps with capacity planning by making real-time predictions based on current utilisation trends, helping you determine when to add new nodes or extra storage.



The screenshot shows the Landscape web interface. At the top, there's a navigation bar with 'landscape', 'Developers account', 'Computers', and 'Support'. On the right, it shows '6' notifications, the user 'Peter Peterson', and a 'Logout' button. Below the navigation bar, there's a summary section for '913 computers registered' and '25 computer selected'. A search bar and 'Access Groups' (global (27)) are visible. The main content area is titled 'Change packages on OpenStack hosts' and shows details for a task created by 'Stan Da Man' on 'Mon 11th Nov, 15:15pm'. The task is 'In progress' with a 79% progress bar. Below this, there's a table of activities:

Status	Description	Computer
Succeeded	Set computer HA mysql service to standby	mysql/1
In progress	Upgrade package linux-server	mysql/1
	Upgrade package linux-server 3.2.0.40.48 to 3.2.0.60.10	

Landscape facilitates the management of any Ubuntu infrastructure

# World-leading OpenStack services

Canonical's cloud services are offered on a bespoke basis, but they can be divided into two categories.

## Cloud consultancy

Canonical consultants and engineers work on-site to help you deliver operational cloud infrastructure in the shortest possible timeframe. We can help you design and deploy OpenStack and Ubuntu on your hardware, integrating physical storage with cloud infrastructure. We can also assist with the development and implementation of user and group policies, help with security decisions and create bespoke strategies for managing capacity.

And it's not just consulting. The aim is always to train your team on OpenStack, Ubuntu and its toolset, ensuring you can effectively monitor and manage your cloud long into the future.

## Ubuntu Advantage support services

The Ubuntu Advantage cloud support service gives telcos and operators 24-hour access to our skilled cloud support engineers, who are there to resolve technical issues quickly and effectively, maximising uptime for your services. Subscriptions includes access to Landscape, Canonical's cloud management platform, as either a hosted service or a dedicated server in your datacentre. And all Ubuntu Advantage subscribers have access to a wealth of Ubuntu support information, in the Knowledge Base.

## BootStack

BootStack (short for: build, operate, and optionally transfer) is the new offering from Canonical to round up its cloud portfolio. Utilising their experience in working with some of the world's leading telcos and enterprises to build OpenStack clouds, Canonical experts will design and build your OpenStack cloud in predictable time and on budget. Canonical will manage the cloud for you for a fixed price, relieving you from the pain of recruiting and training OpenStack staff. When your team is ready to take over your cloud operations, Canonical will transfer it to your care. It's the best way to get up and running quickly on OpenStack.



# Why Canonical and Ubuntu?

## Our proven cloud experience

Ubuntu powers virtually all of the public clouds built with OpenStack, including Rackspace, DreamHost and HP's public clouds.

We provide support and services for many OpenStack environments around the world, from the host infrastructure on which the OpenStack software runs to a range of certified and individually optimised Ubuntu guest images for customer use on each cloud.

In recent years, we have gained unrivalled expertise with OpenStack. We can apply best practice and proven methods, quickly identifying pitfalls or gaps that might be overlooked by less experienced cloud partners.

## Regular releases deliver the latest OpenStack features

For over a decade, a new version of Ubuntu has been released every six months, providing a commercially supported release on a predictable schedule. OpenStack releases updates, including its latest features, on the same six-monthly timeline.

Every two years, the release is deemed a Long Term Support (LTS) version, and supported by Canonical for the next five years. Based on this cycle, Ubuntu can provide telcos and service providers with emerging technologies as they become available.

To give you both the stability of the Ubuntu LTS versions, with access to new OpenStack features as they become available, we have developed the Cloud Archive. This is an online repository providing, at all times, a version of

the latest version of OpenStack that has been optimised for use with the current Ubuntu LTS release, complete with full commercial support. No other vendor can offer this level of OpenStack compatibility.

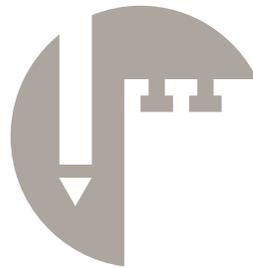
## Unrivalled integration with OpenStack

OpenStack is built into Ubuntu Server and Ubuntu is the reference operating system for OpenStack. An enormous amount of work has gone into the integration of OpenStack and Ubuntu and is leveraged by many cloud providers and enterprise customers. The seamless integration of Ubuntu and OpenStack is the principal reason why Ubuntu is the world's most popular operating system on both private and public clouds.

# Reference architecture and deployment methodology

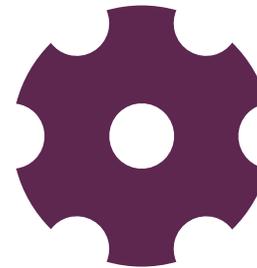
We speed up cloud deployment and minimise risk by using Ubuntu reference architectures and deployment methodologies. It's a tried-and-tested approach that has been developed during projects that have been delivered successfully for other customers, enabling service providers to capitalise on the experience of early market movers.

**To ensure the fastest, lowest risk deployment, our methodology focuses on three core steps:**



## 1. Assess

Canonical evaluates a service provider's technical platform and operational readiness.



## 2. Architect and pilot

Canonical develops a technical architecture and deployment plan that meets the service provider's needs, before deploying a pilot cloud as the foundation of a full operational deployment.



## 3. Full deployment

Canonical helps the service provider move from pilot to full deployment, transferring skills and supporting the implementation long term to ensure success.



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# Conclusion

All over the world, network operators and other service providers are deploying cloud infrastructure to increase network-based revenues, launch new compute and storage services and deliver cloud products from third parties to their subscribers. Yet problems remain.

Proprietary infrastructure is expensive to implement, prompting many operators to choose open-source cloud technologies instead – with OpenStack now the de facto choice.

Like any open source solution, it offers low capital and operational costs and scalability without licensing limits. Building a cloud remains a complex undertaking, however, requiring the integration of many disparate components.

To simplify the process, reduce time to market, reduce risk and, above all help telcos and service providers deliver the best cloud services for their subscribers, Canonical has created the Ubuntu Service Provider Stack, integrating the infrastructure, tools and services needed to create, deploy and support a production-ready OpenStack cloud. It's the culmination of all the experience and product development described in this eBook – and it's ready for you to adopt now.

For a free, no-obligation consultation, please call [+44 20 7630 2400](tel:+442076302400), or email [cloud@ubuntu.com](mailto:cloud@ubuntu.com)

Alternatively, you can request more information at [ubuntu.com/cloud/contact-us](https://ubuntu.com/cloud/contact-us)



# About Canonical

At Canonical, we are passionate about the potential of open source software to transform business. For over a decade, we have supported the development of Ubuntu and promoted its adoption in the enterprise.

By providing custom engineering, support contracts and training, we help clients in the telecoms and IT services industries to cut costs, improve efficiency and tighten security with Ubuntu and OpenStack. We work with hardware manufacturers like HP, Dell and Intel, to ensure the software we create can be delivered on the world's most popular devices. And we contribute thousands of man-hours every year to projects like OpenStack, to ensure that the world's best open source software continues to fulfil its potential.

