



OpenCloud

Sustainable cloud infrastructure for greener IT

Sustainability

<https://opencloud.eu>



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OpenCloud: Sustainable cloud infrastructure for greener IT

Our digital world is growing, and with it, our appetite for energy. Data centres have long been among the world's largest consumers of electricity, with cooling and short hardware cycles driving CO₂ emissions even higher. At the same time, regulatory pressure on IT decision-makers is growing: ESG guidelines, green IT strategies and sustainability reports make ecological action measurable in IT as well.

OpenCloud shows that sustainable IT is not incompatible with high performance. The platform uses energy efficiently, reduces hardware requirements and runs stably and quickly even on existing infrastructure – whether on a small mini-computer such as the Raspberry Pi or in large data centres. This is made possible by a modern, database-free architecture with compiled code and clearly separated microservices for maximum performance with minimum consumption.

In October 2025, OpenCloud was awarded the Blue Angel, the German government's eco-label for particularly energy- and resource-efficient software. This sends a strong signal: OpenCloud proves that digital innovation and responsibility go hand in hand. It's not about growth at any price, but about acting in an open, efficient and resource-saving manner.

OpenCloud is based on a fork of the open source software 'ownCloud Infinite Scale' (OCIS), whose components were co-developed by developers from the science organisation CERN and other active contributors. OpenCloud is now being further developed by the Heinlein Group with new ideas and a clear focus on data protection, interoperability and sustainable digitalisation.

Why sustainability matters in IT

Servers, databases, networks – all of these require energy. The global electricity consumption of data centres has been growing steadily for years. At the same time, the demands on IT infrastructures are increasing, data volumes are exploding, and ever shorter innovation cycles mean that hardware is often replaced long before it is technically obsolete. The result: rising costs, growing energy requirements and an ecological footprint that is difficult to justify.

IT departments are under particular pressure today: they must provide powerful systems while simultaneously reducing costs and meeting sustainability goals. This calls for new strategies: away from pure growth and towards conscious use of resources and long-lasting structures.

Major challenges faced by modern IT

High energy consumption

Data centres are among the largest consumers of electricity worldwide. Every query, every backup and every upload costs energy.

Increasing cooling requirements

More powerful systems and denser data centres generate more waste heat. Keeping them running smoothly requires complex cooling systems, which consume additional energy.

Short hardware life cycles

Many components are replaced even though they are still working.

Technological dependencies

Those who rely on closed systems often cannot decide for themselves how long hardware or software will be used.

Sustainability pressure

Organisations must demonstrate how environmentally friendly their IT is: in sustainability reports, ESG requirements or internal strategies.

Architecture that preserves resources

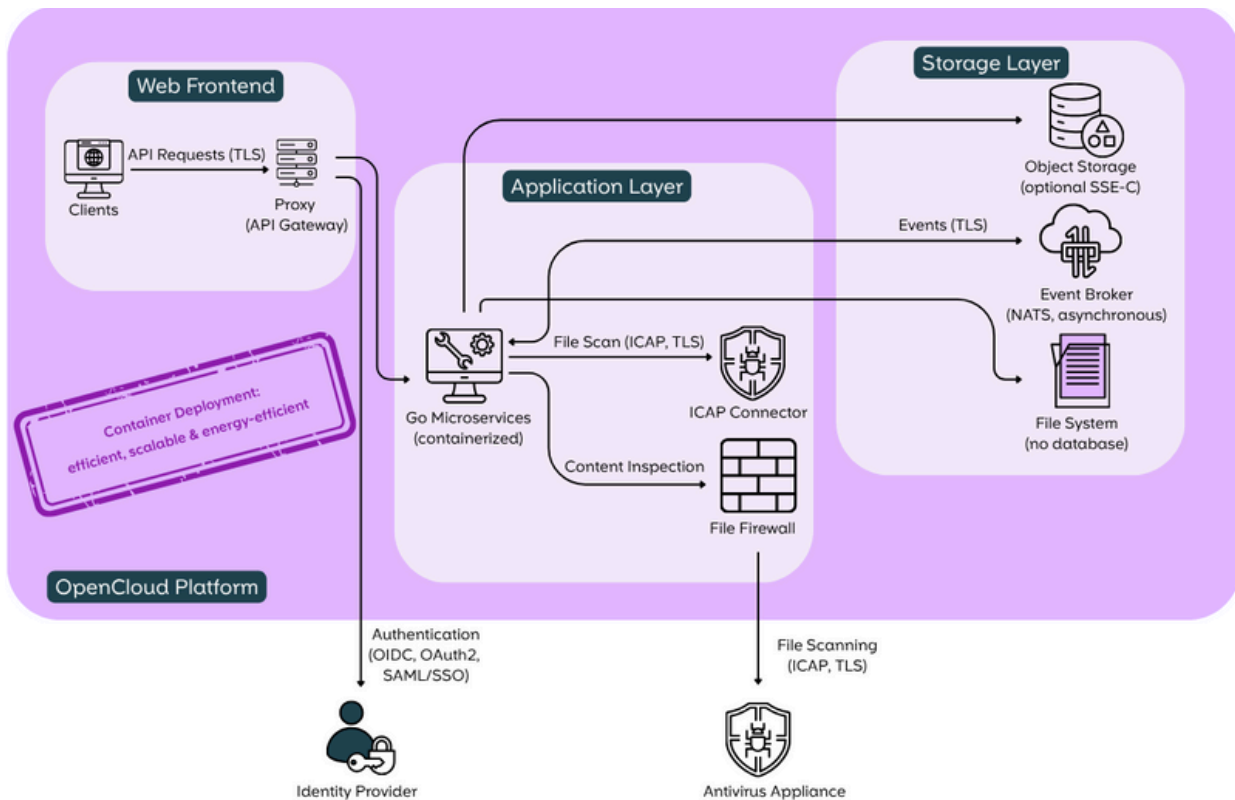
High performance does not come from more powerful hardware, but from clever architecture. OpenCloud uses energy efficiently because every component of the platform is precisely tailored to its purpose. Instead of wasting computing power, it is used where it is really needed.

