Datacenters and Cloud :

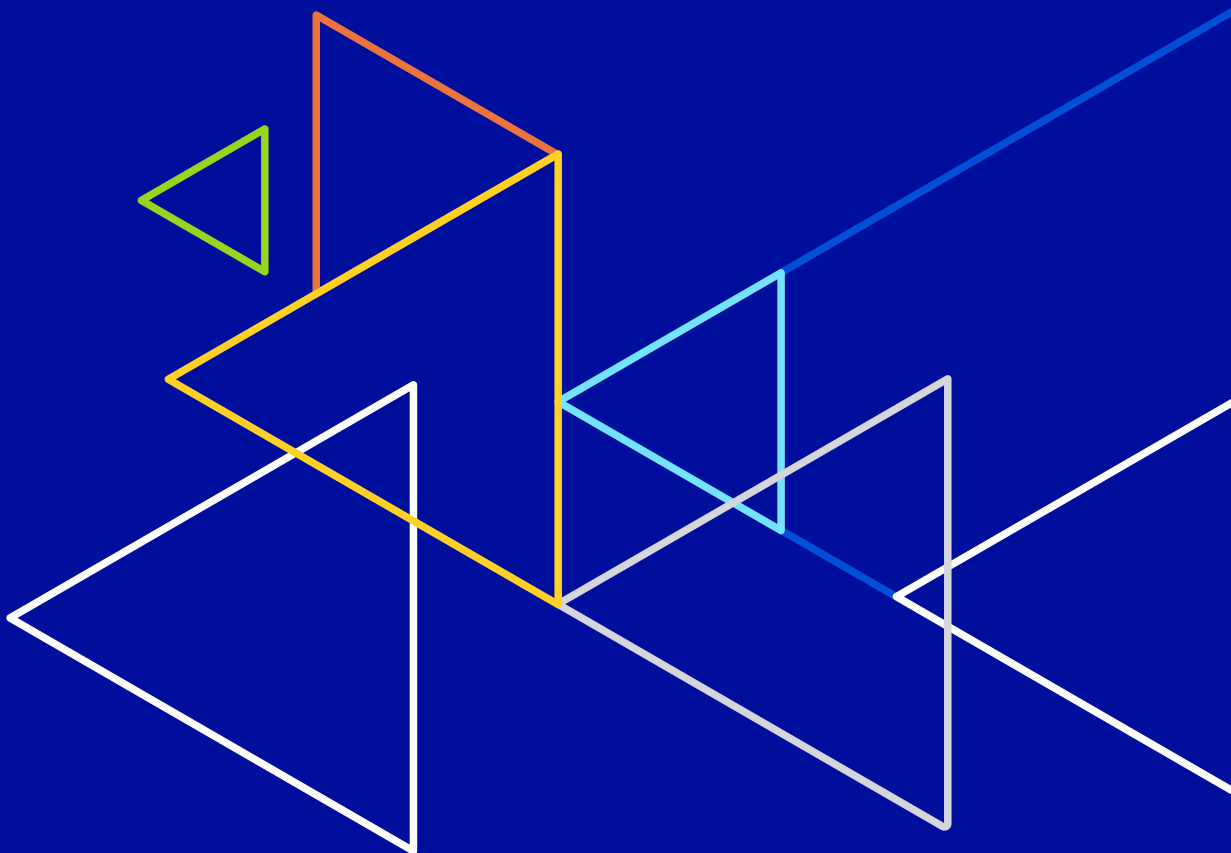
4 strategies for a sustainable and responsible digital future

OVHcloud

ovhcloud.com

As for the future, your task is not to foresee it, but to enable it.

Antoine de Saint Exupéry, Citadelle, 1948



INTRODUCTION

At a time when the IPCC is once again sounding the alarm about global warming, most organisations have realised the value of adapting their strategies in order to achieve “digital sobriety”. Datacentre sustainability is becoming a key requirement from a business, regulatory and operational perspective, For several reasons.

The first relates to the increasing climate risk and the growing impact of greenhouse gas emissions stemming from the datacentre industry. As facilities grow in size and number, governments are responding to the scientific community's recommendations with new guidelines for datacentre managers, leading them to redouble their efforts to improve their environmental strategies. More and more technologies and new design approaches are being implemented in datacentres to minimise their carbon footprint while reducing costs, with a particular focus on optimising water consumption.

