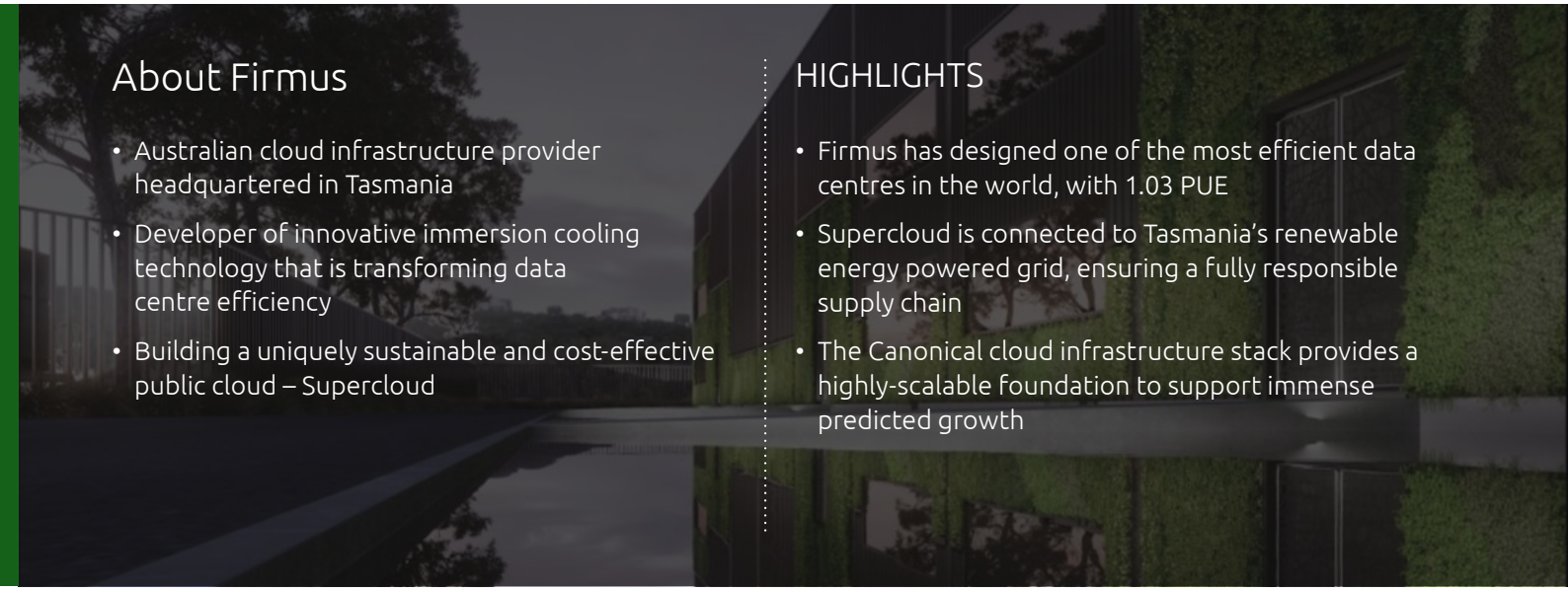
CANONICAL

Firmus redefines cloud sustainability with ultra-efficient data centre powered by grid connected renewable energy



About Firmus

- Australian cloud infrastructure provider headquartered in Tasmania
- Developer of innovative immersion cooling technology that is transforming data centre efficiency
- Building a uniquely sustainable and cost-effective public cloud – Supercloud

HIGHLIGHTS

- Firmus has designed one of the most efficient data centres in the world, with 1.03 PUE
- Supercloud is connected to Tasmania's renewable energy powered grid, ensuring a fully responsible supply chain
- The Canonical cloud infrastructure stack provides a highly-scalable foundation to support immense predicted growth

firmus

The benefits of cloud need not come at the cost of the environment.

Cloud data centres are some of the most egregious offenders when it comes to emissions and environmental impact. With demand for cloud computing rising exponentially, overcoming climate challenges requires a fundamental change in data centre technology – and Firmus has the answer. Built around a uniquely efficient immersion cooling system, powered by majority renewable energy, and leveraging open-source solutions, Firmus' Supercloud sets a new precedent for sustainable public clouds.

Challenge

The rise of cloud has led to transformations in computing, business, and even our daily lives. Reduced costs, improved agility, and enhanced security are just a handful of the benefits that cloud offers, so it is no surprise that demand for the technology is growing every day. However, the price of progress is environmental impact.

Data centres are responsible for a staggering 2% of global greenhouse gas emissions, and that number is rising. This is largely due to the inefficiency of traditional data centre designs. The worldwide average for data centre energy efficiency is 1.59 power usage effectiveness (PUE).[1] This means that for every megawatt that is spent powering computers, the data centre requires an additional 590 kilowatts to run ancillary building support systems – mostly cooling - that needs to remove the vast amount of heat that the computing IT load generates. This value has been stagnant for some time, resulting in inefficient data centres that are costly to operate, costly to access, and costly to the planet.