The most important principles are:

- 1. Compiled Go code:**
OpenCloud is developed in Go. The code runs directly on the machine without having to go through an interpreter. This saves computing time and electricity.
- 2. No database:**
Metadata is stored directly in the file system or object storage. This reduces complexity and lowers energy consumption.
- 3. Container architecture:**
Each service runs in isolation and can be scaled individually. This allows the system to grow in a targeted manner without having to reserve unnecessary resources.
- 4. Asynchronous communication:**
Services exchange information in parallel via the internal NATS event broker. Processes do not block each other, and the platform remains efficient even under load.
- 5. Measurable effect:**
Internal benchmarks show that OpenCloud requires up to 30% less CPU power than interpreter-based systems in continuous operation, resulting in significantly lower energy consumption.

Architecture that preserves resources

The secure architecture of OpenCloud



OpenCloud achieves efficiency not through more powerful servers or more tuning, but through intelligent software. The architecture is designed from the ground up to save energy and conserve resources – a real advantage for sustainable IT infrastructures.

Measurable efficiency

Sustainability is evident not only in the concept, but also in concrete results. In internal benchmark tests, OpenCloud was compared with interpreter-based platforms. The result: with the same user load, OpenCloud requires around 25 to 30 percent less CPU power and thus also less energy.

The reason for this lies in the architecture: compiled Go code, asynchronous communication and the absence of a relational database result in significantly lower computing costs. Since energy consumption and CPU utilisation are closely related in data centres, this efficiency advantage pays off immediately – in lower power consumption and reduced cooling requirements.