Nowadays these considerations are no longer only heard from environmentalist groups. Adopting strategies to reduce environmental impact is recommended by global regulators and is an increasingly important part of the sustainability strategy of many service providers.

As a global cloud services provider, OVHcloud was one of the first to develop such an approach.

OVHcloud is implementing short, medium and long-term strategies to commit to a NetZero 2030 strategy, including improvements in resource use, renewable energy, customer accountability, the circular economy, sustainable supply, as well as carbon capture strategies.

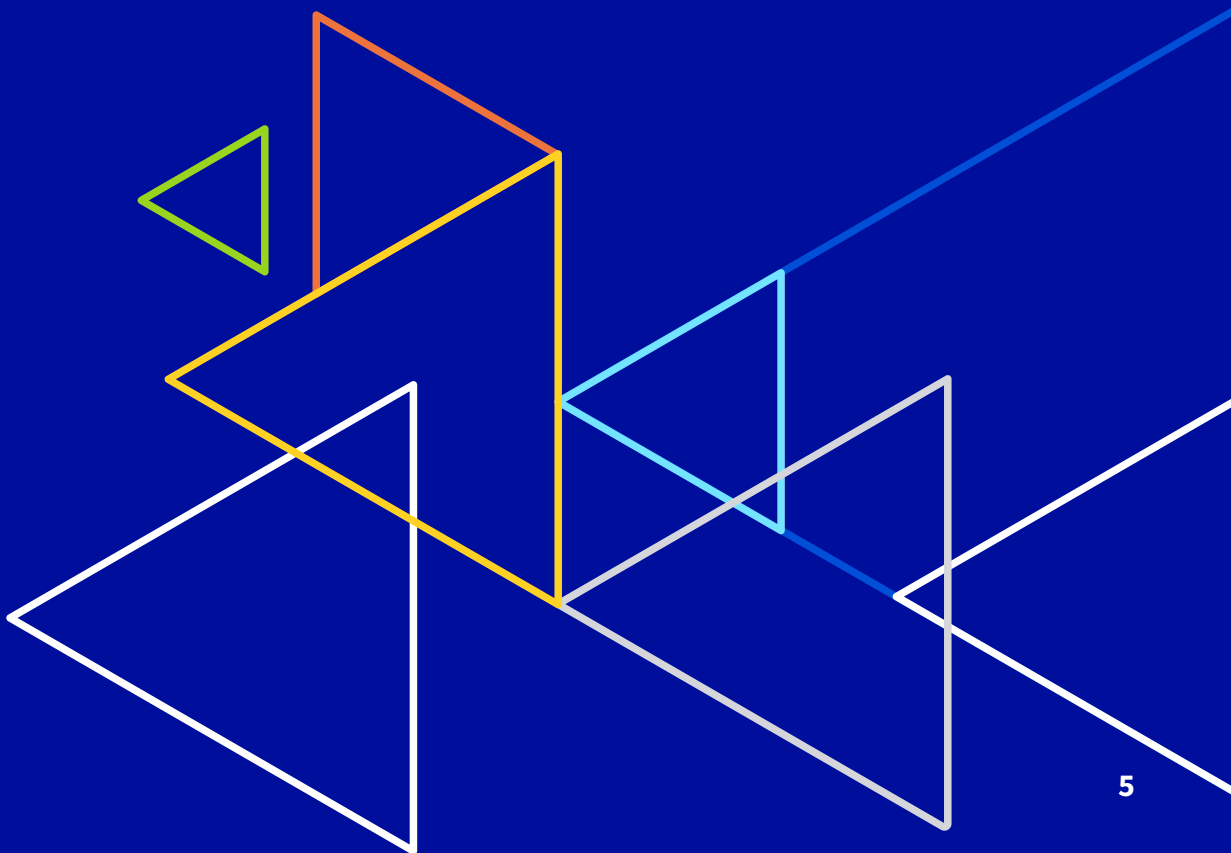
At the same time, OVHcloud is engaging in other innovations by leveraging the circular economy processes currently in place to become a zero-waste facility by 2025, and working with its wider community of customers and suppliers to encourage an ecosystem approach that promotes sustainability across the entire IT supply chain.

