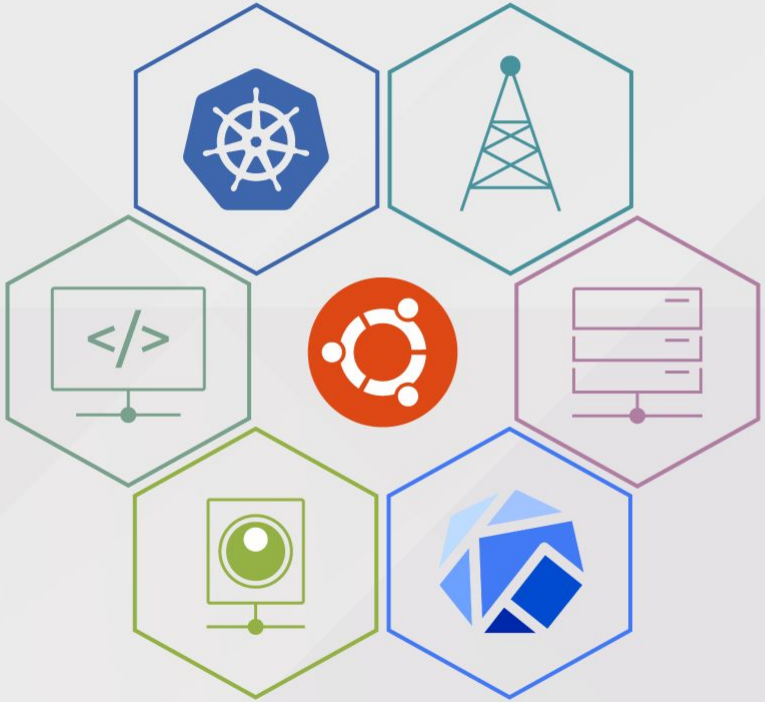
ubuntu
Delivered by Canonical



AI, ML, & Ubuntu

Everything you need to know

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The Basics

What's the difference?

AI

(Artificial Intelligence)

- AI is the term that describes the capability of a machine to imitate intelligent human behavior

ML

(Machine Learning)

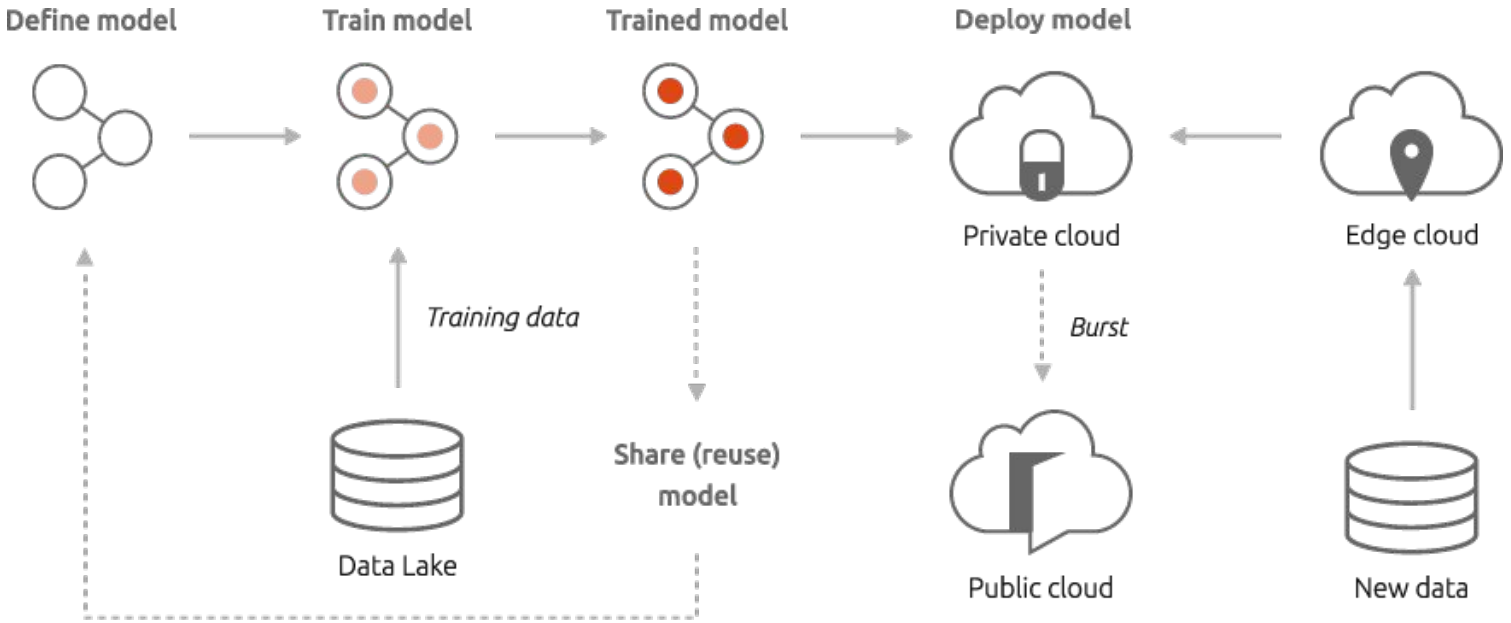
- ML is a process used to achieve AI, designing algorithms that can learn
- Training consists of feeding data to an algorithm and allowing it to adjust & improve over time