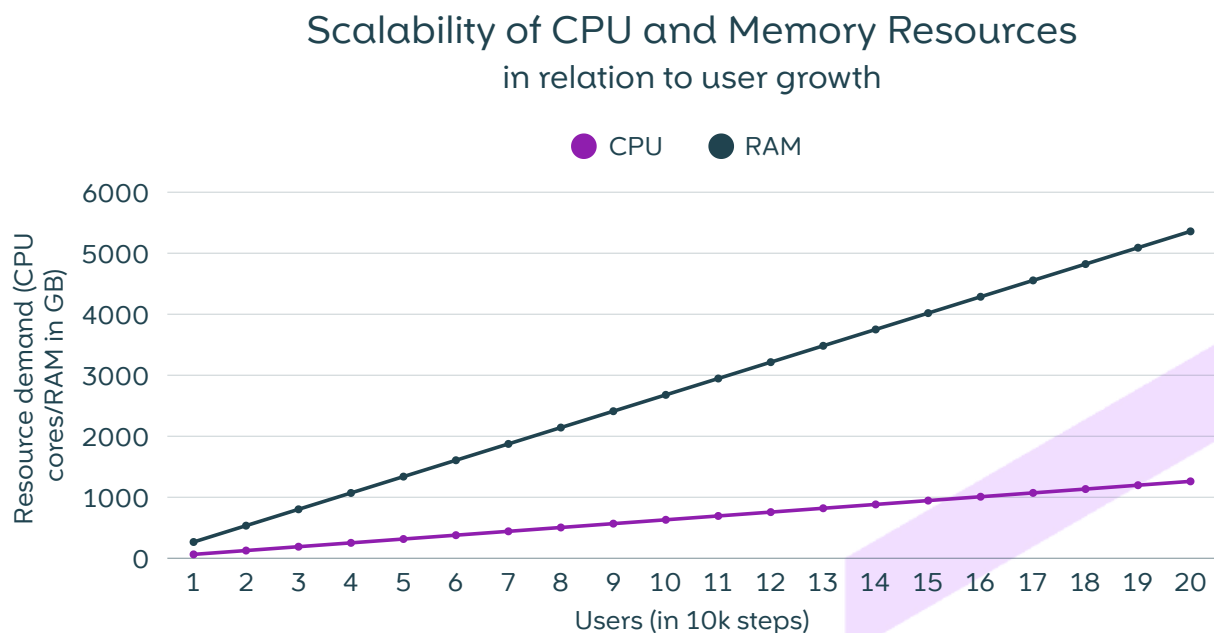


Diagram 1: Linear scaling of CPU and RAM utilisation. The measurements show that OpenCloud uses resources proportionally to the number of users – without any drop in performance or energy efficiency.

CPU and RAM requirements increase linearly and predictably with the number of users in OpenCloud. This means that the platform grows with usage without wasting resources. Efficiency remains measurable and sustainability becomes an integral part of the design.

Sustainable due to modularity and open design

Technical sustainability also means that systems must be able to adapt without constantly requiring new hardware or complete reinstallations. This is precisely why OpenCloud has a modular structure. Each component runs as its own container and can be updated, replaced or scaled independently of the others.

This makes the platform not only flexible, but also durable. New functions can be added without having to change existing structures. Updates require no downtime and place hardly any strain on the system – a clear advantage in terms of efficiency and service life.

Open standards also ensure that OpenCloud works with different storage systems, authentication services and security solutions. Whether POSIX file system or S3-compatible object storage: the platform integrates seamlessly into existing infrastructures, thus extending their service life.

This openness is a central component of sustainable IT and the basis of digital sovereignty. It protects against dependencies, enables long-term planning and ensures that systems can be operated reliably and efficiently for many years – an important contribution to economic and ecological responsibility.



Certified: The Blue Angel

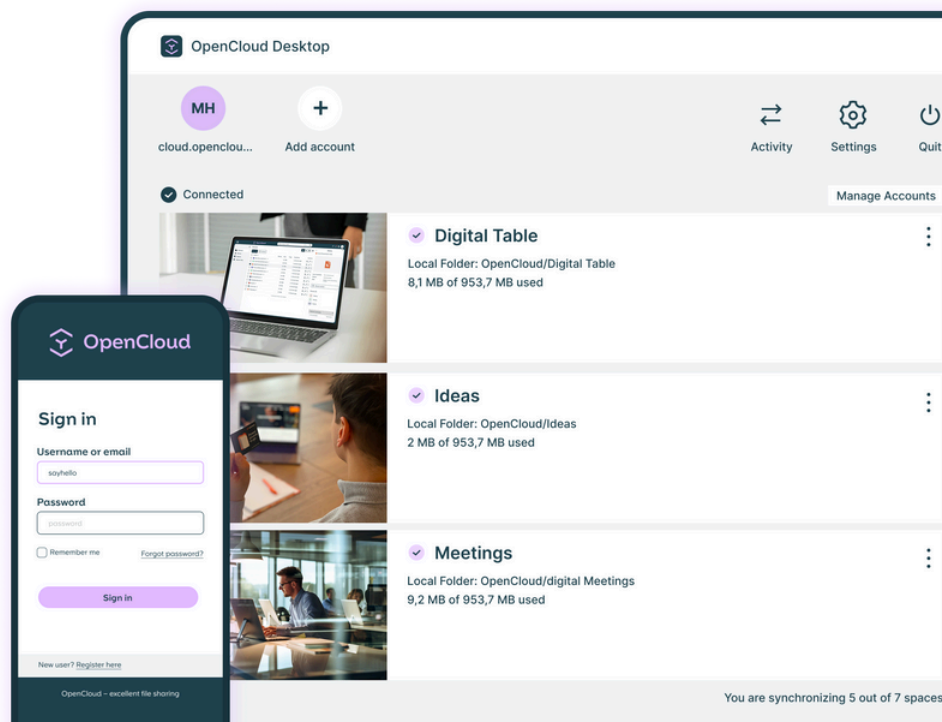
Sustainability is not just a buzzword at OpenCloud, but something that has been tested and certified. Since October 2025, the platform has carried the Blue Angel environmental label (DE-UZ 215) for resource- and energy-efficient software. The German government's seal of approval recognises applications that use energy sparingly, extend the useful life of hardware and promote transparency in operation.