This white paper looks at strategies to reduce the environmental footprint of ICTs, drawing from OVHcloud’s actions in its own datacentres and in the general digital ecosystem.

Overview

01

Sustainability at the heart of digital issues



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The environmental impacts of the digital sector

As early as 2018, the international scientific community warned about global warming levels of 1.5°C above pre-industrial levels and the potential greenhouse-gas emissions trajectories that could follow. To reduce the effects of global warming, these same experts called for an aim to reach carbon neutrality targets by 2030 and zero-carbon by 2050. These ambitious climate targets require significant investment in sustainability strategies by governments and business leaders in all sectors.

While industry and transport are widely recognised as the main sources of greenhouse gas emissions, information and communication technologies also have a significant role to play. Historically, researchers have estimated that the ICT industry accounts for 2% of global emissions, roughly equivalent to the carbon footprint of the airline industry.

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In a widely circulated1 forecast of ICT’s proportion of global electricity consumption, the researchers demonstrated that the datacentre industry would consume an increasing share of global electricity, rising from 0.9% in 2015 to 4.5% of the total in 2025. Meanwhile, the European Commission2 notes that “Europe needs a digital sector that places sustainability at the heart of its concerns. The Commission will also examine measures to improve energy efficiency and circular economy performance in the sector itself, from broadband networks to datacentres and ICT devices.”

1. Forecast for ICT share of global electricity usage 2015 - 2025
2. European Commission. The European Green New Deal. Brussels. December 11, 2019.

2

The environmental impact of digital technology offset by its potential for sustainable development

The EU states that “as powerful enablers for the sustainability transition, digital solutions can advance the circular economy, support the decarbonisation of all sectors and reduce the environmental and social footprint of products placed on the EU market.” For example, key sectors such as agriculture, transport and energy can benefit immensely from digital solutions in their pursuit of the ambitious sustainability objectives of the European Green Deal.

The balance that ICTs establish between their carbon impact and their ability to decarbonise other sectors was described in great detail in GeSI's SMARTer 2020 study, which found that while the ICT footprint is to reach 1.27 GtCO2e by 2020, their abatement potential is seven times greater.

As the key technologies that can contribute to this abatement, datacentres and the cloud are at the heart of the ICT sustainability challenges. By powering customer devices and relying on extensive global networks, the datacentre and cloud industry can help companies optimise their processes to meet their sustainability goals.

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3

The cloud sector: a catalyst for Green IT best practices

Thanks to continuous innovations, the cloud computing and datacentre sector is working successfully to meet the key recommendations of the UN SDGs, particularly Goal 7, which recommends the use of clean energy; Goal 9, which calls for industrial and infrastructure innovations; Goal 12, which calls for responsible consumption and production; and Goal 13, which calls on organisations and individuals to take urgent action to combat climate change.

The environmental benefits of cloud technology are now well documented. Using virtualisation technologies that optimise IT resource sharing, the cloud can save energy by increasing server usage.

Thanks to the consolidation of the cloud, operators use fewer physical servers, which reduces the number of components needed for each service rendered. In addition, the amount of heat lost and the electricity consumption in the datacentre devices would improve. The saved server power is passed on to the facility, reducing the power required to operate the datacentre.
In general, these savings are easier to achieve in large datacentres, which can achieve higher levels of sharing and consolidation through economies of scale, and have the resources to invest in modernisation to meet the essential needs of businesses through technologies such as custom-made chips, high-density storage, virtualisation, software-defined datacentre solutions, and bespoke ventilation and cooling systems.

The energy that can be saved through cloud usage has been estimated in several studies, including those by the Lawrence Berkeley National Laboratory, which estimated that if all US business users moved their email, productivity tools, and customer relationship management software to the cloud, the primary energy footprint of these applications would be reduced by 87%.

Another study by the International Energy Agency stated that the energy efficiency gains associated with the transition to cloud computing, including for hyperscale, are offsetting the increase in consumption levels expected in the future thanks to a surge in digital usage.

