

# Canonical and Ubuntu

Introduction and Product Overview

# ubuntu is everywhere



Web/Social

Media/Entertainment

Transportation/Industrial

Finance/Technology

Telco

Retail

# Why do people select Ubuntu?



## Security & Predictability

Scheduled releases  
Critical security patches

Free access to code,  
when needed



## Developer Productivity

28,000+ supported  
source packages

Broad community  
footprint



## Infrastructure Breadth

Optimized for Azure, AKS and  
Hyper V.

Cross Platform Consistency:  
clouds, edge, mainframe,  
server, desktop, IOT devices,  
robotics.

# Ubuntu the most popular OS from cloud to edge



Public Cloud

Private cloud | Containers | Serverless

Desktop / Edge / IoT

60-80%

55%-70%



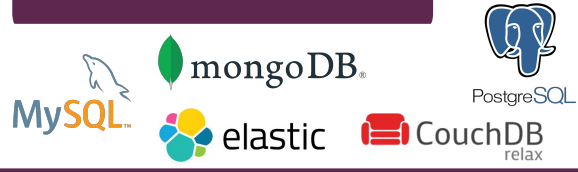


# Ubuntu - The Gateway to Open Source

## Web Applications



## Database



## AI/ML



## Business Applications



## Analytics



## Blockchain



## Storage



## Processing



## Kubernetes & Containers



## Development



## Other



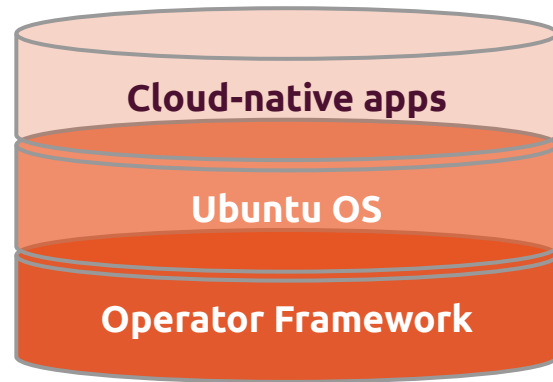
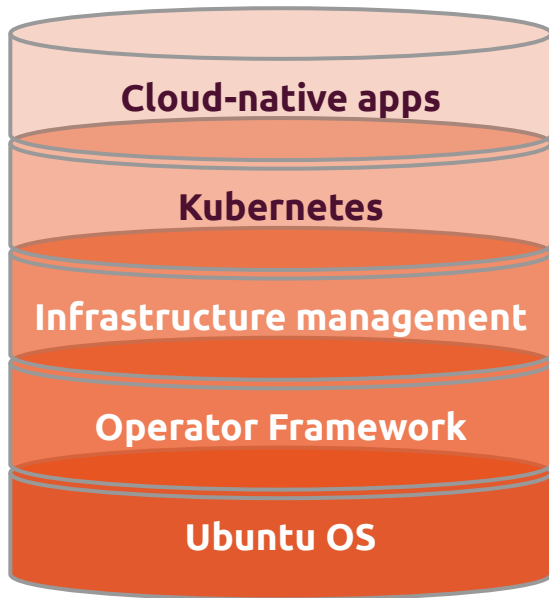
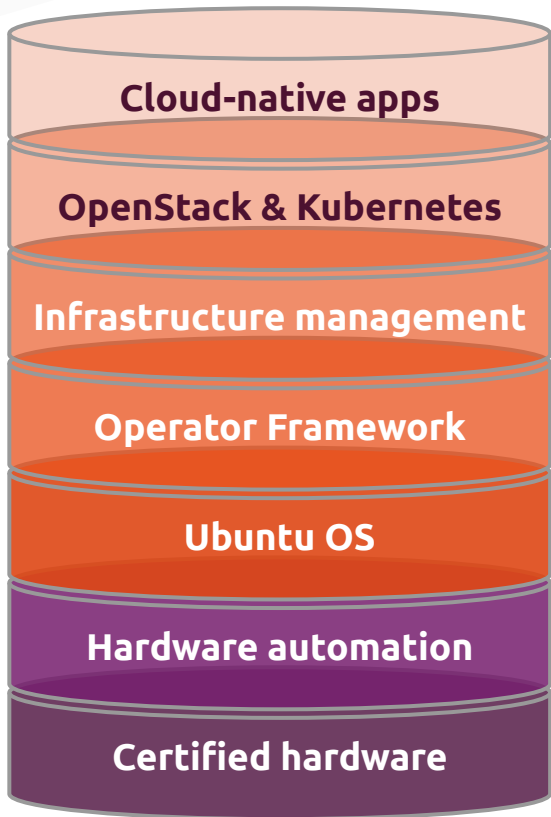
## IOT Edge Robotics





And the Story starts here.....

# Canonical offers solutions across the stack



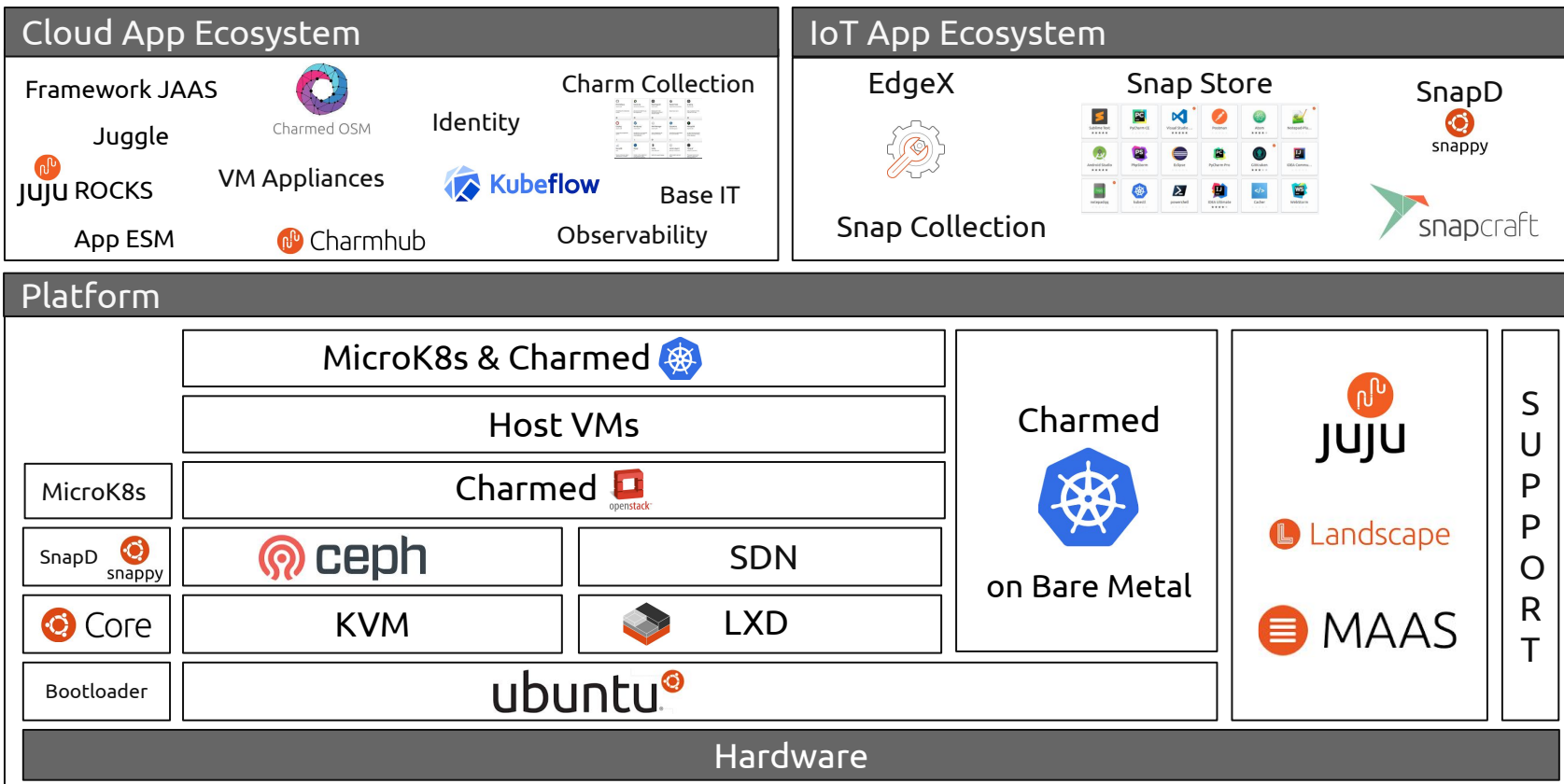
Full Stack solutions that span hybrid and multi-cloud architectures



