

# Achieve Your Data Center Sustainability Goals

Intel® Data Center Manager empowers data centers to take control of their manageability and sustainability goals.

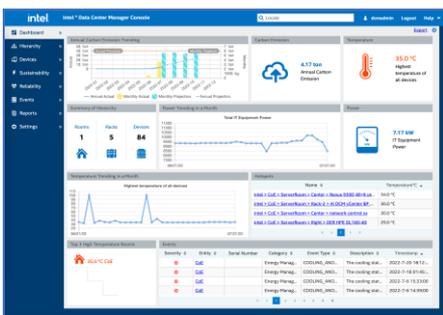


## Abstract

Intel® Data Center Manager (Intel® DCM) is a powerful software that enables data center managers and IT operators to increase the efficiency of the data centers they manage and reduce their carbon footprint. This is achieved through advanced monitoring, calculating, reporting, alerting, predicting, and controlling capabilities, which also improve energy consumption, thermal conditions, device health, and asset management. Real-time visibility into these aspects provides valuable insights and tools to identify and resolve issues quickly, resulting in enhanced data center performance, availability, cost savings, and sustainability.

## Background

Data center operators are constantly challenged with complex obstacles when it comes to achieving sustainability and operational efficiency. Meeting evolving governmental regulations and customer demands, as well as reducing carbon footprint, are all critical components of creating a greener data center. In today's world, transitioning to a more sustainable data center is not just a luxury, but a necessity that cannot be overlooked.



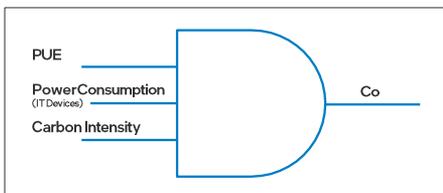
Intel® DCM Console Dashboard

## Data Center Sustainability

With the increased public awareness of today's environmental and climate risks and challenges, it is only sensible to take serious actions to make data centers greener, especially with data centers becoming denser, with multiple GPUs and other accelerators per server.

That is why new regulations for data centers continue to evolve - from strategies to improve efficiency to governmental mandates - making data center sustainability not just optional but essential.

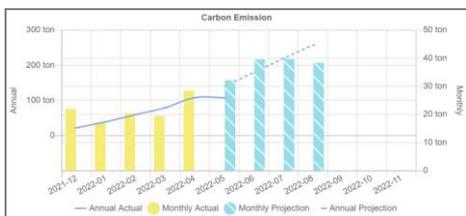
Intel® DCM introduces brand new features that aid data center managers and IT operators in achieving and improving their sustainability and efficiency objectives by monitoring, calculating, reporting, alerting, predicting, and controlling data center carbon emissions and footprint.



Formula for Measuring Carbon Emissions

## Measuring Carbon Emissions

Intel® DCM collects real-time power consumption data from servers and other IT devices in data centers. By inputting the carbon intensity of electricity used (in kilograms of CO<sub>2</sub>-equivalent emissions per kilowatt-hour) in various intervals such as hourly, daily, or monthly, Intel® DCM uses the Power Usage Effectiveness (PUE) metric to calculate carbon emissions in real-time as shown in the opposite figure. This can be calculated on the data center, room, rack, or device level.

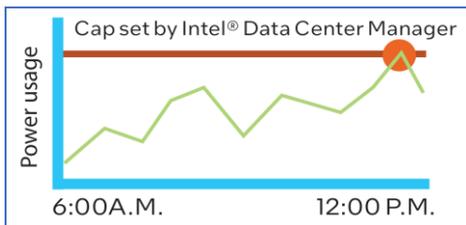


Carbon Emissions Trend & Projection

Additionally, Intel® DCM can calculate carbon emissions for logical groups of devices, making it possible to calculate the carbon footprint of specific workloads.

### Modeling Carbon Emissions

Intel® DCM can project carbon emissions and can trigger alerts based on user defined quotas. Additionally, Intel® DCM can use CPU/memory/IO utilization data to predict the power consumption and carbon emissions of a single node.



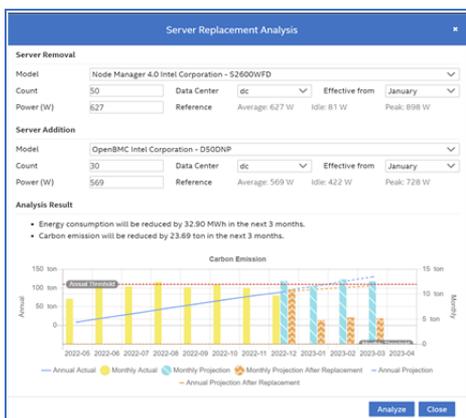
Server Power Capping

### Controlling Carbon Emissions

Intel® DCM can identify underutilized servers so that they can be consolidated to reduce carbon emissions. Additionally, Intel® DCM can power cap servers to reduce their carbon emissions.

