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POV

Navigating the Path to Sustainable IT Ops

Sustainable IT ops

Sustainable IT operations involve implementing sustainable practices, optimizing energy efficiencies in the data center, and minimizing electronic waste. It aims to reduce IT infrastructure's environmental impact while maintaining operational effectiveness.

The year 2023 will be the warmest year on record!

The global mean near-surface temperature in 2023[#1] (data captured till October) was around 1.40 ± 0.12 degrees Celsius above the year 1850–1900 average. It is virtually certain that 2023 will be the warmest year in the observational record.

We have come this far

Climate crises are ever-increasing, each year is getting warmer and warmer, and the overall global temperature has been shooting up. Scientists across the globe have already warned that if the threshold of 2 degrees Celsius rise exceeds, then there could be catastrophic and disastrous outcomes.

The number of industrial and commercial activities is ever-increasing, adding carbon and carbon equivalents, also known as Greenhouse Gas 'GHG,' into the atmosphere. GHG is a cause of global warming, and there is a need to limit our GHG emissions and cut them to half by 2030[#2] so that the temperature remains under 1.5 degrees Celsius to avoid any catastrophic changes and cut down emissions to zero in 2050 for environmental sustainability. While all nations and organizations are coming together to solve this problem, each has taken its own target year based on progress, capabilities, and constraints.

Energy usage amounts to 73.2% of global GHGs,[#3] and to reduce emissions, the electrification of energy and transportation is a must. Out of the total energy sector, the data center consumes 1-2%, or 200–250 TWh[#4] and that is significant as it is close to the aviation industry. Some predictions also mention that the rate at which the data center industry is growing, its energy consumption may reach 8-10% % by the end of this decade. So, it is essential that we use sustainably and develop practices around sustainable IT.

IT can support sustainability

Sustainable IT operations involve using technology in an environmentally and socially responsible manner, considering factors like energy ef ciencies, waste reduction, and ethical sourcing of materials. The goal of sustainable IT is to minimize the environmental impact of information technology by ensuring that we maintain efficiency at each lay r, from application to IT resources to data center cooling.

It is imperative to understand that ~80%[#5] of the server's carbon footprint consumed during the usage phase can be translated into your energy consumption; this has a significant implication for your total cost of ownership since running and cooling the server far exceeds the initial price of the hardware.

But there could be an argument that customers these days don't host servers in their data centers and consume the cloud for hosting applications; the fact is, when it comes to emission reporting, there are multiple parts to it, which revolve around GHG reporting standards and include your consumption of goods and services.

Organizations will have to report the emission numbers

GHG reporting standards: generally, in Scope 1 emissions, direct GHG emissions by data centers, backup generators, purchase fuel energy or refrigerant gas emissions based on the organization's activities under its control. Scope 2 includes emissions from the generation of electricity, heating, and cooling purchased and used for own consumption.

Scope 3 is indirect emissions that result from activities of an organization but occur from sources not owned or controlled by that organization; this includes emissions from the supply chain, employee commutes, and other external factors. The new global reporting agencies seek data from all scopes to include in the emission reports.