**Canonical has only one price  
for the full Open Source Stack**



# Canonical Platform Summary





Ubuntu Linux Distribution

# Server

# Ubuntu Key Focus Areas



## Security, Performance & Long-Term Support

- **Extended Security Maintenance & Livepatch**
  - Extended security coverage for customers
  - Includes all packages from *universe* - critical and high CVE-free
  - Livepatch on bare-metal, AWS and Azure
- **Performance** - Continued focus on boot speed and acceleration of workloads
  - GPU enablement out of the box
  - 100G virtualized performance
  - Netplan improvements
- **Long-Term Support**
  - 5 years LTS standard support
  - 10 years ESM support

# predictable velocity



**Ubuntu 22.04 LTS**

Ubuntu 21.10

Ubuntu 21.04

Ubuntu 20.10

**Ubuntu 20.04 LTS**

Ubuntu 19.10

Ubuntu 19.04

Ubuntu 18.10

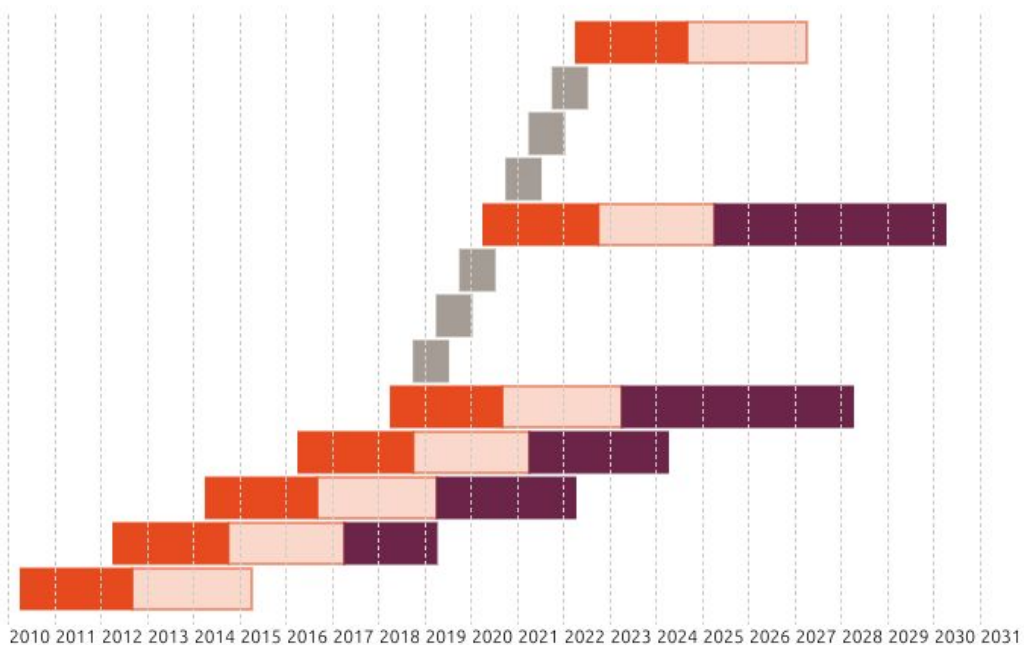
**Ubuntu 18.04 LTS**

**Ubuntu 16.04 LTS**

**Ubuntu 14.04 LTS**

**Ubuntu 12.04 LTS**

**Ubuntu 10.04 LTS**



- Hardware and maintenance updates
- Maintenance updates
- Interim release
- Extended security maintenance for customers