VMware
Zero Carbon
Committed™

PARTNERING FOR A
SUSTAINABLE FUTURE.

VMware Cloud Verified partners (including OVHcloud) who participate in the VMware Zero Carbon Committed programme must operate datacentres based on VMware's Software Defined Datacentre (SDDC) technologies, making them less energy-intensive. They must also commit to powering their datacentres with renewable energy sources by 2030.

02

Four OVHcloud strategies for sustainable datacenters

**Datacentre operators that are determined to tackle the challenge of sustainability need to rely on thoughtful planning, institutional structures,
state-of-the-art technology and clear objectives to achieve their sustainable development goals.
OVHcloud has established a timeline for achieving carbon neutrality, and has identified key business areas for green datacentres.**

In this section, you will find an overview of the choices made by the hosting provider, and the considerations undertaken by its experts to guide the entire digital ecosystem in an environmentally responsible way.

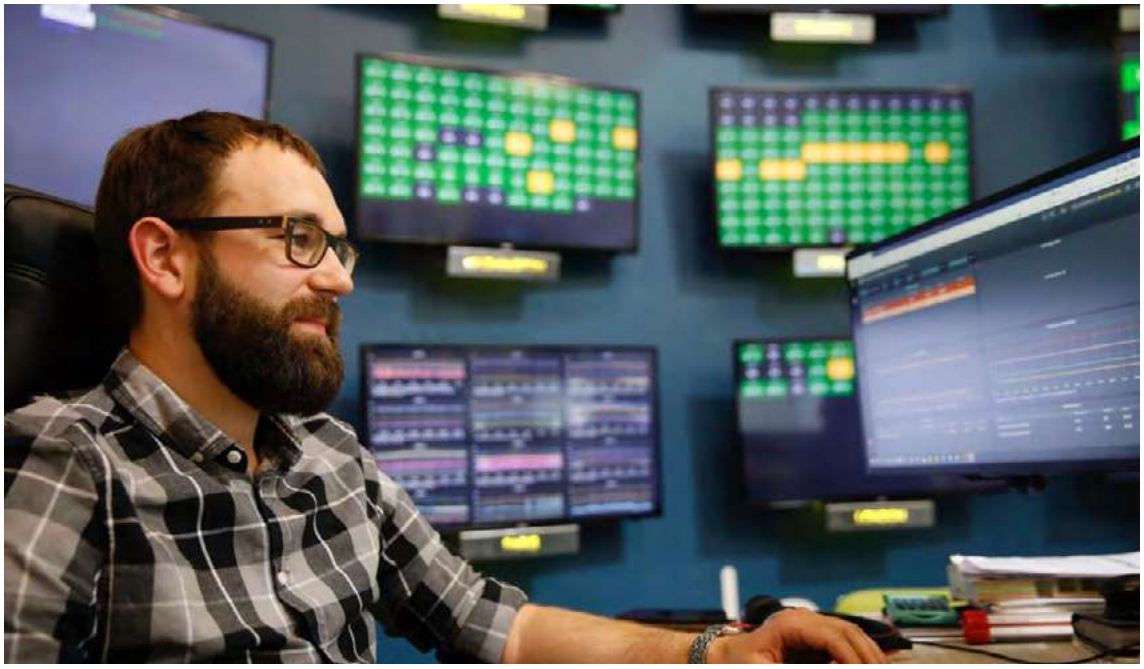
1

Optimising water, energy and carbon use

In order to expand the benefits of efficiently delivering cloud-based IT services, OVHcloud has improved its water, energy, and carbon (WEC) profile through the use of exclusive water-cooling technology that introduces liquid cooling for processors. Combined with open air cooling, this water system has enabled the company to achieve very competitive PUE and WUE scores. Thanks to its closed-loop cooling system, water use is very moderate.

Developed in 2003, OVHcloud's cooling technology is deployed on an "industrial" basis – optimised and standardised for use in servers assembled by the company – across its entire 30-datacentre portfolio.