### Carbon Intensity

Carbon intensity is a measure of the amount of carbon dioxide or other greenhouse gases that are emitted per unit of energy consumed. Typically expressed in kg CO2/kWh. This can be adjusted in Intel® DCM at a granular level (e.g., set 9:00AM to 4:00PM for carbon intensity of solar), and that can be copied to other months with one click.

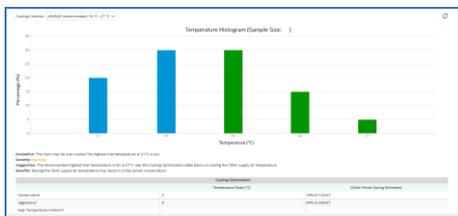


Server Replacement Analysis

### Server Replacement Analysis

Intel® DCM’s server replacement analysis feature can compare the sustainability of two server models based on their average power consumption over time rather than using their maximum power, idle power, or median power. This evaluation is based on actual customer workload data that is analyzed using AI algorithms to project the impact on carbon emissions if the server replacement is carried out.

This enables data center managers to make informed server procurement decisions that optimize energy efficiency and reduce carbon emissions.



Cooling Analysis

### Cooling Analysis

Intel® Data Center Manager’s cooling analysis feature directly collects device temperatures to identify overcooled rooms in data centers. Overcooling is a common problem that unnecessarily consumes power and increases carbon emissions.

By identifying overcooled rooms, data center managers can safely raise their set point temperature, optimizing energy usage and carbon emissions.

The 'Add Section' dialog box allows users to configure a new section for carbon emission reporting. Fields include: Section Template (Carbon Emission), Name (Carbon Emission), Description, Scope (Select Entity Scope), Time Range (Last 1 day), Hierarchy Level (Data Center), Sort (Descending), and Max Count (10). There are 'OK' and 'Cancel' buttons at the bottom.

Carbon Emission Reporting

### Carbon Emission Report

The importance of carbon emission reporting for enterprises cannot be overstated. A well-presented report not only helps companies comply with sustainability regulations but also enhances their chances of securing funding from governments and demonstrating their commitment to becoming carbon neutral. Intel® DCM offers highly detailed carbon emission data reporting, allowing data center managers to view emissions on a per-device, per-hour basis.

This level of granularity allows for customizable reporting, tailored to meet different organizational needs.

## Data Center Manageability

Intel® DCM provides comprehensive features to simplify data center manageability within a single pane of glass. It provides real-time monitoring of infrastructure health, utilization, power, and thermal management. It also includes asset inventory and firmware updating capabilities. With its user-friendly interface, simple installation requirements, and broad range of features, Intel® DCM is an essential tool for optimizing data center performance and efficiency.

Capacity Planning & Energy Monitoring	Forecasting Power & Space Needs 	Optimizing Rack Densities 	Granular Thermal Mapping 	Device Level Energy Monitoring 	Power Capping 
	System Utilization Monitoring 	Identifying Under-utilized Servers 	Real-time Detection of Health Issues 	Predicting Cooling Anomalies 	Reliable & Customizable Alerts 
	Infrastructure Right-sizing 	Real-time Discovery & Asset Tracking 	Remote System Management 	Server Firmware Updating 	End-to-end Data Aggregation 

## Requirements

Operating System of management server	<ul style="list-style-type: none"> <li>• Microsoft Windows Server 2012, 2012 R2, 2016, 2019, 2022</li> <li>• Red Hat Enterprise Linux 7.9 and 8.6 Server x86_64</li> <li>• SUSE Linux Enterprise Server 12 SP5 and 15 SP4 x86_64</li> <li>• Ubuntu Server 18.04.6, 20.04.4, 22.04 x86_64</li> <li>• CentOS 7.9 x86_64</li> <li>• Debian 10.13, 11.4 x86_64</li> </ul>
Hardware specifications of management server	<p>Minimum specifications for the system Intel® DCM is installed on:</p> <ul style="list-style-type: none"> <li>• A dual-core processor of 2.6 GHz or higher</li> <li>• 8GB RAM</li> <li>• 80GB of hard drive space</li> </ul> <p>Recommended specifications for a scaled environment (e.g., managing up to 20,000 nodes):</p> <ul style="list-style-type: none"> <li>• 2 * Intel® Xeon® Gold 6348 CPU @2.60GHz</li> <li>• 64GB RAM</li> <li>• 800GB SSD</li> <li>• Gigabit Network</li> </ul>

## Where to Get More Information

For more information on Intel® Data Center Manager, visit [www.intel.com/dcm](http://www.intel.com/dcm) or contact [dcmsales@intel.com](mailto:dcmsales@intel.com)



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