DL

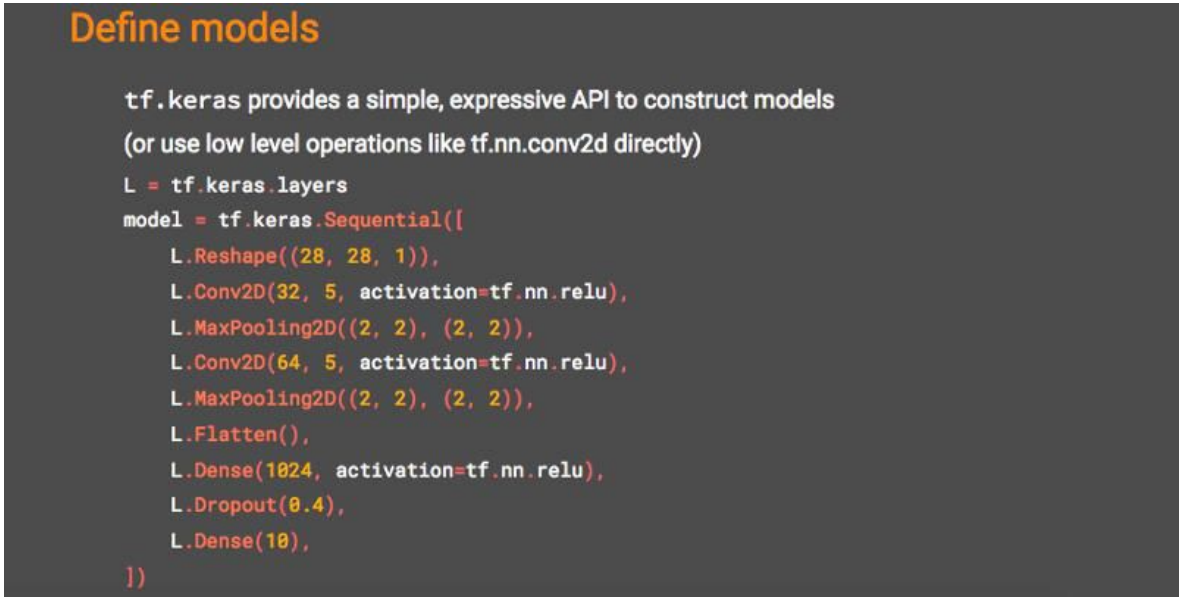
(Deep Learning)

- A subset of ML inspired by how the brain works.
- Deep Learning involves using layers of Artificial Neural Networks
- This creates a human-like logic structure

The training process



Model Example - TensorFlow + Keras



Keras + TensorFlow = easier neural network construction!

