Une image contenant Police, Graphique, graphisme, capture d’écran

Description générée automatiquement

**OVHcloud Environmental Impact Tracker Methodology**

**Cloud environmental footprint**

Table of contents

[1 Comprehensive approach to accounting for GHG emissions 2](#_Toc202948802)

[1.1 Commitment in providing transparent, comprehensive and reliable information 2](#_Toc202948803)

[1.2 Selection of products addressed 3](#_Toc202948804)

[1.3 General approach for calculating environmental footprint 4](#_Toc202948805)

[2 Approach used for calculation of the environmental footprint by server according to the life cycle stage 5](#_Toc202948806)

[2.1 Manufacturing phase 5](#_Toc202948807)

[2.1.1 Calculating a server’s environmental footprint 5](#_Toc202948808)

[2.1.2 Focus on the environmental footprint of GPUs 6](#_Toc202948809)

[2.1.3 Component refurbishment focus 7](#_Toc202948810)

[2.2 Usage phase 8](#_Toc202948811)

[2.3 Operations: miscellaneous issue aggregate 11](#_Toc202948812)

[2.3.1 Emissions from the Carbon Balance 11](#_Toc202948813)

[2.3.2 OVHcloud internal IT usage emissions 12](#_Toc202948814)

[3 Method for allocating environmental footprint 12](#_Toc202948815)

[3.1 Allocation method for dedicated products 13](#_Toc202948816)

[3.2 Allocation method for mutualized products 13](#_Toc202948817)

[3.2.1 Specific methodological choices for allocating the footprint of mutualized products 13](#_Toc202948818)

[3.2.2 Perimeter Public Cloud Computing 15](#_Toc202948819)

[3.2.3 Public Cloud Storage Scope 16](#_Toc202948820)

[3.3 Allocation to customers and report 17](#_Toc202948821)

[3.3.1 Proportional distribution for *Public Cloud* products 17](#_Toc202948822)

[3.3.2 Edit report 17](#_Toc202948823)

[Glossary 20](#_Toc202948824)

[Table of Figures 21](#_Toc202948825)

[Table of Tables 21](#_Toc202948826)

[Table of Equations 21](#_Toc202948827)

Digital technology is playing an increasingly important role at the heart of our professional and personal lives. The democratization of cloud services accompanying this explosion in usage is contributing more and more to the digitization of all economic sectors, creating a cycle of continuous improvement and change.

For over 20 years, OVHcloud has been innovating to make the cloud more sustainable by reducing the impact of its datacentres and servers and using resources sparingly.

Maintaining this innovation momentum, OVHcloud is now offering an Environmental Impact Tracker to provide an estimate of greenhouse gas (GHG) emissions. It stands out as the first to offer a transparent and comprehensive approach. Allowing OVHcloud customers to understand their carbon footprint, the results linked to their cloud usage are broken down into three emission categories:

* **the manufacturing phase**: upstream greenhouse gas emissions linked to the purchase and assembly of components of the servers;
* **the usage phase**: emissions linked to the power consumption of the server(s) and its appendices;
* **other emissions**: other emissions such as freight, buildings or the impact induced by employees, known as ‘operations’.

IJO, a consultancy specializing in Green IT, and Cost House, a consultancy specializing in economic performance, have been commissioned in 2024 to carry out a methodological review of the OVHcloud’s Environmental Impact Tracker which met the standards of the Bilan Carbone® method and the GHG Protocol. You will find [here](https://www.ovhcloud.com/sites/default/files/external_files/https:/www.ovhcloud.com/sites/default/files/external_files/https:/corporate.ocms.ovhcloud.tools/sites/default/files/external_files/signed-ovhcloud-certification-bare-metal-hpc-long-1.2_eng.pdf) the certification letter for the Environmental Impact Tracker, certified as compliant with the Bilan Carbone® method, meeting the requirements of the GHG Protocol and, moreover, adapted to OVHcloud's activities, presenting a high level of accuracy.

Before displaying the automation of environmental footprint calculations, and in order to carry out this project successfully, a strict methodology has been established. We present here a short version of it.

# Comprehensive approach to accounting for GHG emissions

## Commitment in providing transparent, comprehensive and reliable information

OVHcloud’s commitment in communicating greenhouse gas (GHG) emissions information to its customers begins with the calculation of the GHG emissions associated with all the delivered services. OVHcloud develops an approach that embraces all products of its catalog in order to provide a complete environmental footprint to each customer. Every service delivered has its own features and adresses specific customer needs. Therefore, developing a calculation methodology that is specific to each service is a process that OVHcloud handles thoroughly in a methodical and structured way, embraced in overall sustainability roadmap.