CIO 'missing money'  
is in operations

Standard  
value prop  
is here

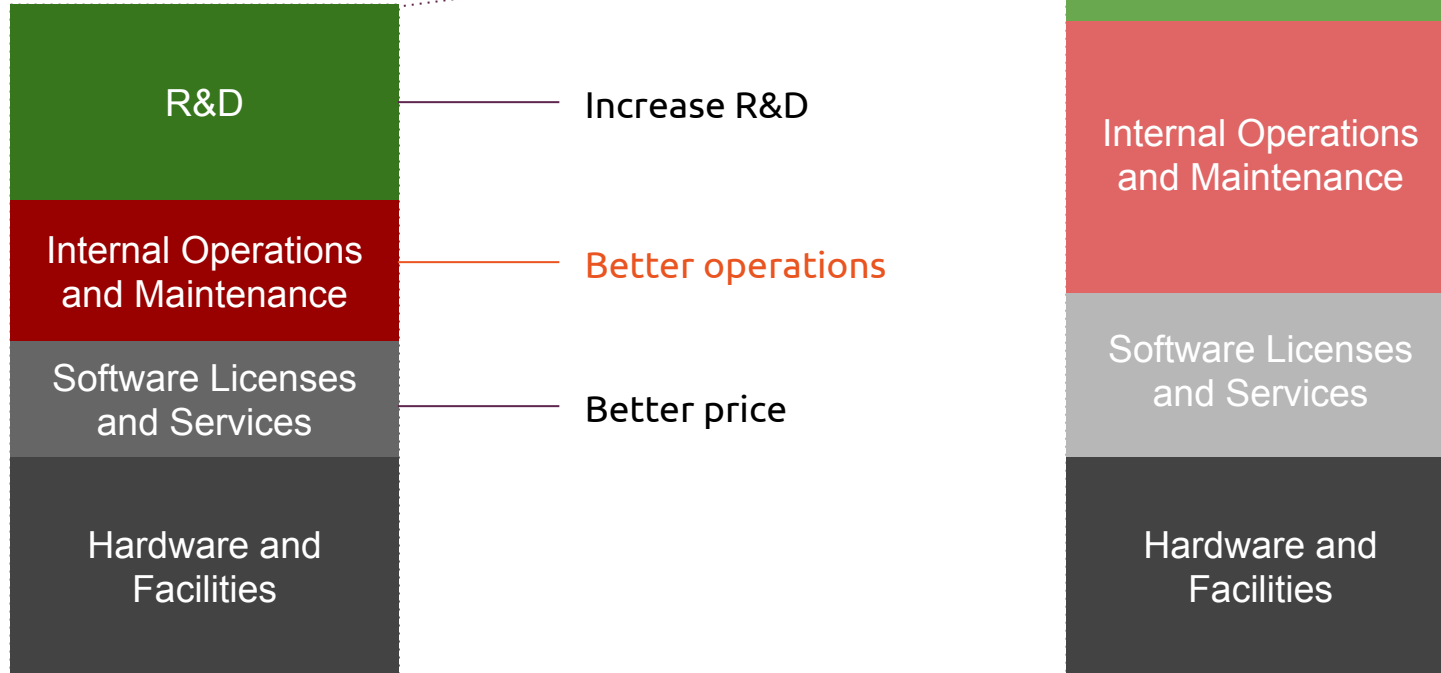
## IT Budget



# Challengers must offer value & innovation



Reduce total cost





Deployment and Operations of OpenStack on Ubuntu

# Charmed OpenStack

# Why Charmed OpenStack?



**Pure upstream**, available within 2 weeks of official release



**Scalable Operations** using model-driven architecture



**Bare metal** operations with MAAS



**Cloud Archive** serves over 50 Million requests for packages



**Secure**, TLS, Kernel Live patching, confinement



**Upgradable** between each OpenStack Release



**Cost effective** at scale and available immediately

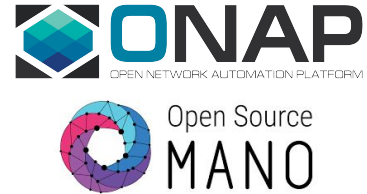
# rich ecosystem



Storage



Software Defined Networking



MANO Solutions



Load Balancing



Edge Cloud Solutions



Monitoring/logging



CANONICAL + ubuntu 

I NEED TO KNOW WHY MOVING  
OUR APP TO THE CLOUD DIDN'T  
AUTOMATICALLY SOLVE ALL OUR  
PROBLEMS.



Dilbert.com @ScottAdamsSays

YOU WOULDN'T  
LET ME RE-  
ARCHITECT THE  
APP TO BE  
CLOUD-NATIVE.

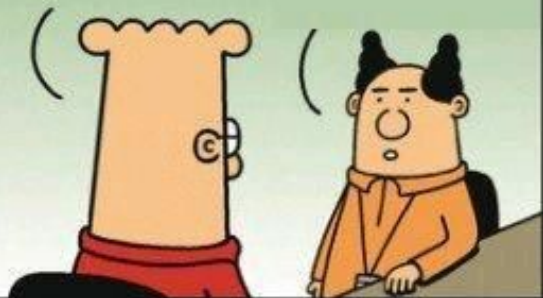
JUST PUT IT  
IN  
CONTAINERS.



11-08-17 © 2017 Scott Adams, Inc./Dist. by Andrews McMeel

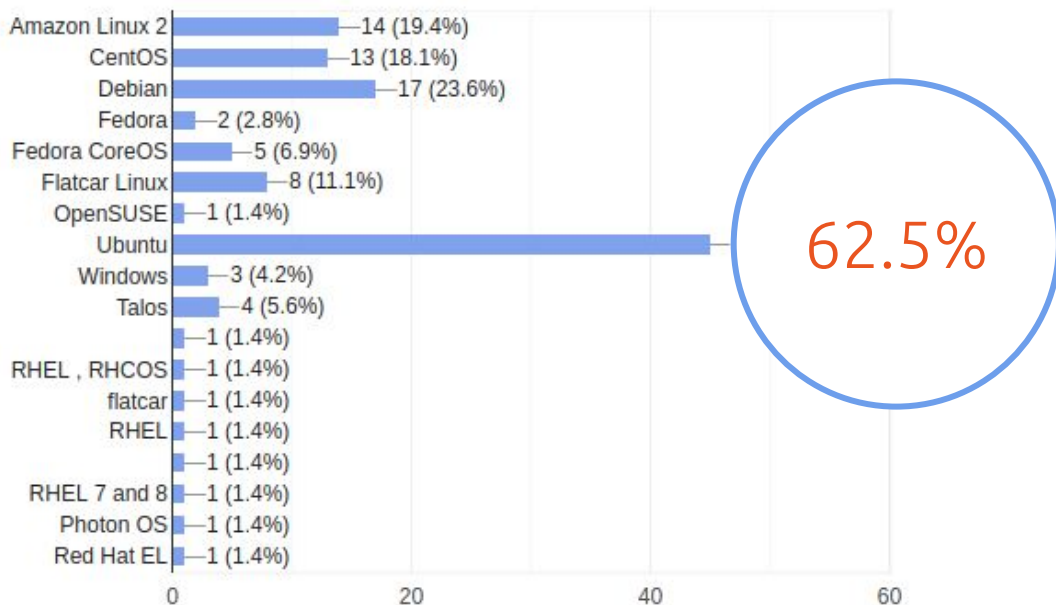
YOU CAN'T  
SOLVE A  
PROBLEM JUST  
BY SAYING  
TECHY THINGS.

KUBERNETES.



# Why does Canonical care about Kubernetes?

What OS are you running on your nodes (select multiple)?



Source: [CNCF](#)



# Kubernetes distributions powered by Ubuntu



Amazon EKS



Azure AKS



Google GKE



VMware PKS



Charmed K8s



MicroK8s



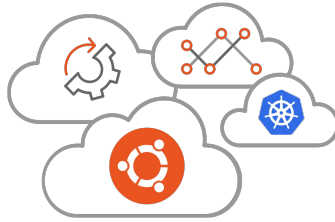
Canonical



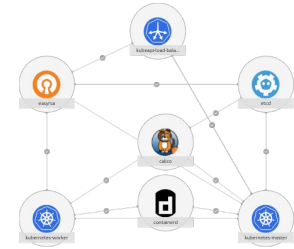
# What is Canonical Kubernetes?