Using the heat exchangers that cool processors and other heat-emitting components, the proprietary system introduces liquid inside the servers to ensure precision cooling. Approximately 70% of the heat generated by the servers is captured and then transferred to a closed-loop system that transports the heated liquid outside the building for cooling. By eliminating the need for server air-cooling infrastructures, such as server fans, air channels, and filters, this approach can save a significant amount of energy. This technology has resulted in a low carbon footprint for OVHcloud in most of the countries in which it operates.



2

Enhancing PUE

Developed by the Green Grid to measure the energy efficiency of a datacentre, the PUE was adopted in 2016 as a global standard under ISO/IEC 30134-2:2016 and continues to be the most common measure for calculating the energy efficiency of a datacentre facility.

To ensure the reliability of its PUE data, OVHcloud adheres to Category 2 of the PUE standard, which involves measuring the load at the power distribution unit, in order to generate a value of “instant” power consumption.

Another factor that may affect the energy measurement of a datacentre is the use of servers: the PUE estimations are less reliable when they are not operating at full capacity. While the customer controls the IT load, as a cloud provider OVHcloud operates at maximum efficiency, reducing the potential for PUE variation.

Across all of its sites, OVHcloud reports a PUE range of 1.1–1.3. These results put the company at the forefront of the hyper-scale providers in terms of energy efficiency.

3

Linking PUE to WUE

Water usage effectiveness (WUE) measures the relationship between the water used by the datacentre – mainly for cooling towers – and the electricity supplied to the hardware. According to a US Department of Energy report, the average WUE for a datacentre is 1.8 litres per kilowatt-hour.

A WUE that is generally less than 1 litre or even 0.4 litres per kilowatt-hour is considered to be good value. Along with the PUE, the WUE gives a fairly complete picture of a datacentre’s efficiency.

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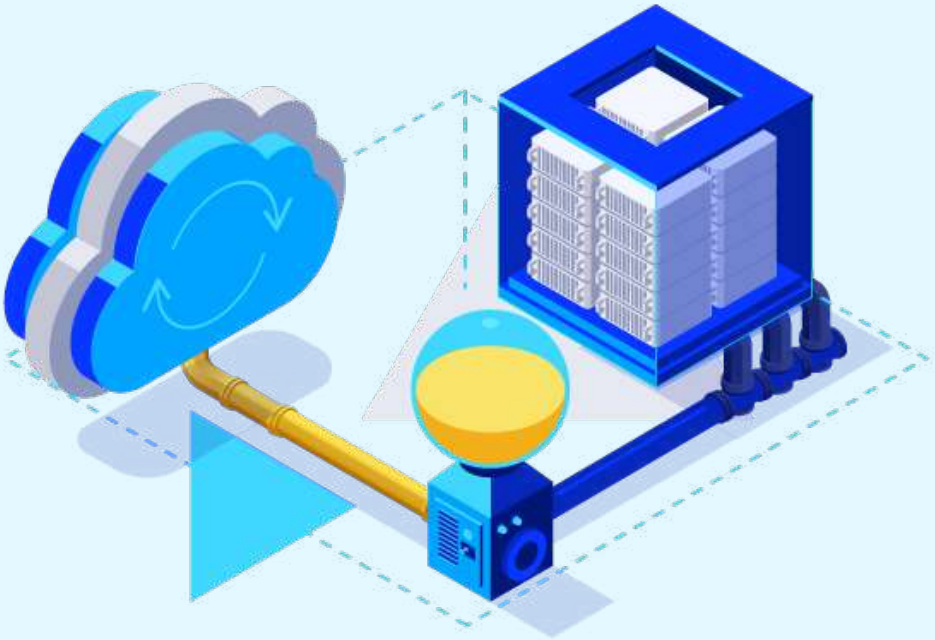

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Analysing Component Lifecycles

OVHcloud builds its datacentres in existing industrial facilities in order to reduce carbon emissions from building new facilities. It also produces its own racks and servers based on an industrial model that standardises component assembly, helping to reduce waste.

To measure the footprint of all components, the company has implemented a lifecycle analysis, which uses a multi-criteria analysis to identify the main impacts for each component. Using this information, along with the industrial model, the company can analyse servers and capitalise on its reverse supply chain by reusing, repairing or recycling each of the server components. The company intends to eliminate its landfill waste by 2025 and strengthen traceability in its programme for reselling used materials.