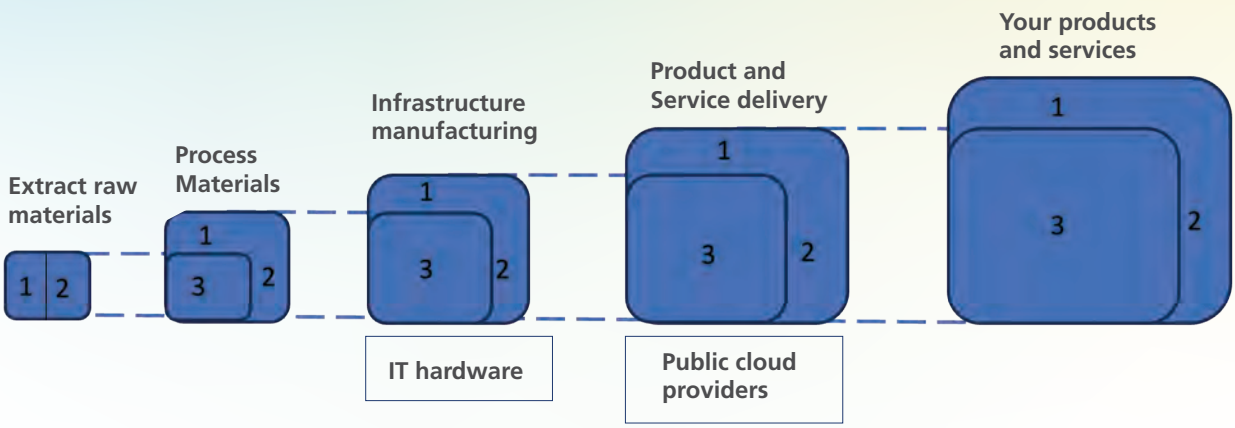

Figure 1: Emission Scope across value chain

Cloud computing sustainability

Cloud providers are increasingly adopting sustainable practices to minimize their environmental footprint by bringing in the usage of renewable energy, energy-efficient technologies, and implementing eco-conscious policies. Customers are responsible for sustainability in the cloud, optimizing workloads and resource utilization, and minimizing the total resources required for workloads. Organizations can also build solutions that will help bring sustainability outside of the cloud or data center using IT technology, i.e., sustainability through technology. For example, preventative maintenance of industrial equipment to avoid failure and the cause of environmental incidents.[#6]

Key levers to tighten for sustainable IT operations

Four major KPIs that contribute to sustainable IT practices for end consumers are:

- Renewable energy usage
- Energy efficiency
- Carbon footprint reduction
- Transparency and reporting

Organizations can explore ways to choose a greener data center based on the geography and carbon intensity of the region. Hosting services in green data centers and less carbon-intensive areas will help

to achieve those KPIs. For example, carbon intensity in Nordic countries is far less; Norway has an almost entirely renewables-based electricity system, with renewable resources accounting for 98% of generation 2020[#7]. Further building a green stack, i.e., code optimization to improve code efficiency and reduce power usage, helps contribute to energy efficiencies. Baselining emissions for the data center helps to provide accurate reporting and tracking of the reduction in emissions.

Going beyond to implement and start sustainable IT operations

Organizations are building in-house practices and adopting frameworks from Sustainable IT.org or GreenOps[#8] to work comprehensively for identifying and optimizing the energy requirements of the technology stack without compromising on the business performance or user experience. At its core, it highlights the need to reduce carbon emissions by bringing awareness, cultural shifts, accountability, and responsibility among various teams.

Organizations are collaborating with IT service providers to realize the benefits of sustainable IT in their data centers and cloud environments. LTIMindtree, with its Sustainable IT Ops, has served multiple customers to set strategy, bring visibility, and work with them to build cultural practices. We have executed projects to baseline and reduce emissions from the application resources and data center servers' environments. Green coding, for instance, scans the application code and comes with a green scoring index to highlight how efficient or less efficient the code is. Further, it gives recommendations and best practices to fix the low-scoring code to meet the green coding measure[#9] and help achieve a higher green index for the application code. Green Infra,[#10] on the other hand, scans the data center and provides recommendations to move the workload to fewer nodes on the virtualized setup in the center. This helps to free up or repurpose the existing hardware for new projects, thus cutting into the the emissions that would be generated by additional hardware. On the cloud, the recommendation is to move the workload to the lower-size instance if the utilization of the servers is low or the server is oversized. The solution takes care of the application performance and policy constraints as it collects metrics from various sources before recommending any actions for workload movement. It is observed that initial baselining and optimization initiatives reduce emissions and energy spend by a substantial amount aligned with organization's target.

Reducing emissions helps the environment. Optimizing code and resource usage allows organizations to save on cost, making IT Operations for businesses more valuable and sustainable in the long run.

Citations

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About the author

Nilesh Korgaonkar, Associate Principal for Consulting Cloud and Infra is a seasoned consultant working with LTIMindtree CIS unit providing technical solutions and solving customers problems to achieve IT resource usage optimization and sustainability. Nilesh builds green IT practices to help organizations to adopt and bring sustainable IT operations in their environment.

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