Keras is all about user-friendliness and easy prototyping, something old TensorFlow sorely craved more of. If you like object oriented thinking and you like building neural networks one layer at a time, you'll love tf.keras. In just the few lines of code below, we've created a sequential neural network with the standard bells and whistles like dropout

Key Components

Kubeflow

Kubeflow

- Kubeflow helps you build composable, portable, and scalable machine learning stacks. With Kubeflow, businesses can speed up the AI tools and framework installation process, particularly leveraging GPGPUs from Nvidia
- Kubeflow simplifies the process of building production-ready machine learning stacks and reduces the barriers to machine learning by being easy to deploy and reusable

Kubeflow

In partnership with

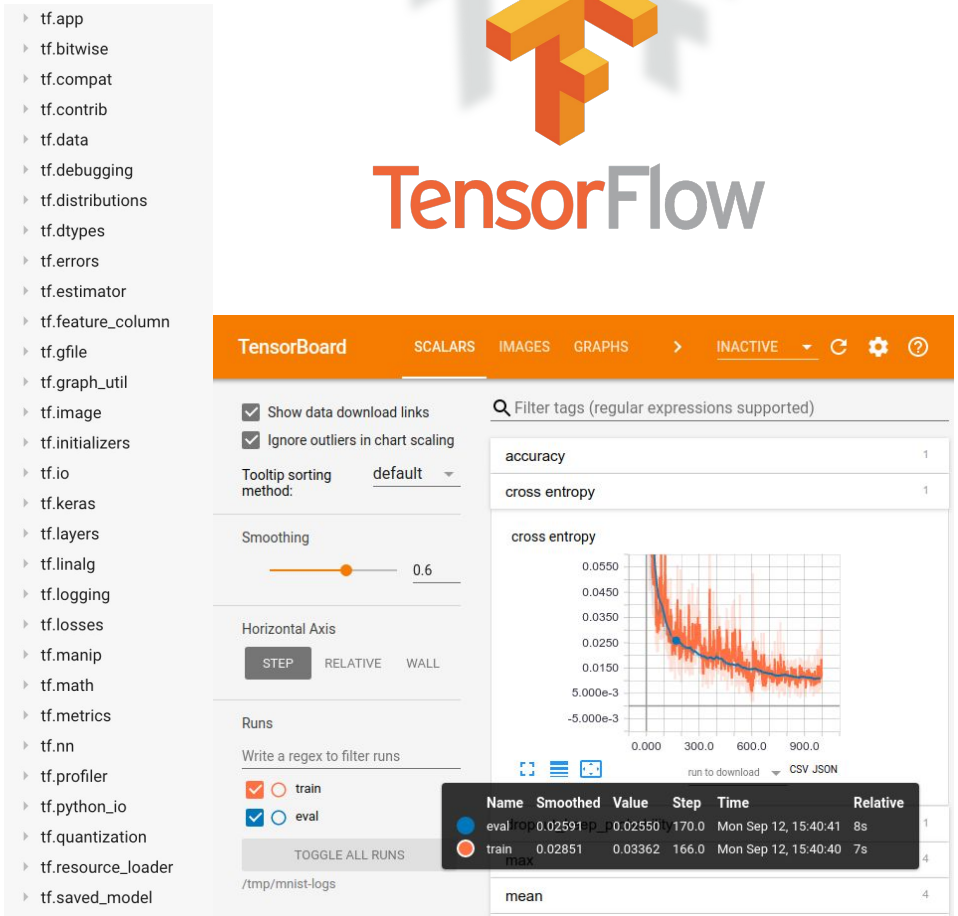
Google

"Canonical has provided both a familiar and highly performant operating system that works everywhere. Whether on-premise or in the cloud, software engineers and data scientists can use tools they are already familiar with, such as Ubuntu, Kubernetes and Kubeflow, and greatly accelerate their ability to deliver value for their customers."