First of all, as recommended by the highest standards in GHG accounting, OVHcloud also includes in this tool, emissions related to OVHcloud operations. The aim here is to provide trustworthy results and highlight commitment to reducing all of OVHcloud emissions. Details about actions on OVHcloud’s environmental commitments are available on our [corporate](https://corporate.ovhcloud.com/fr/sustainability/environment/) website.

The choice made by OVHcloud is to communicate to the customers all of the emissions from the three scopes of carbon reporting (scope 1: direct emissions, scope 2 and 3: indirect emissions). Transparency towards customers is key, and therefore it is OVHcloud responsibility to provide a complete carbon footprint by categories to give to the clients all the elements to monitor and reduce the impacts of the products they use.

OVHcloud activities’ main sources of GHG emissions (location-based) are the production of servers (27 % in 2024) and the supply of electricity (49 % in 2024). The rest of the scopes of emissions account in total for 24 %. To enable customers to reduce their impacts, and in accordance with OVHcloud’s transparency values, the Environmental Impact Tracker shows an environmental footprint allocated over three pillars (Figure 1):

* Manufacturing,
* Usage,
* Operations.

Three pillars have been chosen to show environmental impacts. These three pillars point out life cycle milestones:

Manufacturing, Usage (through electricity) and Operations

## Une image contenant texte, capture d’écran, Page web, Site web Le contenu généré par l’IA peut être incorrect.Selection of products addressed

Figure - Perimeters for assessing the GHG emissions of cloud services (Source: OVHcloud)

OVHcloud offers a large range of services, from computing to data storage to web hosting. This extensive catalog is a challenge when addressing the allocation of GHG emissions.

Consequently, and with the aim of designing a coherent and reliable approach, we decided to address five major products:

* *Bare metal* dedicated servers (first available version: May 2023)
* *Hosted Private Cloud* servers (first available version for hosts: August 2023)
* *Public Cloud* - Compute (first available version: January 2025)
* *Public Cloud* - Block Storage and Object Storage (coming soon)
* Web hosting (coming soon)

As published in the Fiscal Year 2024[[1]](#footnote-1) Annual Results, the revenues of these products account for about 63 % of the global revenues for Private Cloud products (which include *Baremetal* and *Hosted Private Cloud*), 18 % for Public Cloud products and 19 % for Webcloud and other products.

The Environmental Impact Tracker includes the precise calculation of the emissions related to these products all the locations (excluding the USA).

The OVHcloud Environmental Impact Tracker includes the major products across Bare Metal, Hosted Private Cloud, Public Cloud and web hosting. It also includes most of its locations.

## General approach for calculating environmental footprint

Developing a model to assess the environmental impacts of products and manage their allocation to each customer requires being able to evaluate the environmental footprint of each server installed in OVHcloud’s data centers that is used for the operation of customer services. In the calculation model developed by OVHcloud and presented in this paper, the estimation of the servers-related carbon emissions is a key enabler for the rest of the process, including spreading the emissions over the different services used by the customers, in accordance with the configuration and the location of the servers.

GHG emission calculation is made at the server level and includes all the materials, teams and activities required for operating the building and managing the servers. Furthermore, as it is explained in the sections below, the methodology differentiates two different types of products: dedicated services and mutualized ones (more precisions are given in the sections “Method for allocating environmental footprint”). The global approach explained and specified in this paper is summarized in Figure 2.

Figure - Diagram of the global approach chosen for environmental footprint assessment (source: OVHcloud

Une image contenant texte, capture d’écran, diagramme, Police

Le contenu généré par l’IA peut être incorrect.The three pillars (Manufacturing, Usage and Operations) of OVHcloud Environmental Impact Tracker model also reflect three different approaches to calculate carbon footprints. One is due to on-site activities of manufacturing which require various materials; the second is directly linked to the location of OVHcloud’s buildings, the available energy sources and OVHcloud’s efforts towards the use of low-carbon energy; and the last one gathers a large range of emission sources to allocate to each customer. This section aims at providing key elements on the three approaches developed by OVHcloud to assess customer related environmental footprint.

To assess customers’ environmental footprint, OVHcloud calculates the infrastructure footprint across the three pillars (Manufacturing, Usage and Operations) and allocates it according to product type (dedicated or mutualized)

# Approach used for calculation of the environmental footprint by server according to the life cycle stage

## Manufacturing phase

As it represents 27 % (in 2024) of the global carbon assessment of the company, the manufacturing of the servers (including upstream emissions of the hardware manufacturing) used in OVHcloud data centers is central in the calculation of the environmental impact for the services provided to customers. OVHcloud assembles all of the servers we use and their cooling system, with various configurations. The wide range of configurations, designed for the different use cases of the customers, requires a strong methodology to be able to evaluate the environmental footprint of every server used in each data center.

