Hewlett Packard Enterprise

Reference guide

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HPE GREENLAKE ENVIRONMENTAL SAVINGS

CONTENTS

ENVIRONMENTAL SUSTAINABILITY BENEFITS OF HPE GREENLAKE

HPE GreenLake is a consumption-based service model that can address the key causes of overprovisioning and low utilization rates for your on-premises or collocated data center IT equipment. HPE can help you execute an efficient hybrid multicloud delivery model that reduces total cost of ownership by 30% while reducing the environmental footprint of your IT.[1]

In addition to significant CAPEX and OPEX savings, HPE GreenLake customers are able to improve operational efficiencies for equipment, staff, and infrastructure; free up valuable space and cooling to overcome resource constraints; and reduce energy consumption and carbon emissions. The key benefits realized by the majority of HPE GreenLake customers include:

- Increased utilization driven by a metered infrastructure approach
- Minimized comatose equipment, which drains energy and resources while doing no useful work
- Enhanced server refresh cycles to take advantage of performance improvements from newer technologies while helping ensure the responsible management of end-of-use assets
- Right-sized infrastructure that reduces hardware-related costs and helps minimize the consumption of unnecessary assets

With HPE GreenLake Management Services, HPE remotely monitors, operates, and optimize your infrastructure and applications, so you're not held back by internal resources and capabilities. With unique IP and automation, along with a team of 23,000 global experts, the service delivers comprehensive monitoring, operations, administration, optimization, and nearly continuous improvement across all areas of IT.

By identifying the right technologies, processes, and business models to meet your needs, HPE can help you implement an IT strategy that delivers on both digital transformation and environmental sustainability objectives.

BENEFITS REALIZATION BY WORKLOAD

HPE estimates the following energy savings based on the most common configurations of HPE GreenLake solutions.

HPE GreenLake for compute

General compute provides consumption-based, rack-optimized servers for scalability in a small footprint. These HPE servers provide a balance of performance, expansion, and manageability across diverse workloads to support even your most critical applications and data on-premises.

Our portfolio of energy effective compute solutions enables HPE customers to achieve more compute with less energy. HPE Integrated Lights Out (iLO) is the foundation for the intelligence of HPE servers, with always-on intelligent provisioning, thermal control, and Dynamic Power Capping technology.

Yet, enterprises typically overprovision compute by more than 50%. When delivered and managed through HPE GreenLake, this is slashed to just 10% excess capacity, helping minimize the power drained by idle equipment. In addition, utilization levels of more than 70% are targeted by HPE GreenLake Management Services, yielding significant energy and cost savings over the 10% utilization rates found, on average, in nonvirtualized environments.[2]

Depending on the workload, HPE estimates that energy effectiveness increases approximately threefold when transitioning to HPE GreenLake for compute due to increased performance per watt.[3] For instance:

- **HPE ProLiant DL360 and HPE ProLiant DL380 servers:** 3x increase in energy effectiveness, realized with an approximate 7x performance increase for a 2x increase in power.[4]
- **HPE Synergy 480 Gen10 Compute Module:** 2.8x to 3.3x increase in energy effectiveness, realized with a 7x performance increase for a 2.1 to 2.5x increase in power. In addition, IDC calculates that customers can run equivalent workloads at 35% lower cost on average over five years with HPE Synergy than their legacy platform, including a 25% reduction in IT infrastructure-related costs such as the cost of hardware, power, and facilities.[5]

[1] "The Total Economic Impact™ of HPE GreenLake Flex Capacity," a commissioned study conducted by Forrester Consulting, 2020
[2] "Beyond PUE: Tackling IT's Wasted Terawatts," Uptime Institute, 2020
[3] Based on internal HPE calculations, 2021
[4] Based on HPE calculations, 2021
[5] "Generating Business Value Through IT Agility Using HPE Synergy," IDC, 2019