-David Aronchick,
Google Product Manager for Kubeflow

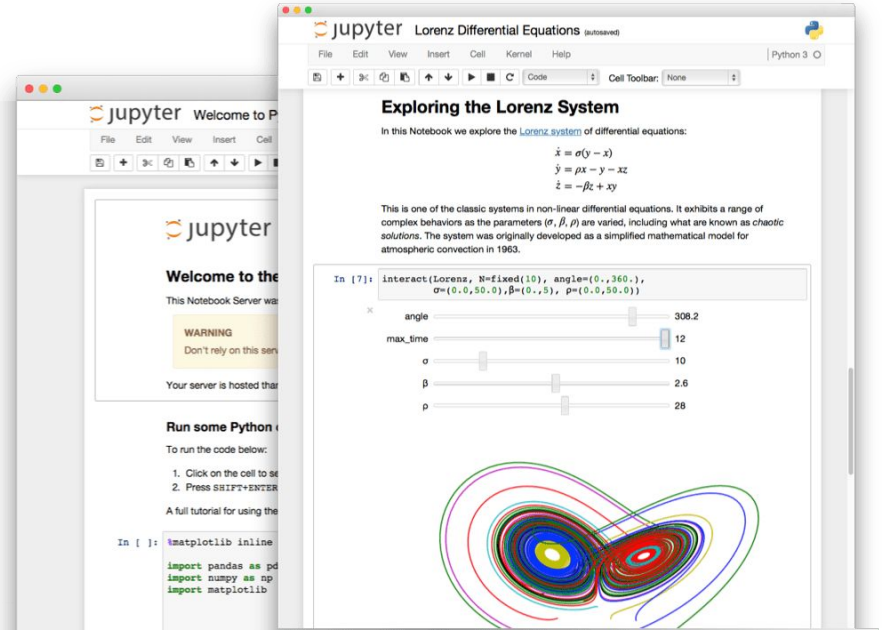
TensorFlow

- TensorFlow is an open source software library for high performance numerical computation
- Its flexible architecture allows easy deployment of computation across a variety of platforms (CPUs, GPUs, TPUs), and from desktops to clusters of servers to mobile and edge devices
- It comes with strong support for machine learning and deep learning and the flexible numerical computation core is used across many other scientific domains



jupyter

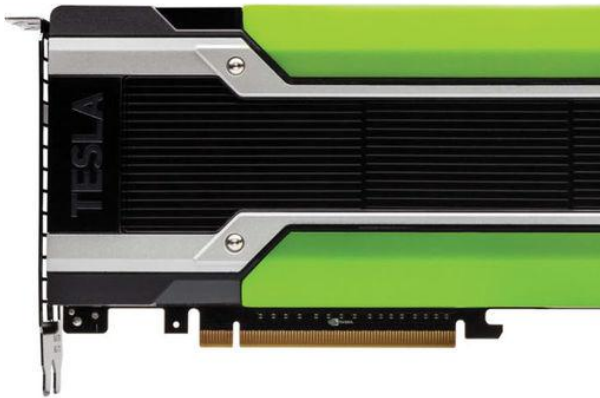
JupyterHub



- With JupyterHub you can create a multi-user Hub which spawns, manages, and proxies multiple instances of the single-user Jupyter notebook server
- Project Jupyter created JupyterHub to support many users. The Hub can offer notebook servers to a class of students, a corporate data science workgroup, a scientific research project, or a high performance computing group

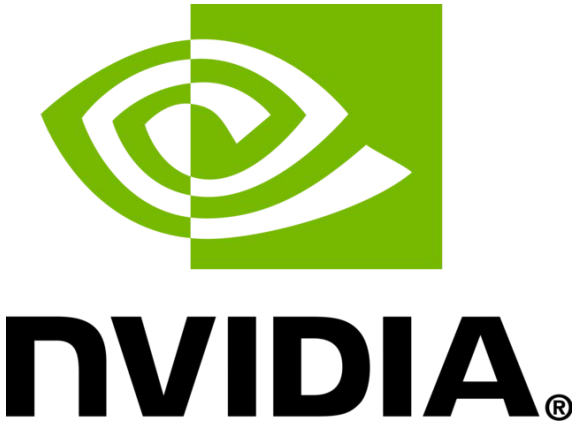
GPGPUs (General Purpose Graphic Processing Units)

- The use of graphics cards for high performance computing tasks as a post to graphical tasks
- Due to the number of individual cores, GPUs can process far more pictures and graphical data per second than a conventional CPU
- This provides significant performance gains for tasks such as machine learning (eg; processing a large bank of images)



"Organizations are increasingly looking to accelerate their deep learning and AI implementations. In addition to using Ubuntu on our DGX systems, we have been working with Canonical to offer Kubernetes on NVIDIA GPUs as a scalable and portable solution for multi-cloud deep learning training and inference workloads."