## K8s-optimised Ubuntu



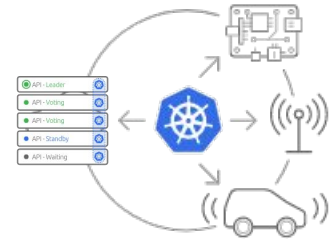
## Charmed K8s



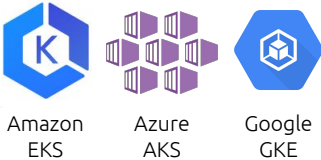
## Partner K8s



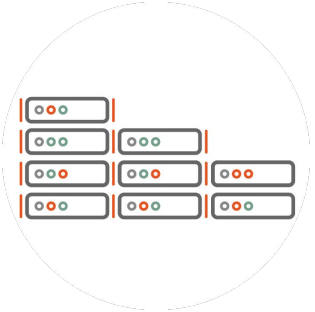
## MicroK8s



# Multi-cloud Kubernetes with enterprise support



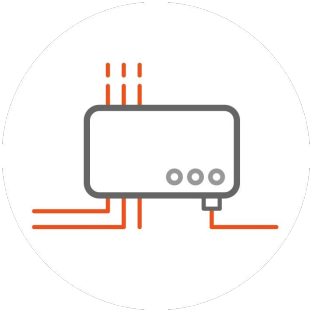
Public Cloud



Private Cloud



Micro Cloud



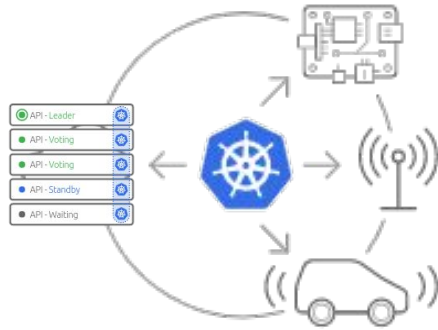
Internet of Things

# Why Canonical Kubernetes?



- ✓ Best price-performance
- ✓ Vast cloud infrastructure compatibility
- ✓ Hardened Kubernetes infrastructure
- ✓ Better multi-cloud experience
- ✓ Lifecycle automation framework reduces complexity
- ✓ A single vendor for Kubernetes & container support

# K8s on rails



MicroK8s

Lightweight, zero-ops, opinionated



VS

# Composable K8s



Charmed Kubernetes

Configurable, multi-cloud, lifecycle management

# MicroK8s

- Pure upstream - NO vendor APIs
- Edge, IoT and appliances
- Zero-ops experience
- High availability
- Single package - 60 second setup
- Standalone or clustered
- Opinionated, “sensible defaults”
- Linux, Windows & Mac workstations
- Automatic updates & security patching
- Enterprise support

vs

# Charmed Kubernetes

- Pure upstream - NO vendor APIs
- Model-driven, declarative ops
- Multi-cloud and hybrid-cloud
- High availability
- Pluggable CNI, CSI, CRI
- DPDK, CPU pinning, SR-IOV, Hugepages
- Fine-grained service placement
- GPU acceleration
- Third-party components and services
- Enterprise support

# MicroK8s

# Charmed K8s

Pure upstream Kubernetes

Extensive tooling catalogue & integrations

Lifecycle automation framework for infra & apps

Enterprise-grade high-availability & GPU acceleration

Security patching and updates

x86/AMD, ARM, s390x (IBM LinuxONE & zSystem) & IBM Power compatible

# Comprehensive Kubernetes ecosystem







# kubernetes

Consulting | Security | Support | Operations



CANONICAL

# Bootstrap your Kubernetes journey



## Kubernetes Explorer

- 3-day workshop
- MicroK8s, Charmed K8s & Kubernetes fundamentals

## Kubernetes Discoverer

- Reference architecture
- Public clouds, VMware, Openstack
- Storage & SDN options
- Logging, monitoring, alerting
- High Availability
- Support or Fully Managed

## Kubernetes Discoverer Plus

- Custom architecture
- Public clouds, VMware, Openstack, Bare Metal
- Storage & SDN options
- Third-party integrations
- GPU Acceleration
- Private registry options
- High Availability
- Support or Fully Managed

# Managed Kubernetes: We operate, You innovate

Cost-effective and predictable economics

Customised deployment

24/7 active management

99.9% uptime SLA

On-request scaling

Updates & security patches

SOC 2 Type 2, ISO 27001/27002, GDPR

Transfer control on request



# Managed applications on Kubernetes



# LTS Docker Images

NGINX



mongoDB



MySQL



RabbitMQ



Grafana



# Managed applications on Kubernetes



# A comprehensive portfolio for vertical integration



 JAAS  Landscape

Management Layer



Apps on K8s



Charmed K8s

MicroK8s

Kubernetes

 openstack®

Virtual Machines

ubuntu 

Operating system

 MAAS

Bare metal provisioning

# Canonical Ceph





# Background

# Storage options



# Competition



## Traditional on-prem storage solutions



NetApp™



## Novel on-prem SDS solutions



IBM  
Spectrum  
Scale



# What is Ceph



- Software defined storage solution
- OSS running on any commodity HW
- Single cluster can serve **object**, **block** and **file** workloads