For several years, OVHcloud has indeed implemented high standards to assemble and disassemble servers. Therefore, components have different use phases, limiting the purchase of new components. This integrated model enables OVHcloud to provide price competitive services with a high level of reliability while minimizing the associated environmental impacts.

### Calculating a server’s environmental footprint

Une image contenant Appareils électroniques, Composant électronique, Composant de circuit, Ingénierie électronique

Le contenu généré par l’IA peut être incorrect.The carbon impact of producing a server predominantly comes from the manufacturing of a few main types of components such as CPU, GPU, RAM, HDD/SDD, motherboard and power supply (Figure 3). Therefore, it was important to develop a model that reflect the real impacts and therefore that is based on the physical configuration of the machine. As OVHcloud assemble every server, the model has to be fed by reliable and regularly updated data.

Figure - Explaining picture of the composition of the OVHcloud server

A calculation model based on the configuration of a server has been developed to assess the environmental footprint of every physical host (Equation 1).

Equation - Calculation of the environmental footprint of server manufacturing (excluding refurbishment)

With: *EF: emission factor*

By combining recent data from the scientific literature with information from component and semiconductor manufacturers, the model succeeds to spread OVHcloud’s impact of manufacturing over all the servers, including primary manufacturing (Table 1). Hence, a single but evolving model enables providing precise personalized environmental footprint for every physical machine.

|  |  |  |
| --- | --- | --- |
| Components | Units | Emission factors |

Table - Carbon footprint of major components (Source: IJO, 2022)

|  |  |  |
| --- | --- | --- |
| Rack  (Motherboard and appendices) | Number of U | 1U: 200 kgCO2eq  2U: 250 kgCO2eq  4U: 350 kgCO2eq |
| CPU | Number of cores | 1.5 kgCO2eq/core |
| GPU | Sales reference | |
| RAM | Gigabyte | 2 kgCO2eq/GB |
| SSD disk | Terabyte | 60 kgCO2eq/TB |
| HDD disk | Terabyte | 25 kgCO2eq/TB |

### Focus on the environmental footprint of GPUs

The environmental footprint of GPUs was estimated from the *Green Cloud Computing* study (2021)[[2]](#footnote-2). The approach involves breaking the GPU into 5 elements and extracting the information required for calculation. Thus, the publication cited above allows to approximate the environmental footprint of a GPU through the sum of the footprint of:

* the graphics processor,
* memory,
* printed circuits of the board (PCB),
* the computer bus,
* of heat dissipation.

### Component refurbishment focus

Une image contenant texte, capture d’écran, diagramme, Police

Le contenu généré par l’IA peut être incorrect.The calculation model (Calculating a server’s environmental footprint), developed to assess server manufacturing impacts distributes these emissions over the whole lifecycle of the servers and components. Thus, the concept of depreciation period should be inserted. OVHcloud has chosen to match the 5-year depreciation. However, the same component can have 1, 2 or several phases of use over its lifetime (including changing components over the lifetime of the server)(Figure 4).

Figure - OVHcloud components lifecycle (Source: OVHcloud)

For added reliability, this calculation model also takes into account the fact that some range of products used older components, thereby contributing to extend lifetimes of machines and components as part of OVHcloud Sustainability strategy.

In the case of servers with refurbished components, over its lifetime, we accurately consider manufacturing emissions, depending on the server configuration and the share of refurbished components in the product range used. This is taken into account by the ratios (or reduction rates) that include the impacts of refurbishment (Equation 2). These ratios are updated each fiscal year and are calculated based on internal data that is monitored for each range and component type.

Equation - Calculation of the environmental footprint of server manufacturing (with refurbishment)

The model developed to assess the GHG emissions associated to the production of every server relies on three key points:

- the configuration of the machines, especially CPUs, GPUs, RAM, and hard disks, whether HDD or SSD,

-the expected lifetime considering the different use phases,

-the share of refurbishment components used in process of assembling the servers depends on the product range.

## Usage phase

Une image contenant texte, diagramme, capture d’écran, cercle

Le contenu généré par l’IA peut être incorrect.Operating a physical server requires the mobilization of many other hardware and IT infrastructure, which must be taken into account in assessing environmental impacts. A diagram summarizing the main power sources used to estimate a server’s direct and indirect power consumption is provided in Figure 5.

Figure - Main power consumptions sources for operating a server (source: OVHcloud)

OVHcloud achieves to maintain low carbon emissions thanks to the location of many data centers in countries where the GHG intensity of the electricity mix is relatively low such as France or Canada. This leads to globally low CUE (Carbon Usage Effectiveness), at 0.16 kgCO2e/kWh IT in 2024. Also, OVHcloud achieves good results in PUE (Power Usage Effectiveness) and WUE (Water Usage Effectiveness) with the implementation of its own cooling technologies (Table 2). When we are not able to measure the PUE, we use PUE of 1.6 (in 2024).