-Duncan Poole,
Director of Platform Alliances at NVIDIA



Enterprise use cases

Finserv

- The financial industry is finding many exciting use cases for AI / ML. Here are just a few
  - Embedded in ISV & inhouse apps
  - Credit Risk and Market Risk reporting using historical data
  - Real time fraud detection analysing patterns of activity against historical data
  - Analysis of multiple historical resources of transactions and messaging systems to answer regulators
  - Marketing tools providing analysis of clients using multiple set of historical online transaction data

Self Driving Cars

- Self driving cars require extensive AI in order to create reliable and safe autonomous systems
- Autonomous vehicles must be trained in detecting the world around them such as pedestrians, road signs, white lines, objects, and more

Ubuntu is powering autonomous car efforts from Intel, NVIDIA, Samsung, and Baidu

Oil & Gas

- Processing raw data at the source
- Saving time, backhaul, data storage

- Upstream is a giant IoT gateway. Data gathered includes
  - Crown Block / Traveling Block
  - Top Drive, Iron Roughneck
  - Fluid Manifold
  - Mud Line Return & Pump
  - Mud Shaker, Cleaner
  - Mud and Water Tank Reservoir
  - Accumulator Unit
  - Blowout Preventer
  - Rig Lift
  - Winches, Cables for Deck Floor

Healthcare

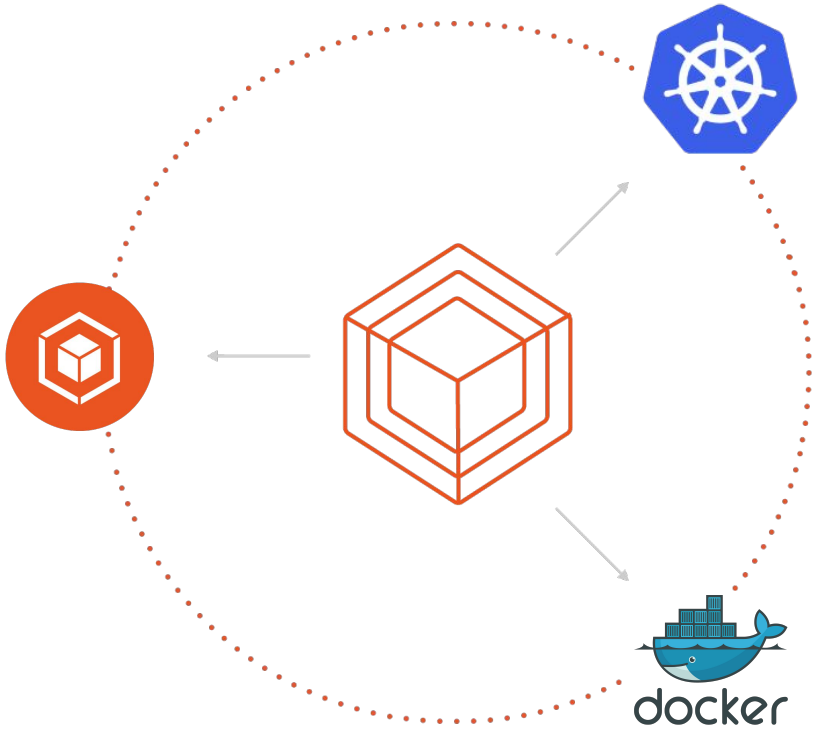
- AI & ML are being used in healthcare for
  - Personal genetics
  - Drug discovery
  - Disease identification and management
- Use case: Using ML algorithms to digest patient records and perform pattern recognition
- Use case: Using ML to understand genetic code
- Potential: Providing better insights

How does Canonical help customers in their AI endeavours?

Ubuntu: The #1 Platform For Containers

LXD

A pure-container hypervisor that runs unmodified Linux guest operating systems with VM-style operations.



Canonical's Distribution of Kubernetes

Pure Kubernetes tested across the widest range of clouds with modern metrics and monitoring, brought to you by Canonical

Docker Engine on Ubuntu

Docker Engine is a lightweight container runtime with robust tooling that builds and runs your containers. **Over 65% of all Docker-based scale out operations run on Ubuntu.**

We help enterprises run containers at scale, on public, private and bare metal clouds.