*Half of openstack deployments use ceph for storage*

# Competition



## Traditional on-prem storage solutions



NetApp™



## Novel on-prem SDS solutions



IBM  
Spectrum  
Scale





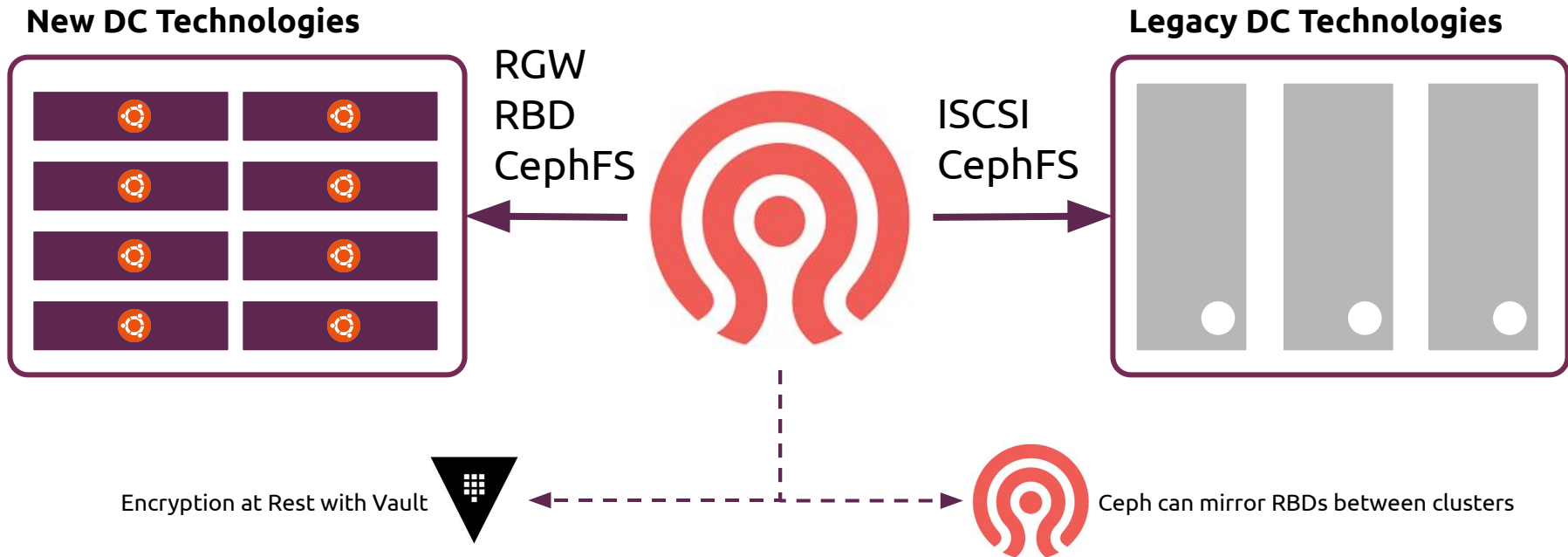
# Technical details

# What is Ceph?



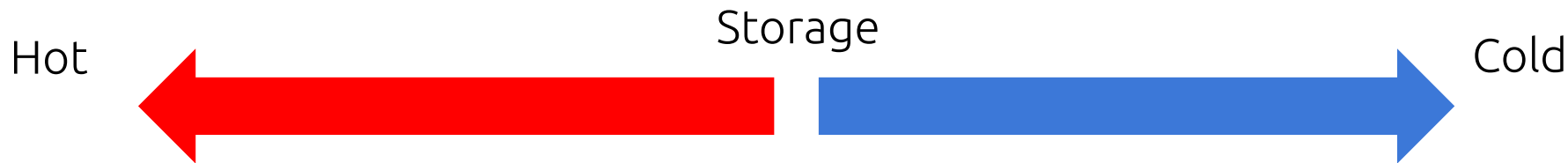
A Software Defined Storage solution, designed to provide massively scalable, **block, object** and **file** storage from a single resilient storage cluster

# Respond to your storage needs





# Flexible Architecture



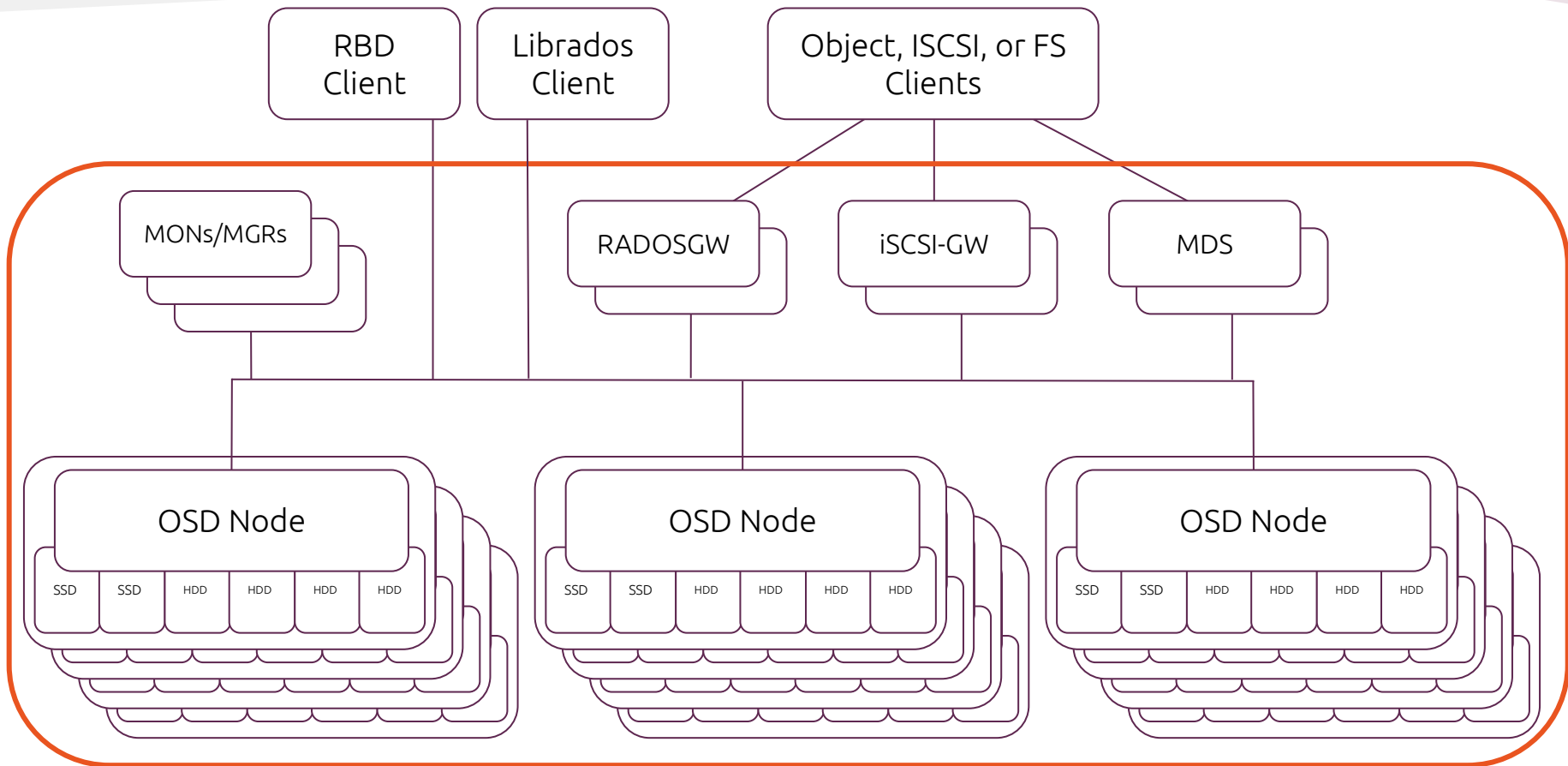
- From full-NVMe to cost effective spinning media, Charmed Ceph works with the hardware suited to customer requirements
- Higher performing Replication or space efficient Erasure Coding (EC)
- Bluestore Compression for cold data
- Bcache: a cache layer in front of every disk

# Data Protection



- RBD Snapshots for point in time recovery
- RBD replication to a secondary cluster
- RGW replication to a secondary cluster