HPE GreenLake for storage

Over-investing in storage is a common problem for organizations, balancing provisioning risks with competing resource demands from other key IT and business activities. A study by Futurum Research found that almost 70% of enterprises using on-premises storage over-invest[6] while a report by Gartner estimates that 40% of storage capacity is unutilized, on average.[7] HPE estimates that the overall cost of keeping this free space unutilized for 500 TB of storage infrastructure over five years is $2.19 million.[8]

By changing the way, you buy storage to a storage consumption service, HPE GreenLake helps minimize this excess capacity from 40% down to just 10%. In addition to a 30% reduction in total cost of ownership, our customers see a reduction in the environmental footprint of their IT from avoided power and cooling resources.[9]

HPE GreenLake for virtual machines

Virtual Machines (VMs) allow IT organizations to run multiple virtual computers, operating systems, and applications on a single physical server, making more efficient use of the hardware and improving ROI. As opposed to nonvirtualized environments, which typically run at a fraction of capacity because each server is dedicated to a specific application, virtualization enables you to achieve higher workloads with higher utilizations.

The consolidation of applications onto VMs can lower server costs and their embodied environmental footprints. In addition, although operational energy consumption may increase due to increased utilization under HPE management, performance per watt is expected to increase exponentially.

HPE hyperconverged infrastructure (HCI) provides a software-defined management experience that virtualizes every storage and compute resources, allowing them to scale independently to help eliminate overprovisioning, lower VM license costs, and offer industry-leading data efficiency and data reduction depending on the workload. HPE HCI combines seamlessly with existing HPE ProLiant servers to improve resource efficiency and, powered by HPE InfoSight and its advanced artificial intelligence, can self-optimize and heal to help maximize performance across the full stack of storage, compute, networking, and virtualization.

When managed with HPE GreenLake Management Services, increased utilization levels deliver significant improvements in energy effectiveness, for instance:

- **HPE ProLiant DL325 Gen10 with HPE Nimble Storage HF40:** As utilization increases by 60%, customers may gain a 4.5x increase in energy effectiveness, realized with a 9x performance increase for 2x increase in power.[10]
- **HPE SimpliVity 380:** As utilization increases by 60%, customers may gain a 3.5x increase in energy effectiveness, realized with a 7x performance increase for less than 2x increase in power.[11]

When migrating workloads from 1U or 2U servers to a VM such as the HPE ProLiant DL325 with HPE Nimble Storage HF40 or HPE SimpliVity, power savings from consolidating workloads onto these VMs can yield a reduction of 69% total cost in ownership.[12] When compared to a traditional infrastructure consisting of siloed servers and SAN storage, customers can save 49% over three years; and this increases to 55% or more in remote office/brand office (ROBO) deployments.[13]

[6] "The Power of Consumption-Based On-Premises Services in Meeting Dynamic Storage Demands," Futurum Research, 2019
[7] "IT Key Metrics Data 2019: Key Infrastructure Measures: Storage Analysis," Gartner, 2019
[8] "Understanding the Hidden Cost of 'Free Space' in Datacenter Storage," HPE 2020
[9] Based on HPE internal data, 2021
[10] HPE ProLiant DL325 with HPE Nimble Storage HF40: Calculations based on SPECpower_ssj2008 for Ops/watt measurements and HPE Power Advisor for power consumption of specific configurations
[11] Based on HPE calculations, 2021
[12] "The Total Economic Impact of HPE SimpliVity Hyperconverged Infrastructure," Forrester Report, 2017
[13] "Analyzing the Economic Benefits of All-flash HPE SimpliVity 380," Enterprise Strategy Group, 2018

WANT MORE INFORMATION?

Contact your account executive to learn more about the sustainability and IT efficiency benefits of adopting HPE GreenLake.