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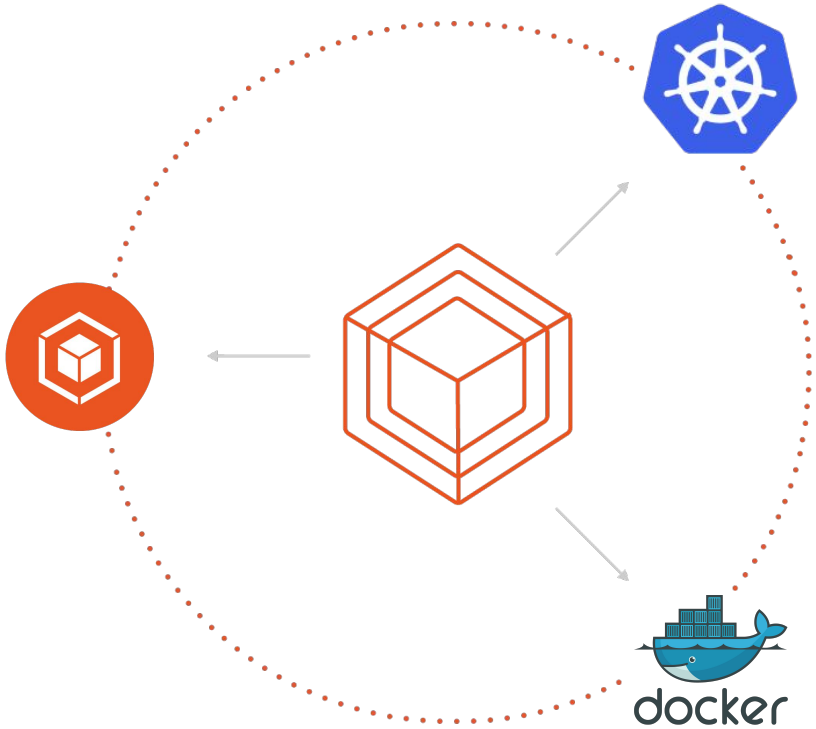

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Canonical’s distribution of Kubernetes


Pure upstream, latest & greatest versions


Operates on AWS, Azure, GCE, OpenStack, VMWare


Bare metal operations with MAAS


100% compatible with Google’s Kubernetes


Secured. TLS, Kernel Live patching, confinement


Upgradable between each Kubernetes Release


Cost effective at scale

Developing on Ubuntu

Develop AI models on high-end Ubuntu workstations

Train on racks of bare metal Kubernetes or public clouds with hardware acceleration

Deploy to edge & IoT

Workstation

Rack

Cloud

IoT

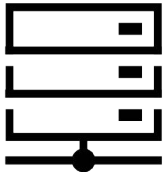
All on Ubuntu, delivered by Canonical

Ubuntu Desktop for workstation AI

- Accelerate data science
- Lightest footprint
- Laptop to workstation
- GPGPU optional
- Develop and test AI

Ubuntu-certified workstations from Dell and HP with NVIDIA, microk8s and Kubeflow

mxnet Microsoft CNTK NVIDIA Caffe ONNX TensorFlow intel go MAHOUT PYTORCH OpenCV



Bare metal AI

Kubernetes on bare metal with NVIDIA GPGPU acceleration

- Highest performance
- On-premise with local data
- Hardware recommendations
- Fully managed options

NVIDIA DGX-1

Canonical Cloud AI

Kubeflow on Kubernetes on Openstack with NVIDIA GPGPU acceleration

- Maximize benefits of OpenStack
- On-premise with local data
- Hardware recommendations
- Fully managed options

Public cloud AI

Google Cloud Platform

In partnership with Google GKE

Google and Canonical together enable smooth hybrid operations between Google's Container Engine (GKE) service with Ubuntu worker nodes, and Canonical's Distribution of Kubernetes