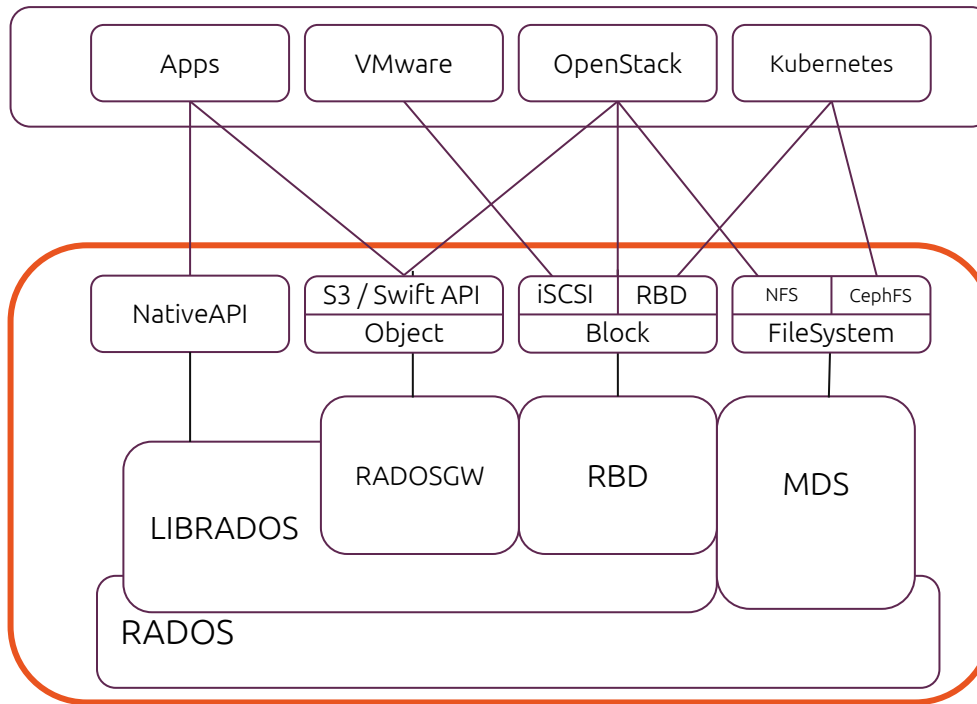
# Ceph Architecture



# Ceph Architecture

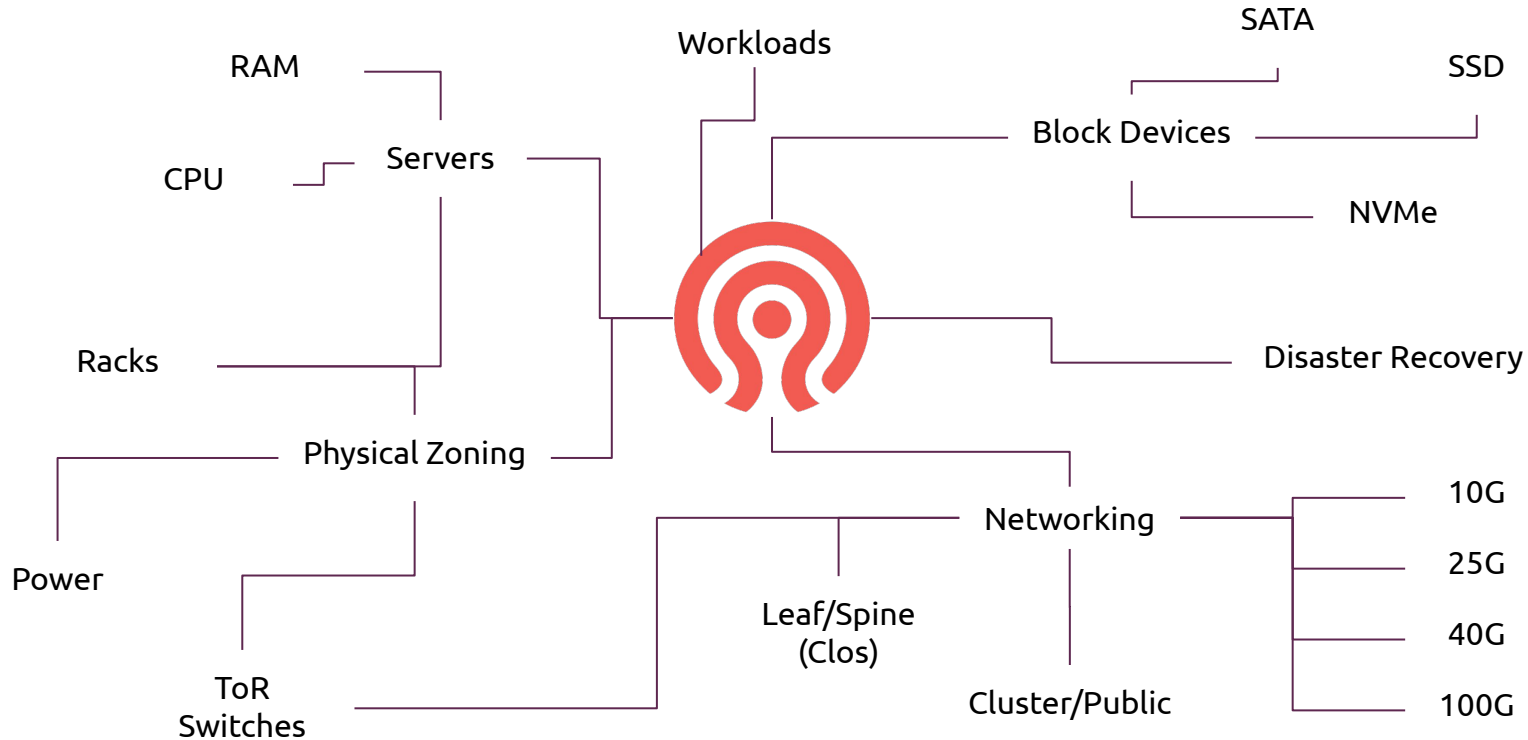


Use Cases



Interfaces

# Things to consider when deploying Ceph



# Automate failure domain settings



Configure Availability Zones in MAAS and our tools will pass that information to each node and set Ceph's Failure Domains accordingly