The power consumption is not equal between each OVHcloud server. It depends on its configuration and on its usage. OVHcloud is currently deploying Smart PDUs to precisely monitor the electricity consumption of each server.

As all servers do not benefit from this monitoring, a simplified approach has been used in the calculation model. For each server, OVHcloud has evaluated the associated power consumption with an internal project aiming at providing for every potential configuration – capacity of the CPU, size of the RAM, etc. – and customer profile the typical power consumption expected. The evaluated typical power consumptions are then compared to real measured power consumptions to validate the models. The energy consumption thus provided represents a workload of 100% 24/7. A simplified approach allows our customers who know their workload to translate the results provided by our tool to their infrastructure (Figure 6).

Figure – Elements for workload-based power conversion

Nevertheless, as explained above assessing the net power consumption of the server has to be completed by the rest of the electricity consumption of the datacenter. To provide the best quality and most useful information to customers, we consider the proper PUE of each datacenter. This is done considering the overall power consumption of the data center and distributing extra power consumptions – those that are not from direct server consumptions – over all server connected in the building. The method allows for a more precise estimation of the power consumption to be allocated to each OVHcloud server.

OVHcloud leads an ambitious green energy policy. Once the power consumption has been estimated, the GHG emissions are calculated on a location-based approach, meaning that the local energy mix is considered for each datacenter (Table 2). Since November 2023, we have been taking into account the GHG emissions corresponding to our low carbon energy contracts as indicated by the "market-based" emission factors. At this stage, the carbon footprint of the usage phase of each server completed by other IT materials and infrastructure is assessed and included in the global results(Equation 3).

Equation - Calculation of the environmental footprint of the usage phase of a server

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Datacentre | | Source of electrical emission factors  Location-based3 | Electrical emission factors  Market-based  kg CO2eq/kWh | PUE  Measured | WUE  Measured  *l/kWh* |
| Beauharnois | BHS | Electricity Maps (2025) Québec-2024-Yearly. Carbon Intensity Data (April 3, 2025). | 0.0261 | 1.25 | 1.33 |
| Erith | ERI | Electricity Maps (2025) United Kingdom-2024-Yearly. Carbon Intensity Data (April 3, 2025). | 0.0130 | 1.26 | 0.21 |
| Gravelines | GRA | Electricity Maps (2025) France-2024-Yearly. Carbon Intensity Data (April 3, 2025). | 0.0349 | 1.22 | 0.20 |
| Hillsboro | HIL | Electricity Maps (2025) Oregon-2024-Yearly. Carbon Intensity Data (April 3, 2025). | 0.0127 | 1.35 | 0.53 |
| Limburg | LIM | Electricity Maps (2025) Germany-2024-Yearly. Carbon Intensity Data (April 3, 2025). | 0.0216 | 1.24 | 0.35 |
| Roubaix | RBX | Electricity Maps (2025) France-2024-Yearly. Carbon Intensity Data (April 3, 2025). | 0.0349 | 1.29 | 0.39 |
| Strasbourg | SBG | Electricity Maps (2025) France-2024-Yearly. Carbon Intensity Data (April 3, 2025). | 0.0349 | 1.21 | 0.50 |
| Vint Hill | WINE | Electricity Maps (2025) Virginia-2024-Yearly. Carbon Intensity Data (April 3, 2025). | 0.4211 | 1.39 | 0.10 |
| Warsaw | WAW | Electricity Maps (2025) Poland-2024-Yearly. Carbon Intensity Data (April 3, 2025). | 0.0128 | 1.25 | 0.60 |

Table - GHG intensity of electricity mix where OVHcloud operate

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Co-location datacentre | | Source of electrical emission factors  Rental-based[[3]](#footnote-3) | **Electrical emission factors**  Market-based  *kg CO2eq/kWh* | **PUE**  *News release* |
| Mumbai | MUM | Electricity Maps (2025) Western-India-2024-Yearly. Carbon Intensity Data (April 3, 2025). | Same as location-based power emission factor | 1.58 |
| Singapore | SGP | Electricity Maps (2025) Singapore-2024-Yearly. Carbon Intensity Data (April 3, 2025). | 1.72 |
| Sydney | SYD | Electricity Maps (2025) Australia-2024-Yearly. Carbon Intensity Data (April 3, 2025). | 1.30 |
| Toronto | YYZ | Electricity Maps (2025) Ontario-2024-Yearly. Carbon Intensity Data (April 3, 2025). | N.C. |