With this certification, an independent body confirms that OpenCloud meets the key criteria: energy efficiency, durability, resource conservation and transparency. This officially confirms what has long been evident in practice – sustainable software can be powerful, secure and open at the same time.



www.blauer-engel.de/uz215

- energie- und datensparsam
- abwärtskompatibel und gesicherte Updates
- werbe- und trackingfrei



Overview: How OpenCloud ensures sustainability

Function	Description
Energy-efficient architecture	Compiled Go code and asynchronous processes reduce energy consumption during operation.
Resource-efficient operation	Containers only start when needed; unused services remain inactive and do not consume energy.
Long-lasting systems	Updates and maintenance can be carried out without interruption, which extends the service life of the infrastructure.
Reuse of existing hardware	OpenCloud also runs stably on older systems, saving you the cost of new purchases and disposal.
Flexible storage options	Support for POSIX file systems and S3-compatible object storage enables sustainable use of existing storage solutions.
Predictable scaling	CPU and RAM requirements increase linearly with usage. Resources are used in a targeted manner instead of being oversized.
Transparent operation	Open standards and transparent processes ensure digital sovereignty and make sustainability verifiable.

Sustainability as part of digital sovereignty

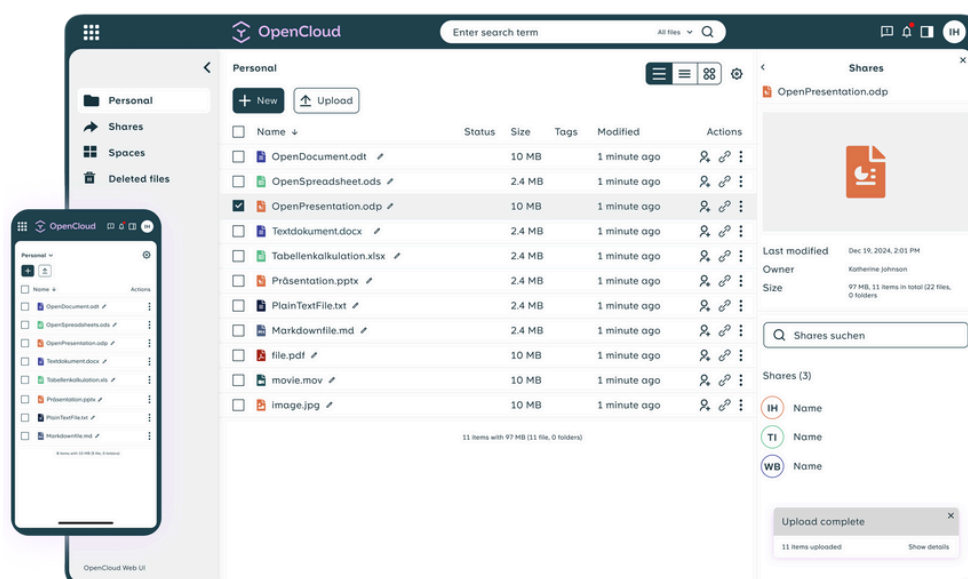
Open software is the key to digital sovereignty and, therefore, sustainable IT. If you go with open standards, you won't be tied to any specific cloud and can keep control of your data and systems.

OpenCloud demonstrates that both are possible: modern technology and responsible use of resources. The platform is transparent, flexible and durable. The open approach enables organisations to develop, adapt and operate their own solutions in the long term.

Sustainable. Efficient. Future-proof. OpenCloud combines environmental responsibility with technical strength – for organisations that see sustainability as part of their digital strategy.

Would you like to make your IT more sustainable and independent? We would be happy to discuss how OpenCloud can support you in this endeavour – from planning to long-term operation.

Get in contact with us at sales@opencloud.eu.
We look forward to hearing from you.





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