Infra Nodes

Logging, Monitoring and  
Alert (LMA) Stack



JUJU



MAAS

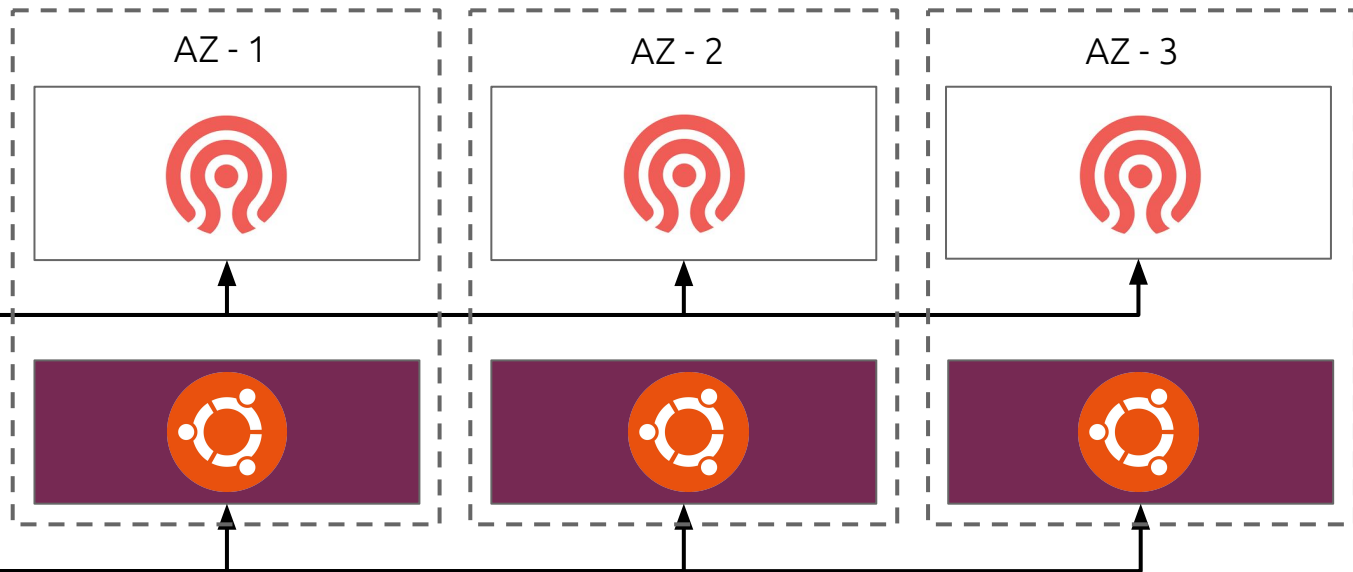
AZ - 1



AZ - 2



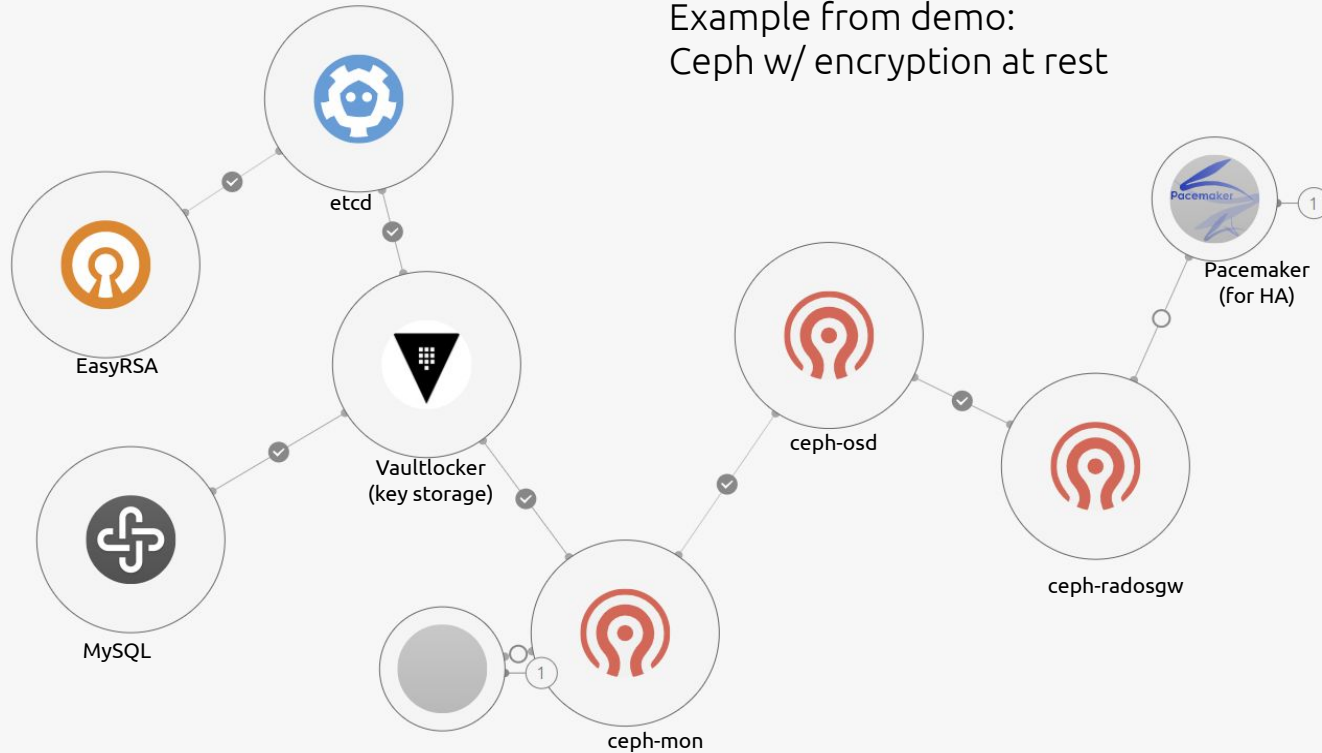
AZ - 3



# Ceph model-driven operations



Example from demo:  
Ceph w/ encryption at rest



# Benefits of Ceph



- Highly Scalable from terabytes to exabytes
- Reliable - No single point of failure in the cluster; fault tolerant through data distribution and replication; and widely used in production
- Configurable and Upgradable - cost/performance optimization via configuration; stay up-to-date and take advantage of new features
- Compatible with Amazon S3 and OpenStack Swift APIs
- Secure - through client authentication and encryption at rest
- AWS Signature 4 (AWS4) support
- Cost effective - Low CAPEX by using commodity hardware; low OPEX through failure detection, self-management and self-healing





# Product



## Ubuntu Ceph

- Included in Ubuntu Advantage for Infrastructure
- Simple and predictable pricing model
- Up to 192 TB of raw storage included per node
- Best pricing in the industry for clusters exceeding this allowance
- Get access to the storage experts 24x7 or on business hours
- Alternatively, get ESM if all you need is peace of mind by consuming security patches from the world's leading security team

## Managed Ceph

- Fully managed storage cluster, on your servers, at your location
- Built in 2 weeks using a proven reference architecture
- Customise the architecture in iterations based on your storage needs
- Your team has access to all machines at all times
- Modern monitoring and log management
- Easy-to-transfer ownership of a turnkey solution

## Charmed Ceph

- Deploy complex Ceph clusters in minutes
- Easily upgrade to newer Ceph versions
- Provide model-driven orchestration for repeatability and predictability
- Configure nodes consistently across various node types
- Replace failing disk drives and retire old hardware
- Expand the capacity of your storage cluster