|  |  |  |  |
| --- | --- | --- | --- |
| **Local-Zone** | | Source of electrical emission factors  Location-based3 | Electrical emission factors  Market-based  *kg CO2eq/kWh* |
| Amsterdam | AMS | Electricity Maps (2025) Netherlands-2024-Yearly. Carbon Intensity Data (April 3, 2025). | Same as location-based power emission factor |
| Bengaluru | BLR | Electricity Maps (2025) Belgium-2024-Yearly. Carbon Intensity Data (April 3, 2025). |
| Madrid | MAD | Electricity Maps (2025) Spain-2024-Yearly. Carbon Intensity Data (April 3, 2025). |
| Milan | MIL | Electricity Maps (2025) Italy-2024-Yearly. Carbon Intensity Data (April 3, 2025). |
| Marseille | SRM | Electricity Maps (2025) France-2024-Yearly. Carbon Intensity Data (April 3, 2025). |
| Prague | GWP | Electricity Maps (2025) Czechia-2024-Yearly. Carbon Intensity Data (April 3, 2025). |
| Zurich | ZRH | Electricity Maps (2025) Switzerland-2024-Yearly. Carbon Intensity Data (April 3, 2025). |

The model developed to assess the greenhouse gas emissions associated with each server’s use phase is based on three key points:

- the energy consumption of the servers is considered to be 100% 24/7,

- the PUE is used to take into account the energy consumption of the auxiliary required for a server to work properly,

- Energy mixes are considered to be location-based and market-based.

## Operations: miscellaneous issue aggregate

### Emissions from the Carbon Balance

As explained above, this nature of emissions gathers every OVHcloud greenhouse gas emissions that is not accounted as either the manufacturing or the use phase. The environmental footprint of the operations is the sum of the impacts from the company’s annual carbon footpring using the GHG Protocol method, including:

* Scope 1: Direct emissions
  + Combustion from back-up power generators
  + Operation of internal vehicle fleet with internal combustion engine
  + Air conditioning leaks
* Scope 3: Indirect upstream and downstream emissions
  + Indirect emissions from domestic fuel consumption
  + Indirect emissions from fuel consumption
  + Emissions from power consumption of production and offices
  + Water consumption emissions
  + Emissions related to waste management
  + Fixed assets of buildings
  + Infrastructure deployment
  + Network Equipment purchases
  + Emissions due to the backbone
  + Purchase of IT licenses not hosted at OVHcloud
  + Consumables/meals/supplies/services purchases
  + Purchase of work equipment from OVHcloud employees
  + Incoming and outgoing freight emissions
  + Business travel programs
  + Employee commuting
  + Equipment purchase (Xdsl and VoIP)
  + Use of equipment delivered to customers (xDsl/VoIP)

The method chosen is a simplified approach using an equal distribution of the Operations impacts over the entirety of the servers dedicated to customer use.

### OVHcloud internal IT usage emissions

This raises the question of the allocation of the impacts generating by OVHcloud’s internal IT. It has been decided that there would be one single methodology for distributing the related greenhouse gas emissions, and that this method would be the same as for the Operations. Indeed, when dealing with corporate IT equipment the impacts must be equally allocated over all OVHcloud servers.

The environmental impact of a dedicated server for internal use is distributed the same as the rest of Operations, i.e. equally across physical servers for customers to use.

As for the Operations, alternative allocation methods that more realistically reflect the server resource consumption can be imagined. However, for the time being, as the Operation part represents a minor part of the total footprint, the equal distribution will give satisfactory results. As an example, repartition of the data centers buildings according to the number of servers installed inside seems relevant, while allocation of the support team’s footprint can be challenged: products can have dedicated teams, according to level of support for instance.

# Method for allocating environmental footprint

The whole methodology developed by OVHcloud and presented here aims at distributing the entirety of the company’s greenhouse gas emissions in a single document. It is assumed that the whole company activity is dedicated to delivering the best services to its customers, and therefore all of its impacts must be considering in this reporting process. OVHcloud offers two different types of products:

* products that imply dedicated equipment to a customer, i.e. a server. The whole physical machine capacity and therefore all virtual machines hosted are dedicated,
* products hosted on servers which are mutualized between different customers.

OVHcloud offers are categorized in the Table 3.

Table - Table of OVHcloud offers with the dedicated or mutualized services categorization

|  |  |
| --- | --- |
| OVHcloud Dedicated products | OVHcloud mutualized products |
| Baremetal | Public Cloud - Compute |
| Hosted Private Cloud | Public Cloud - Storage (Block) |
|  | Public Cloud - Storage (Object) |
|  | Web Hosting |

These two kinds of offers must be considered separately in the modeling process. The rules for allocating the carbon footprint will vary and require different assumptions. Both approaches are presented below.