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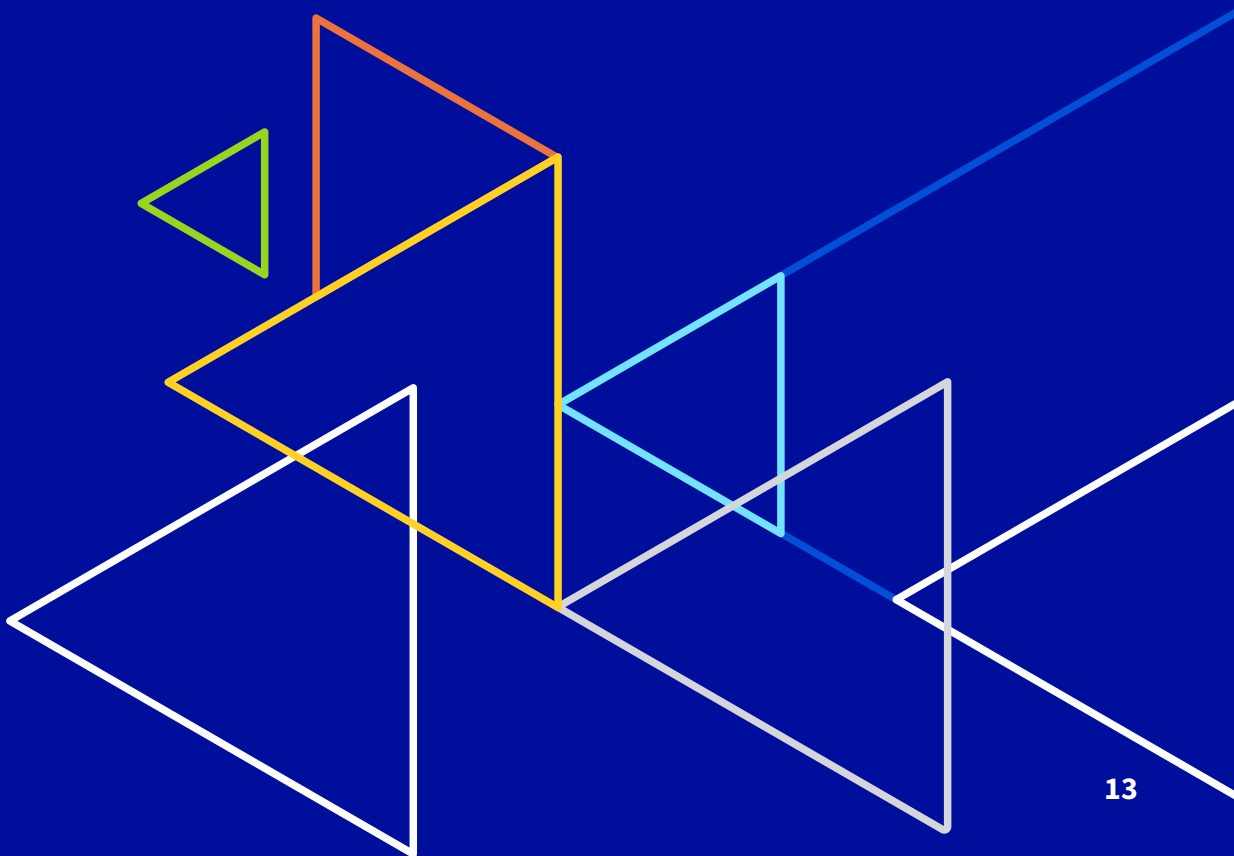
03

Eight actions to adopt for a more conscientious IS

Ultimately, cloud service providers have little control over their customers' usage patterns. To encourage best practices, OVHcloud is committing to a series of measures to optimise workloads and reduce energy consumption.



1 Increasing the lifespan of IT equipment and applications

After the datacentre itself, the assets that have the second-highest environmental impact are IT equipment. Increasing their lifespan is sometimes an underestimated challenge.

Better use of resources, particularly virtualisation technologies, is a key element in controlling energy expenditure by limiting the number of terminals and increasing the occupancy rate of active servers. Keeping dormant servers in your datacentre is the worst-case scenario, as their manufacturing impact is not being offset at all.