ASSUMPTIONS

System assumptions

- For compute configurations: Pre-state assumes a nonvirtualized environment with a 10% utilization rate and overprovisioning at 60%. Post-state assumes an HPE GreenLake installation with planned excess capacity of 10% (on average) and an HPE Pointnext Services managed utilization objective of 70%.
- For storage configurations: Pre-state assumes an environment with 40% excess storage capacity. Post-state assumes an environment with 10% excess storage capacity, scalable through planned growth cycles.
- For VM configurations: Pre-state assumes a nonvirtualized environment with a 10% utilization rate.[14] Post-state assumes an HPE Pointnext Services managed utilization objective of 70%.
- In absence of an exact match between modeled configurations in HPE Power Advisor and the SPECpower data sheets, the best match was selected, focusing on selecting the closest processor and memory.
- Configurations modeled were selected as the most quoted configurations globally through HPE GreenLake Quick Quote tool issued between June 2020 and January 2021. These configurations are intended to provide a sample of environmental savings achieved through HPE GreenLake compute, storage, and VM solutions.

System parameters

System parameters outlined in the following are for demonstrative purposes only.

i. Compute

Product specifications	Compute general	Composable
Frame	HPE ProLiant DL360 Gen10 4LFF HPE 42U G2 Enterprise Shock Rack	HPE Synergy 480 HPE 42U G2 Enterprise Shock Rack / HPE Synergy 12000 frames
Processor	2x Intel® Xeon® Bronze 3206R Kit for HPE ProLiant DL360 Gen10 server	2x Intel Xeon Bronze Processor Kit for HPE Synergy 480 Gen10
Memory	6x HPE 32GB Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	6x HPE 32GB Dual Rank x4 DDR4-2933 CAS-21-21-21
Hard drive	2x 480 GB SATA 6G RI LFF SCC DS SSD	1x 480 GB SATA MU M.2 2280 DS SSD
Power supply and/or kit	1x 800W FS Univ Hot plug LH power supply Kit	HPE SY 480 Gen10 M.2 FIO Adptr Brd Kit

ii. Storage

	General purpose	Mission critical
Solution	HPE Nimble Storage HF40 adaptive, dual controller array providing up to 100,000 IOPS using 16 GB Fibre Channel host connectivity in HPE 42U G2 Enterprise Shock Rack	HPE Primera A650 2-node All Flash array providing up to 128,000 IOPS using 8x 16 GB Fibre Channel host connectivity in HPE 42U G2 Enterprise Shock Rack
Memory required	131 TB, 200 TB, 500 TB **(modeled separately)**	100 TB, 500 TB **(modeled separately)**

[14] "Beyond PUE: Tackling IT's Wasted Terawatts," Uptime Institute, 2020

iii. Virtual machine

	General purpose	Hyperconverged
Frame	HPE ProLiant DL325 with HPE Nimble Storage HF40 HPE 42U 600mmx1200mm G2 Kitted Advanced Pallet Rack with Side Panels and Baying	HPE SimpliVity HPE 42U 600mmx1200mm G2 Kitted Advanced Pallet Rack with Side Panels and Baying
Compute	HPE ProLiant DL325 Gen10 Plus CTO server	HPE SimpliVity 380 Gen10 SFF H node
Storage	HPE Nimble Storage Adaptive Array 294TB (21x14TB) FIO HDD Bundle	1x 1.2 TB SAS 12G SFF (2.5 in.) 20-pack HDD
Processor	1x AMD EPYC 7282 FIO Processor Kit for HPE ProLiant DL325 Gen10 Plus	1x HPE ProLiant DL380 Gen10 6230 Xeon-G Kit, 20-core
Memory	2x HPE 128GB Quad Rank x4 DDR4-3200 CAS 22-22-22 Load Reduced Smart Memory Kit	1x 192G (12x16G) RDIMM Kit
Hard drive	2x HPE 480GB SATA RI LFF LPC DS SSD	4x 1.92 TB SATA 6G Mixed Use SFF (2.5 in.) SSD
Power supply and/or kit	HPE 500W FS Plat Ht Plg LH Pwr Sply Kit, HPE NS AF/HF 1200W Spare Pwr Sply	1x HPE FlexFabric 10Gb 2-port 534FLR-SFP + Adapter

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