## Allocation method for dedicated products

Once the impacts of all the servers have been estimated, it results in a list of machines with associated amount of GHG emissions divided into three natures of emissions - Manufacturing, Usage and Operations. In order to be able to communicate to each customer the emissions related to their use of OVHcloud products, the next step is to distribute these emissions to OVHcloud customers taking into account the services they have subscribed to and the infrastructure on which they are based.

Regarding the dedicated services, the customers have at their disposal a range of physical machines which can be operated whenever they want and to the capacity they want. It is then evident that for such services the whole carbon footprint associated with the dedicated servers must be allocated to the client who holds them. Once the list of dedicated servers for a customer has been identified, the emissions from each server related to the three categories (Manufacturing, Usage, Operations) are summed using the methods presented in the Equation 4. Finally, customers can be presented with a carbon footprint encompassing the entire product lifecycle, broken down by datacentre and services.

Equation - Computing a customer's environmental footprint with dedicated servers

)

For dedicated products (e.g. Baremetal, Hosted Private Cloud), all emissions associated with the dedicated equipment are allocated to the customer.

## Allocation method for mutualized products

By mutualizing resources in a public cloud, you can distribute workloads across a shared infrastructure, via virtualized environments, thus optimizing resource usage.

The environmental footprint of mutualized cloud services involves transferring the footprint of the physical environment to the shared environment. This way, the physical infrastructure footprint will be distributed among customers in proportion to their consumption of virtualized resources.

### Specific methodological choices for allocating the footprint of mutualized products

#### Approach to customer consumption

To determine each customer’s usage for mutualized services, OVHcloud has chosen to use the billed services. This approach allows you to finely estimate the reserved consumption corresponding to the scaling of the resources provided by OVHcloud. This methodological choice guarantees accessibility to reliable and consolidated data, allowing the use of a robust calculation method that can be replicated to every OVHcloud customer.

Thus, the consumption metric is based on number and reference template (see Setting a reference template for instances) virtual machines (VMs) consumed for "*Compute*" services, and the volume of data stored for "*Storage*" services.

#### Global Infrastructure Approach

Shared services, divided into different ranges, are based on a physical infrastructure similar to BareMetal services. The method used to determine the footprint of each physical server (Approach used for calculation of the environmental footprint by server according to the life cycle stage) is replicated to estimate the footprint of the servers hosting the mutualized services.

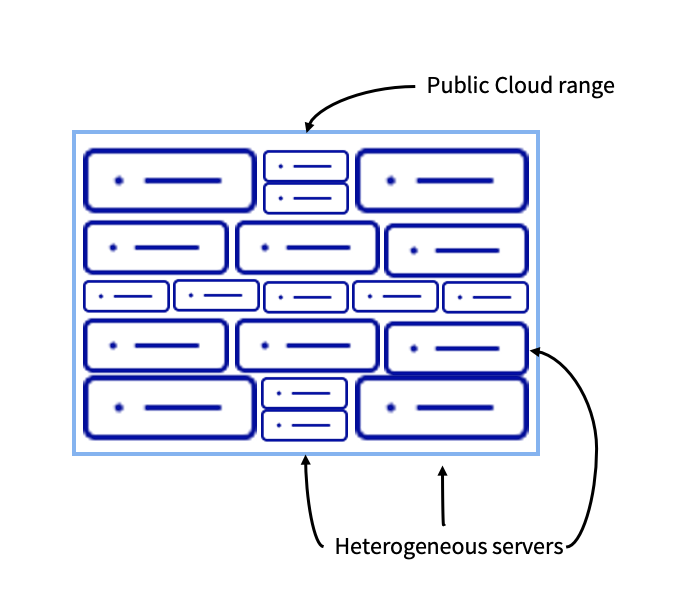
However, due to the mutualized nature of the services, the fact that a specific resource is not allocated to a customer, and due to the possible heterogeneous configuration of the servers hosting each range, OVHcloud has chosen to consolidate the environmental footprint into a total footprint, on the scale of the global infrastructure of the servers making up the range (Figure 7). This averaging ensures a consistent footprint estimate for the customer, who will only see small variations in the footprint for the same service due to the dynamic operation of mutualized infrastructure.

Figure - Heterogeneous configuration of servers hosting a Public Cloud range

#### Architecture of mutualized products

The architecture of the Public Cloud is schematically divided into two main components:

* The first part that runs client workloads. It groups together the physical servers on which virtual instances are deployed, and the storage systems. This part uses hardware resources and electricity to run the virtual machines, and is subject to an Operations footprint.
* A second part includes the infrastructure for management and orchestration. This includes, but is not limited to, dedicated servers for resource management and allocation, internal databases, and API services that allow users to create, modify, or delete their instances. It does not run business applications directly, but it also consumes energy and represents an environmental footprint (server manufacture and operation, network maintenance, monitoring, etc.).

