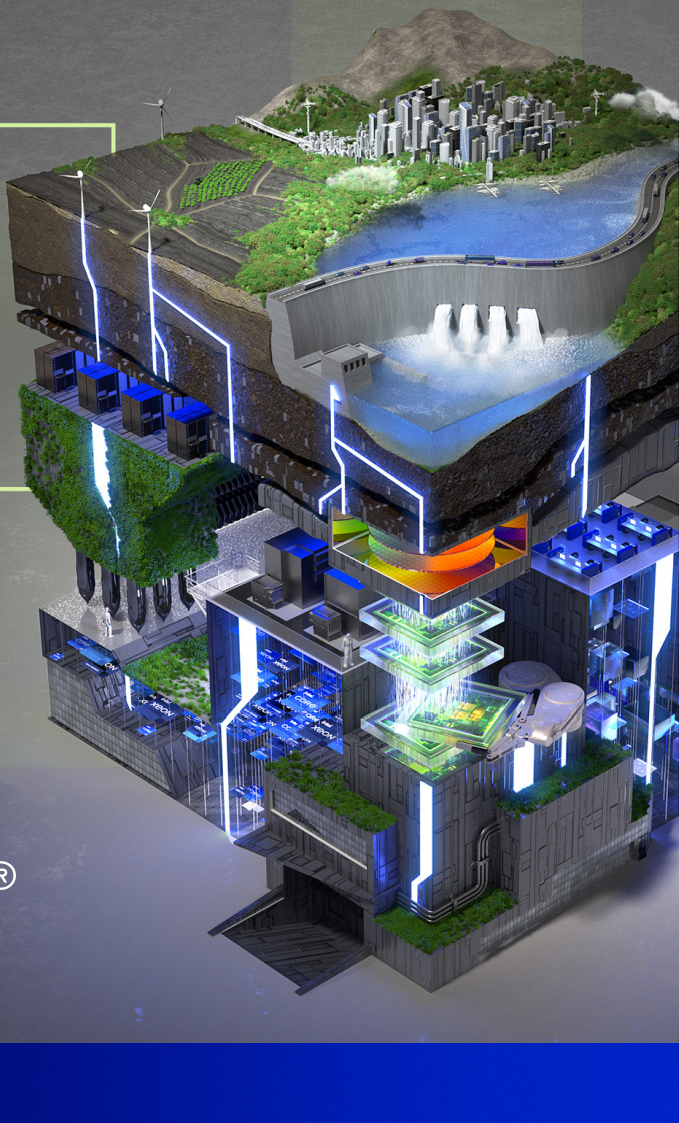




The sustainable data center



Deliver top performance and energy-efficient compute with Intel®



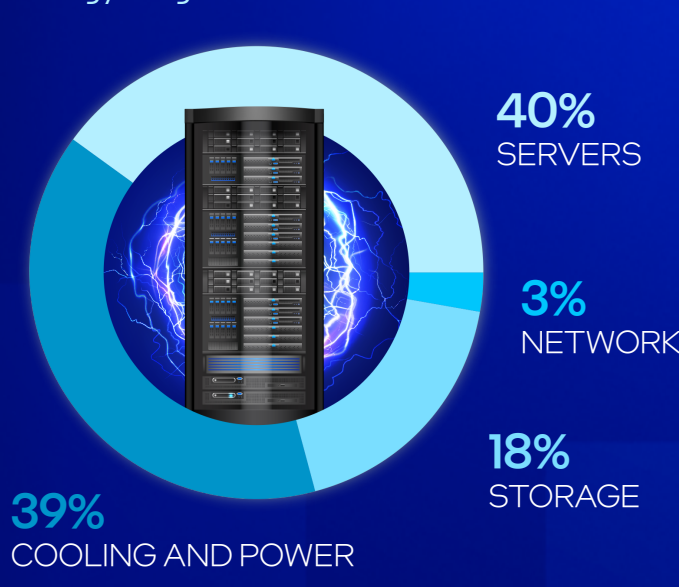
Uncover opportunity end-to-end

A more sustainable data center must optimize for every watt used across networking, storage, compute, cooling, and power—not just the performance of one component.

Intel's hardware, software, systems, and tools can advance data center efficiency: creating energy and carbon footprint savings while giving you the TCO and flexibility you need.

All without sacrificing performance.