2 Limiting the impact of code on energy consumption

In developing its lines of code, OVHcloud strives to take the associated energy consumption into account, in order to minimise the carbon footprint, which will ultimately benefit customers. As Germain Masse, who is responsible for energy efficiency at OVHcloud, says: “It goes without saying that high-performance code runs faster for identical resources.”

As an algorithmist, Germain has an important role in the quality of the code issued – but he also wears the hats of architect and building block assembler. Very often, Germain ends up relying on application building blocks or SaaS or PaaS services. “But the reason behind choosing these application building blocks can sometimes be unclear, both in terms of environmental factors and in terms of performance.” With more resources available “on demand”, developers who are faced with choosing a framework or language tend to be drawn in by go-to-market strategies, and fall out of the habit of measuring performance.

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3 Optimising software management

Software requirements – in terms of memory, CPU power, and disk space – determine the service life of a piece of computer hardware. By looking for lighter alternative tools that meet the real needs of users, the CIO is helping to extend the lifespan of the hardware. This also raises questions about the choices we make around governing applications and data. In today's environment, higher amounts of data automatically increases the number of hardware devices needed to ensure their performance and availability. Considering whether high levels of availability are appropriate for certain applications, or how many copies of data are kept online, is a good start.

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4 Streamline usage

Postponing backups in order to avoid performing the operation when a large number of employees are using the network is an example of good practice.

IT decision-makers need to consider the possibility of staggering certain processes in batches in order to smooth out usage, and ensure that not all resources are consumed at the same time. For example, an organisation that issues and processes its invoices on the first day of each month may consider spreading out these transactions.

5 Choosing a suitable infrastructure

It is also important to ensure that your infrastructure is suitable for hosting your application environment. OVHcloud offers a wide range of options: Hosted Private Cloud, Public Cloud, as well as a very wide variety of Bare Metal servers.

With hundreds of Bare Metal options and models, OVHcloud partners can precisely adjust their ratios (RAM per core ratio, storage per RAM or core, etc.) and ensure they are using the best virtual machine for every workload.

6 Choosing the right storage model

While the storage trend favours flash memory technologies – which have a relatively high environmental impact – it's important to highlight the value of so-called "cold" archiving solutions.

OVHcloud follows this logic by offering long-term storage technologies, based mainly on IBM 3592 tape cartridges. This low-power solution guarantees security and resilience, so that sensitive data can be preserved in the long term.

Trends are moving towards lower-cost, but more conscientious archiving solutions.

As organisations look for ways to store, manage and enhance ever-increasing amounts of data, tape technologies will also play a strategic role in addressing storage infrastructure challenges. In addition to their reliability, magnetic tape data storage consumes no power when not in use, unlike magnetic and flash hard disks.

It's up to you to choose the right storage model to suit your situation. Do you need a real-time archiving solution? Should the recovery time for your data be near-instantaneous, or do you have a few hours or even days to set up your backups? Beyond the matter of the budget, these questions should provide food for thought for any CIO that is committed to reducing their organisation's environmental footprint.

7 Making the right choices when it comes to data redundancy

The relevance of replicating multiple copies of data and their online retention should also be considered. The higher the level of redundancy, the higher the costs, and the higher the environmental impact. Think about various use cases, and draw a distinction between contexts that actually require a high level of redundancy (e.g. hosting healthcare data) and those where the level of redundancy can be reduced.

Studies have shown that algorithm improvements can minimise hardware redundancy levels while ensuring logical redundancy levels. For example, the data protection method of Erasure Coding allows you to reduce the level of physical redundancy while using coding algorithms to guarantee the same level of logical redundancy. As a result, while the CPU usage slightly higher due to the computing involved, it is largely offset by the energy gain.

8 Using indicators to measure progress

Implementing indicators will measure progress while providing a basis for planning the sustainability goals that can be set for a datacentre, keeping the aim of reducing the environmental impact in mind. These indicators can be shared internally with employees, externally with investors, partners and customers, as well as with authorities. In fact, they raise awareness among all stakeholders and provide a quantified environmental record to illustrate the company's sustainable development initiatives.


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