Accounting for each of the two parts independently therefore provides a clearer picture of the service’s total environmental footprint and a better distribution of emissions between the different customers.

### Perimeter Public Cloud Computing

#### Setting a reference template for instances

To harmonize the comparison between different sizes of instances, even within a range, a reference template has been defined. For each of the ranges, this instance template corresponds to the smallest configuration (Table 4). The other configurations are then expressed as a multiple of each reference template. This approach facilitates the subsequent allocation of the environmental footprint. The parameters generally taken into account to characterize an instance are:

* The number of vCPUs,
* The amount of RAM,
* Storage capacity,
* Une image contenant texte, capture d’écran, ligne, Police

  Le contenu généré par l’IA peut être incorrect.The possible presence of GPUs.

Table - Reference template of b3 range

#### Calculate total server hosting capacity

For each range, to assess how the environmental footprint is distributed at the instance level, you need to know the total capacity of the servers in the range, using the equivalent reference template.

Specifically, for each type of host server:

* The number of instances of the reference template that can be accommodated next to the CPU and RAM is determined. The lower value of these two criteria is used, so that a single resource is not saturated.
* These capacities are added up for all of the physical servers that make up the services hosted for customers.

#### Reduce the unit environmental footprint to a reference instance

Once the overall environmental footprint of servers in a range is known, as well as the total capacity in instance as a reference template equivalent, it becomes possible to calculate the average carbon footprint of a reference instance (Equation 5). This calculation makes it possible to determine the average footprint of a VM, based on an hour of use, in each range.

Equation - Calculation of the environmental footprint of an instance of the reference template

The calculation of the average footprint of the use of a VM is identical for each range. The result is then used as a basis for distributing the environmental footprint between customers.

#### Distribution of the environmental footprint according to use

Once collected, data from each server is aggregated by range and datacentre to determine the total carbon footprint. Then there is the distribution between users:

* Customers share the physical servers that host their instances. OVHcloud determines each customer’s share of consumption, using a “weight” proportional to the number of instances they own (expressed in multiples of the reference template), and a metered usage (hours billed).
* The management and orchestration servers are shared for all users in a datacentre. Each customer is allocated a share according to the volume of instances used by the customer. For example, a customer representing 10% of all instances will be allocated 10% of the carbon footprint of the management and orchestration servers.

### Public Cloud Storage Scope

#### Definition and challenges

Storage of data (files, databases, backups, archives) is a significant issue in terms of greenhouse gas emissions. Storage infrastructure are based on servers equipped with a large number of hard disks, sometimes distributed over several geographical zones. Replication mechanisms (×2, ×3, erasure coding, etc.) guarantee data durability, but mechanically increase the overall footprint.

Two large perimeters are distinguished:

* Block Storage: A solution for storing segmented data in fixed-size blocks, stored on disks connected to instances via storage arrays. Data is striped across independent disks. Each block is treated separately.
* Object Storage: a technology that offers an online storage service, accessible via protocols such as S3, Swift or equivalent, and allows data to be stored without any space limit. You can push any type of data into an object storage service.

#### Calculation methods

The same calculation logic used to calculate the usage footprint of “*Compute*” services is applied to calculate the usage footprint of storage services.

It consists of several steps:

* Hardware inventory: servers assigned to storage are identified (number, models, installed disk capacity, location),
* Calculation of the total storage capacity of the servers: the number and type of disks are taken into account, integrating the size limitation rules according to the technologies used and the replication/erasure coding mechanisms.
* Unit environmental footprint calculation: Emissions attributed to storage servers are reported against the total effective storage capacity. This calculation determines the average storage footprint of 1Gb in each range.
* Distribution of the environmental footprint according to usage: customers are then allocated a share of the overall impact, in proportion to the usage measured (amount of data stored and duration of service use).

## Allocation to customers and report

### Proportional distribution for *Public Cloud* products

The distribution of the carbon footprint is based on the proportion of use observed. The criteria can be combined (e.g. number of × duration instances, volume hosted × duration) to reflect reality as closely as possible.

In determining each customer’s share, three factors are taken into account:

* The number of instances of the reference template consumed (or the sum of the coefficients if the instance is different from the reference template). The carbon footprint of a virtual machine is then multiplied by the reference template for the range.
* The instance reservation time. We integrate the actual time for reserving instances (in hours). The more instances a customer keeps reserved, the greater their footprint share.
* The share of management and orchestration servers. We use a ratio based on the number of hours that services are reserved in the entire datacentre. It was decided to use a calculation model combining the number of instances with their size. The weighting of reference template is preferred to avoid a customer with very large but few machines being underbilled compared to a customer who multiplies small instances.

The total environmental footprint of each customer is calculated. This result is returned monthly to customers to facilitate monitoring.