**AT&T**

*Telefonica*

---

**YAHOO!**  
JAPAN



**BNP PARIBAS**

**Bell**



wellcome  
**sanger**  
institute

**FIS**





Next generation model-driven operations

# Canonical Automation Portfolio

# Canonical automation portfolio



MAAS



Bare metal  
Provisioning

+

Asset inventory

+

Hardware, storage and  
network modelling



JUJU



Software modelling

+

Deployment

+

Operations -  
upgrades, scale  
out/back



Landscape



Package  
management

+

Security Audit

+

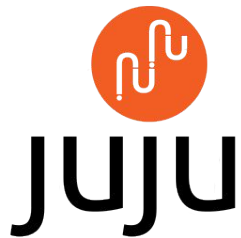
Compliance  
reporting



- 1 Automated **physical provisioning**
- 2 **Dynamic allocation** to workloads
- 3 **IP Address Management (IPAM)**
- 4 Web interface and **REST API**
- 5 **Windows, Linux OS install**



# Juju



- 1 **Deploy and manage**
- 2 **Deploy and scale workloads** to any cloud
- 3 **Powerful service orchestration**
- 4 **Rich web based GUI**
- 5 **Speed**



# Ubuntu System Management



- Inventory of software packages on each machine
- Health monitoring & service scaling based on workload requirements
- Policy-based updates, upgrades for (security) patching
- Audit logs & reports for compliance reporting
- Private software repositories for internal / custom packages
- Manage via CLI or GUI. Or integrate with your existing systems via the API.





Unlocking Open Source

# Ubuntu Advantage for Infrastructure

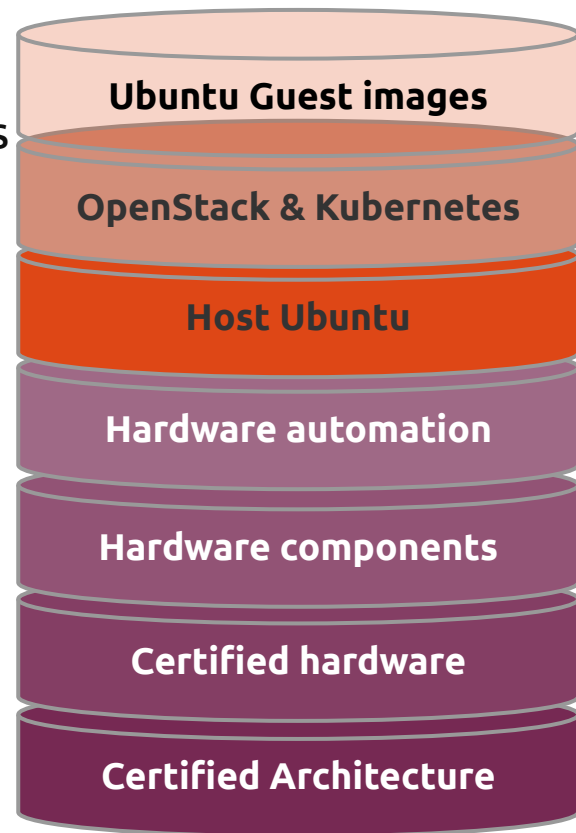
# Ubuntu Advantage for Infrastructure



- **Kernel livepatch access**  
Automated kernel security patching without downtime.
- **Extended Security Maintenance (ESM)**  
A growing list of security updates exclusively available for UA subscribers.
- **Landscape**  
Ubuntu Systems Management at scale for audit and compliance
- **Certified and Secure**  
FIPS compliant crypto libraries, Common Criteria, DISA/STIG, FedRAMP, PCI

# Canonical full stack

- Ubuntu guest images
- OpenStack & Kubernetes Charms, packages, projects
- Ubuntu as a host: Hypervisor, Kernel, Security
- MAAS: Hardware image provisioning
- Firmware: servers, network cards
- Certified hardware
- Certified architectures: X86, ARM64, LinuxONE,  
IBM POWER

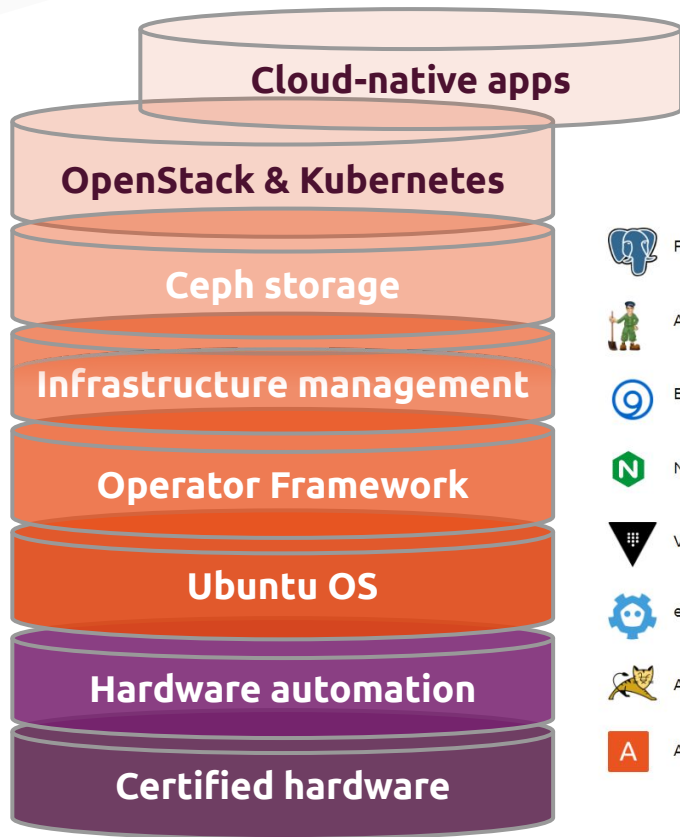




Unlocking Open Source

# Ubuntu Pro + Support

# Cloud native Apps - Ubuntu Pro + Support



These apps are deployed by our charms and we can support these apps within our environments

<https://ubuntu.com/support>



PostgreSQL



MySQL



OpenJDK



Kafka



Apache Zookeeper



RabbitMQ



Memcached



Squid Apache



Bind



OpenLDAP



Nagios



Apache



NGINX



containerd



NodeJS



Mailman



Vault



Grafana



Filebeat



MariaDB



etcd



Telegraf



Prometheus



Graylog



Apache Tomcat



Samba



Kubeflow



Open Source Mano (OSM)



Anbox Cloud



ROS

# Ubuntu Pro + Support

\$3400/yr per machine

## SOLUTION

## SCOPE

Security patching

Ubuntu Main repository

Ubuntu Universe repository

Kernel Livepatch

24/7 support

Ubuntu Server

Kubernetes

LXD

OpenStack

Ceph/Swift

MAAS

Applications

Systems management

Landscape

Compliance and certification

FIPS 140-2 Level 1 certified  
crypto modules

CIS Benchmark

Common Criteria /EAL2





# Infrastructure Economics



# A resilient cloud is an economical cloud



- ✓ **Full stack** support
- ✓ Highly available
- ✓ **Including** upgrades and updates
- ✓ Active infrastructure monitoring
- ✓ Capacity and performance reports
- ✓ **Predictable** cost profile

Thank you. Questions?