GKE on Ubuntu with NVIDIA GPGPU acceleration

- Effectively infinite scale
- Portable workloads
- Fastest cloud ML

aws

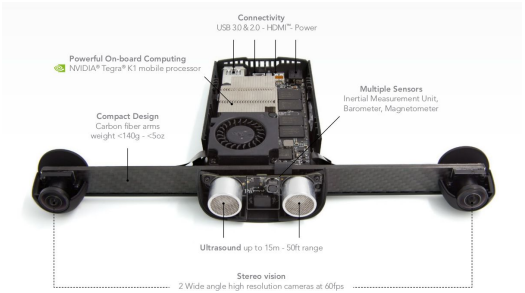
Azure

Inference devices at the edge

Ubuntu gives you a seamless operational framework for development, training and inference all the way out to the edge

Smart camera: Amazon Deeplens

- Familiar developer environment
- Deep integration with cloud service
- Store of “inference models”



Autonomous Drone: Parrot

- ROS support
- Fast time to market
- Robotic appstore: future proof business model

Setup, training, and support

Getting started with Kubernetes

Canonical offers three service packages to help you launch your Kubernetes strategy

Kubernetes Explorer

$19,500 one off fee

Our three-day training on Canonical Kubernetes and tooling, helping you ramp up your Kubernetes skills and get you ready to deploy in your own environment.

What's included:

- Kubernetes and Container basics
- Reference architecture
- Deployment on multiple substrates
- Security and patching
- Monitoring and logging
- Lifecycle management
- Backup and recovery

Kubernetes Discoverer

$45,000 one off fee

Get up and running in one week with a customised architecture to fit your requirements, including deploying on virtualised environments, private and public clouds.

What's included:

- High availability Kubernetes, deployed on Public Cloud, VMware, OpenStack
- Custom Kubernetes architecture optimised for your workloads
- Calico, Canal, Flannel networking
- 3 days on-site in-person Canonical Kubernetes training

Kubernetes Discoverer Plus

$95,000 one off fee

Be up and running in three weeks with a production-grade Kubernetes cluster with a modular ecosystem to fit your requirements. Deploy virtualised or bare metal.

What's included:

- High availability production-grade Kubernetes, deployed on Public Cloud, VMware, OpenStack, or Bare metal
- GPU acceleration
- Storage for persistent volumes
- Custom Networking options
- Management platform
- Private Registry
- Load balancers
- Application Catalog
- 2 days on-site in-person Knowledge Transfer to Kubernetes Operators

ubuntu.com/kubernetes

AI & ML Support from Canonical

Available with:

- Kubernetes Discoverer
- Kubernetes Discoverer Plus

Workshop

$40,000 one off fee

One additional day on Kubeflow, including Tensorflow and JupyterHub, covering everything your business needs to know to have a full on-prem/off-prem AI/ML game plan.

- On site or remote options
- Hands-on K8s and Kubeflow
- Full pipeline view
- ML / Data science assessment

ML / Data Science Assessment

$40,000 one off fee

Canonical will leverage its network of data science partners to deliver an AI assessment as part of the workshop with options for ongoing engagement post-deployment.

- Understand AI lifecycle
- Preliminary AI discovery
- Development assessment
- Deploy and operate analysis
- Finalize initial AI strategy

Enterprise Support with Ubuntu Advantage

	UBUNTU	UBUNTU ADVANTAGE FOR KUBERNETES		MANAGED KUBERNETES
	WITHOUT SUPPORT	STANDARD	ADVANCED	MANAGED
Price per node (physical) *	$0	$600/year	$1,200/year	$4,380/year
Price per node (virtual) *	$0	$200/year	$400/year	$1,460/year
Phone and web ticket support	None	8am – 6pm on weekdays	24 hours a day, everyday	24 hours a day, everyday
Industry-leading cloud operations tooling (Ubuntu, MAAS, Juju, LXD)	✔	✔	✔	✔
Deploy, run, scale, upgrade K8s	✔	✔	✔	✔
Monitoring and logging		✔	✔	✔
Landscape Management		✔	✔	✔
Livepatch		✔	✔	✔
Knowledge Base		✔	✔	✔
High availability support			✔	✔
Remote operations, smart alerts and proactive monitoring by Canonical's cloud experts 24 hours a day, everyday				✔
Disaster recovery				✔

* Minimums apply

Key Takeaways

CANONICAL

Questions please

Thank you

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