According to Gartner®, the average energy usage within the data center is:



Reduce power consumption, even in demanding workloads with our configurable hardware and intelligent software

Improve efficiency and performance across targeted workloads

Up to **10x** improved performance/watt² on AI workloads with built-in acceleration*

*in 5th Gen Intel® Xeon® Scalable processors with Intel® AMX

Increase energy efficiency on lower-utilization workloads

Up to **14%** performance/watt improvement at ~50% load with Optimized Power Mode enabled³

*on 5th Gen Intel Xeon, versus OPM disabled

Enable AI and ML with carbon- and power-efficient deep learning training and inference

79% higher throughput/watt with Intel® Gaudi[®]2 vs. NVIDIA H100⁴

Save power deploying fewer new servers to meet performance goals

Up to **1,482 MWh** fleet energy savings with 5th Gen Intel Xeon[®] on data storage workloads⁵

*vs. 3rd Gen Intel® Xeon® processor-based servers over 4 years



Reveal CO2 emissions savings and reduce costs

by improving infrastructure utilization with intelligent tools and hardware-enabled telemetry

Better value with a lower carbon footprint vs. 4th Gen AMD EPYC, without compromising performance

62% TCO savings

634 tons reduced CO2 emissions⁷

Estimated over 4 years on a natural language processing workload

Decommissioning a single server can save up to

~1000KG Co2-equivalent emissions⁶

Refreshing and consolidating Xeon[®] processor-based servers* can reduce up to⁸

↓ **94%** server count

↓ **90%** CO2 emissions and power

↓ **77%** TCO

*when refreshing from 1st Gen Xeon[®] to 5th Gen Xeon[®] processors over 4 years on a natural language processing workload

Optimize for renewable energy

Selectively increase workloads when renewable sources are available, lowering your carbon impact

with built-in telemetry and intelligent software

Reduce costs with more efficient liquid cooling



With liquid immersion...

95% reduction in cooling OPEX

30% increase in hardware lifespan

10x increase in server density



Take advantage of Intel's holistic approach to driving innovation and supporting your data center's sustainability, including:



Driving computing platform efficiency

Lower system power usage with power management tools, load line improvements, and micro-architectural adjustments



Building a foundation for dense, high-performance computing

Shrinking data center footprint while meeting growing compute demands by increasing rack density with efficient liquid cooling and rack power optimization resources



Enabling operational awareness, automatically

Creating more intelligent, carbon-aware data centers, automatically combining rich telemetry data and system tools



Collaborating to optimize the hardware life cycle

Reducing waste and extending hardware life with innovative designs to allow greater device servicing and component reuse and recycling



Learn more about Intel's sustainable data center tools.

Visit intel.com/sustainabledatacenter

Footnotes and disclaimers

1. Gartner, How Can Sustainability Drive Data Center Infrastructure Cost Optimization?, November 2022

2. 5th Gen Intel Xeon Scalable processors using built-in Intel AMX accelerator engine deliver up to 10.2X better performance and 9.95X performance/watt improvement compared to a baseline 5th Gen Intel Xeon processor without acceleration on Image Classification with ResNet50 workloads. Performance varies by use, configuration and other factors. Results may vary. 8592: 1-node, 2x INTEL(R) XEON(R) PLATINUM 8592, 64 cores, HT On, Turbo On, NUMA 2, Total Memory 1024GB (16x24GB DDR5 5600 MT/s [5600 MT/s]), BIOS 2.0, microcode 0x21000161, 2x Ethernet Controller X710 for IGBASE-T, 1x Ethernet interface, 1x I7T SAMSUNG MZQL21T9HCUJ-00A07, Ubuntu 22.04.2 LTS, 515.0-78-generic. Test by Intel as of 10/10/23. Software configuration: ResNet50_v15, Intel Model Zoo: https://github.com/IntelAI/models; gcc-11.4, OneDNN3.2, Python 3.9, Conda 4.12.0, Intel TF 2.10

3. See [T2] at intel.com/processorclaims: 5th Gen Intel Xeon processors. Results may vary.

4. For test details and configuration, go to habana.ai/habana-claims-validation

5. See [T9] at intel.com/processorclaims: 5th Gen Intel Xeon processors. Results may vary.

6. Go Climate. "The Carbon Footprint of Servers" October 2022.

7. See [T206] at intel.com/processorclaims: 5th Gen Intel Xeon processors. Results may vary.

8. See [T77] at intel.com/processorclaims: 5th Gen Intel Xeon processors. Results may vary.

9. hypertec.com/immersion-cooling

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