



# The Future is Distributed

How distributed computing reduces costs, improves scalability and increases sustainability



# The Different Types of Cloud

WHERE DOES DISTRIBUTED COME IN?

PUBLIC CLOUD



PRIVATE CLOUD



HYBRID CLOUD



DISTRIBUTED CLOUD  
COMPUTING





# How it Works

## DISTRIBUTED COMPUTING

SPLITTING WORKLOADS

SETI @ HOME

INDEPENDENT VS CONNECTED

SPEED VS COST



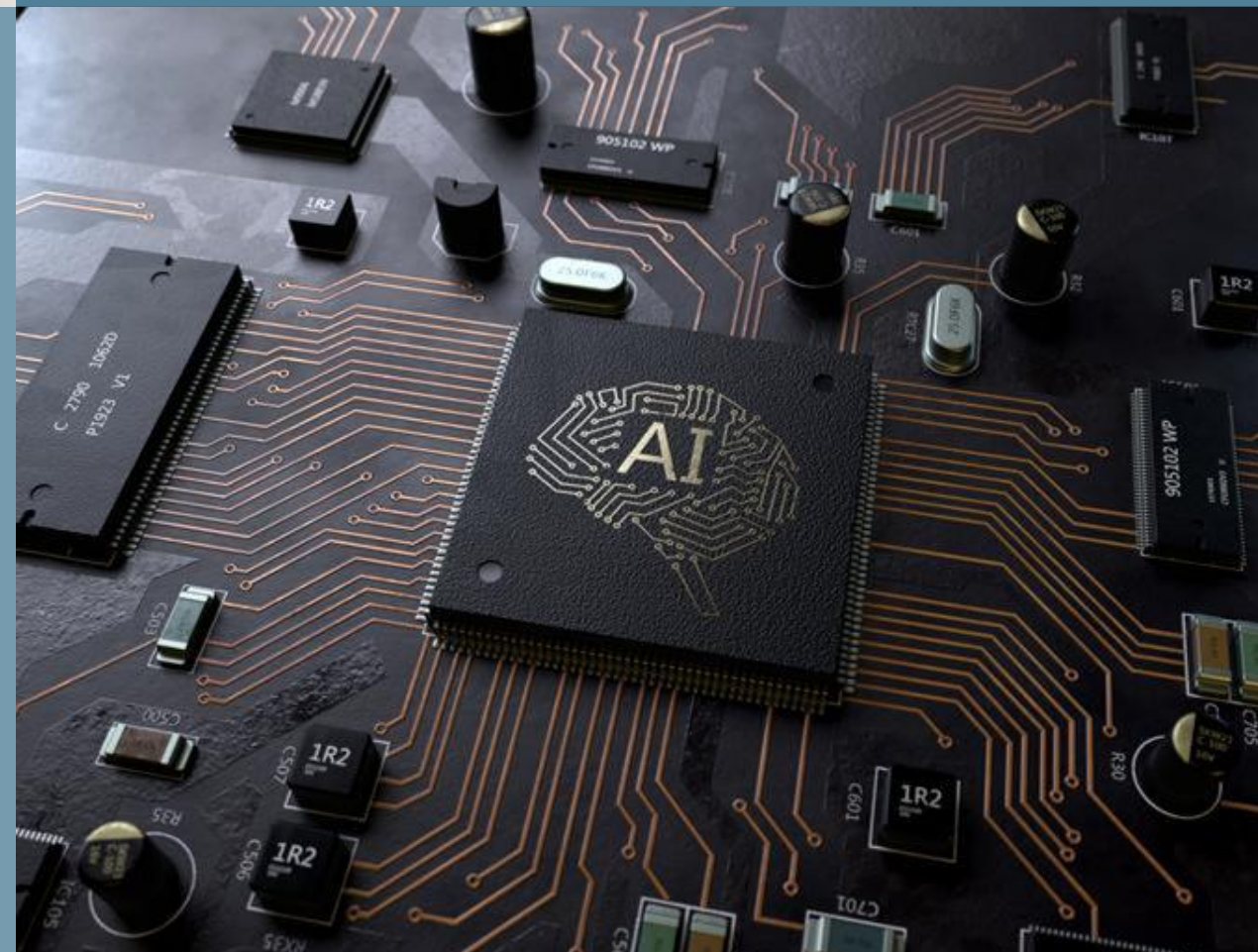


## VIDEO RENDERING & STREAMING



## IOT

## AI & MACHINE LEARNING



## DATA ANALYSIS



## IMAGE ANALYSIS



## SCIENTIFIC AND MEDICAL RESEARCH



# The CO<sub>2</sub> Impact of Computing

## SERVER IMPACT

Impact to produce a high-end server is 1,300 kg CO<sub>2</sub>e

## COAL ENERGY

1,800 kg CO<sub>2</sub> to run a high-end server on coal for 1 year

## DATA CENTRE IMPACT

CO<sub>2</sub> to build a data centre to house a high-end server is 100 kg CO<sub>2</sub>e per server

## HYDRO ENERGY

Nominal kg CO<sub>2</sub> to run a high-end server on hydro for 1 year



# Statistics of Unused Capacity

## DATA CENTRE



Typical 30-50% spare capacity

## ENTERPRISE



Typical 80% spare capacity

## HOME DEVICES



Typical 70-80% spare capacity



# Performance and Cost of Different Platforms

Comparison Pricing for ~70 TFLOPs of Compute

	Spot monthly cost	Non-Spot Monthly Cost	Savings of using spot	Saving over most expensive monthly option
<b>AWS (Spot)</b>	\$2,651.65	\$5,256.58	49.56%	73.25%
<b>GCP (Preemptible)</b>	\$2,511.20	\$5,968.48	57.93%	74.67%
<b>Azure (Low Priority)</b>	\$1,460.45	\$9,912.00	85.27%	85.27%
<b>Cudo</b>	\$576.00			94.19%

# Decentralised Infrastructure



## Splitting

Split work out as multiple tasks



## Failover

If a task fails, failover to another node  
Reproducible code



## Scheduler

Run a scheduler to manage tasks



## Deployment Manager

Deploy new VMs/images/Code to available compute. Scale up/down as needed E.g. Terraform, Kubernetes





## LOCATION AWARE ROUTING

Run closer to the edge, lower latency, less backbone impact



## GEOGRAPHY & SCALE

Geography and data sovereignty. Increased ability to scale compute and data analysis



## COST

Reduction of up to 95%

**Cost Neutral**



## ENVIRONMENT

Minimising CO2 impact

# BENEFITS



Automated fulfillment of spare capacity	Automated monetisation of spare capacity
Capacity 2020 <ul style="list-style-type: none"> <li>● &gt;1 million GPUs</li> <li>● &gt;1m CPUs</li> <li>● 100's PB's bandwidth</li> <li>● 145 countries</li> </ul>	24x7 Automated Revenue <ul style="list-style-type: none"> <li>● Available Capacity</li> <li>● Time of Day settings</li> </ul>
Locate within ms of location	Automated or manual pricing
Virtually unlimited scalability	Integrate engine into software development
Up to 95% savings	Cost Neutral: Be your own compute UPS
Better for the environment	Elect to become carbon Neutral

CUDO





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