### Edit report

Each emission, regardless of its nature (Manufacturing, Usage and Operations), is reported in the customer’s greenhouse gas emissions estimation document, as presented in the Figure 8. This document, generate through the Environmental Impact Tracker, restitutes the results in monthly and annual time periods to facilitate monitoring in .pdf format.

Une image contenant texte, capture d’écran, diagramme, Parallèle

Le contenu généré par l’IA peut être incorrect.

Figure - Report template (source: OVHcloud)

This policy brief provides a general framework for assessing and distributing the carbon footprint within two major perimeters: dedicated servers (*Baremetal* and *Hosted Private Cloud*) and mutualized servers (*Public Cloud* “*Compute*” and *Public Cloud “Storage”*).

By systematically taking inventory of equipment, consolidating reliable data and implementing fair distribution rules, this system gives organizations and our customers a clear view of their responsibilities in terms of environmental impacts. It also allows you to identify priority optimization levers (reduction of stored volumes, right-sizing of computing instances, redesign of web hosting, etc.).

Once this computing system is in place, it becomes possible to drive a more ambitious Green IT strategy. The improvements achieved on each of the perimeters can be cumulative and create a virtuous circle, to the benefit of both economic performance and the reduction of environmental impacts. Finally, engagement and awareness raising from all stakeholders, from the provider to the end users, remains essential to move towards a more sober and environmentally friendly cloud model.

Glossary

|  |  |
| --- | --- |
| CPU | Central Processing Unit |
| CUE | Carbon Usage Effectiveness |
| GHG | Greenhouse gases |
| GPU | Graphic Processing Unit |
| GHG | Green House Gazes |
| HDD | Hard Disk Drive |
| kgCO2eq | Kilogram of carbon dioxide equivalent |
| PCB | Printed Circuit Board |
| PCIe | Peripheral Component Interconnect Express |
| PUE | Power Usage Effectiveness |
| RAM | Random-Access Memory |
| SSD | Solid State Drive |
| T&D | Transport and Distribution |
| VM | Virtual Machine |
| WTT | Well to tank |
| WUE | Water Usage Effectiveness |

Table of Figures

[Figure 1 - Perimeters for assessing the GHG emissions of cloud services (Source: OVHcloud) 3](#_Toc202948836)

[Figure 2 - Diagram of the global approach chosen for environmental footprint assessment (source: OVHcloud 4](#_Toc202948837)

[Figure 3 - Explaining picture of the composition of the OVHcloud server 5](#_Toc202948838)

[Figure 4 - OVHcloud components lifecycle (Source: OVHcloud) 7](#_Toc202948839)

[Figure 5 - Main power consumptions sources for operating a server (source: OVHcloud) 8](#_Toc202948840)

[Figure 6 – Elements for workload-based power conversion 9](#_Toc202948841)

[Figure 7 - Heterogeneous configuration of servers hosting a Public Cloud range 14](#_Toc202948842)

[Figure 8 - Report template (source: OVHcloud) 18](#_Toc202948843)

Table of Tables

[Table 1 - Carbon footprint of major components (Source: IJO, 2022) 6](#_Toc202948844)

[Table 2 - GHG intensity of electricity mix where OVHcloud operate 10](#_Toc202948845)

[Table 3 - Table of OVHcloud offers with the dedicated or mutualized services categorization 12](#_Toc202948846)

[Table 4 - Reference template of b3 range 15](#_Toc202948847)

Table of Equations

[Equation 1 - Calculation of the environmental footprint of server manufacturing (excluding refurbishment) 6](#_Toc202948848)

[Equation 2 - Calculation of the environmental footprint of server manufacturing (with refurbishment) 7](#_Toc202948849)

[Equation 3 - Calculation of the environmental footprint of the usage phase of a server 9](#_Toc202948850)

[Equation 4 - Computing a customer's environmental footprint with dedicated servers 13](#_Toc202948851)

[Equation 5 - Calculation of the environmental footprint of an instance of the reference template 16](#_Toc202948852)

1. The annual results for 2024 are available on the OVHcloud [website](https://corporate.ovhcloud.com/fr/investor-relations/financial-results/). [↑](#footnote-ref-1)
2. Green Cloud Computing - Lebenszyklusbasierte Datenerhebung zu Umweltwirkungen des Cloud Computing (2021) - [link](https://www.umweltbundesamt.de/sites/default/files/medien/5750/publikationen/2021-06-17_texte_94-2021_green-cloud-computing.pdf) [↑](#footnote-ref-2)
3. Available [here](https://portal.electricitymaps.com/datasets) under the Open Database License (ODbL): [https://opendatacommons.org/licenses/odbl/1-0/](http://example.com/) [↑](#footnote-ref-3)