This is the challenge that Firmus is working to solve.

Initially, the company set out to develop a more sustainable approach to mining bitcoin – one of the most power-intensive computing workloads in the world. The project led to the inception of an innovative new immersion cooling solution: submerging servers in a bath of non-conductive, biodegradable fluid that is approximately 1000 times more effective at wicking away heat than air.

Tim Rosenfield, CEO and Co-Founder of Firmus, takes up the story: “We quickly realised that our immersion cooling discovery had applications beyond cryptocurrency, and we began exploring what the technology could do for the data centre industry and for clouds. We ended up with a product that is arguably the most efficient data centre design in the world, coming in at 1.03 PUE, as well as amongst the most capable. At 100KW hosting capacity per 45RU immersion rack, Firmus’ technology is uniquely suited to hosting GPU and heavy and power-intensive AI servers that are used with increasing frequency for breakthroughs in science, industry and human endeavour.”

Firmus saw that the efficiency of its Supercloud data centre design would enable it to offer a public cloud product at a price point sustainably lower than the rest of the market, and the company immediately set about putting its idea into practice.

“Immersion cooling clearly had a lot of long-term potentials,” explains Tim Rosenfield, “But by building a public cloud, we also saw an opportunity to start benefiting Australians right away.”

1 Uptime Institute, Global Data Center Survey 2020

Solution

> "The level of engagement from the Canonical team was remarkable. Even before we entered into a commercial agreement, Canonical offered valuable advice around OEMs and hardware choices. They were dedicated to our project from the get-go."
>
> – Tim Rosenfield, CEO and Co-Founder, Firmus

Pursuing its vision of a sustainable public cloud, Firmus chose to build its data centre in Tasmania, an island powered exclusively by renewable energy. With the data centre coming to life, the next step was building the cloud infrastructure.

"From the outset, open source was a must, and OpenStack was our platform of choice," recalls Tim Rosenfield. "Our team is passionate about the industry, and we believe that open source keeps the momentum going in critical projects like this one."

To help design and deploy its OpenStack cloud, Firmus needed a partner that understood the scope of what it was trying to achieve and possess extensive technical expertise. Of all the vendors that the company evaluated, Canonical stood out as the most impressive.

"We felt that, from a technical perspective, Canonical could grow with us," says Tim Rosenfield. "And the level of engagement from the Canonical team was remarkable. Even before we entered into a commercial agreement, Canonical offered valuable advice around OEMs and hardware choices. They were dedicated to our project from the get-go."

This engagement gave Firmus the confidence to choose the full Canonical cloud infrastructure stack – including Charmed OpenStack and Charmed Kubernetes – and tasked Canonical with building and supporting the ecosystem.

Results

> "We believe that our approach to cloud computing will have global appeal, and we hope that it will serve as a benchmark for a more responsible industry."
>
> – Tim Rosenfield, CEO and Co-Founder, Firmus

Firmus worked with Canonical to deploy and test its initial cluster, and Supercloud entered a beta phase in early 2022. With an OpenStack hypervisor backbone, Supercloud launches with its Sustainable Compute Engine (SCE), Sustainable Cloud Storage (SCS), and infrastructure platform including Supercloud Workspace Images (SWI), Kubernetes on SCE & Kubeflow on SCE. Thanks to a sustainability advantage, Supercloud is able to bring these products to the IaaS market at price materially lower than existing providers.

Firmus' data centre will begin with a 20-megawatt IT load, with plans to double to 40 megawatts within six months.

"Given the price point and value we're offering, we expect that the market will receive Supercloud well," explains Tim Rosenfield. "And thanks to the Canonical suite, we'll have a strong and flexible foundation to scale from."

In addition to scalability, Charmed OpenStack and Charmed Kubernetes will deliver the automation that Firmus needs to manage, update, and secure its public cloud seamlessly. What's more, combining the Canonical solutions with other leading-edge technology, such as Nvidia GPUs, will ensure that Supercloud can provide a highly performant service capable of supporting even the most demanding AI workloads.

The most important proposition of all, however, is the effect that Supercloud's end-to-end sustainability will have on its users' carbon emissions.

"If the planet is to survive, there needs to be a fundamental shift in the way we look at our carbon footprint," concludes Tim Rosenfield. "In terms of both cost and environmental impact, an hour of compute with Supercloud is materially different to an hour of compute with other clouds today. We believe that our approach to cloud computing will have global appeal, and we hope that it will serve as a benchmark for a more responsible industry."

ubuntu
Delivered by Canonical