

Title: A succinct state-of-the-art survey on green cloud computing: Challenges, strategies, and future directions

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Abstract: [Cloud computing](#) is a method of providing various computing services, including software, hardware, databases, data storage, and infrastructure, to the public through the Internet. The rapid expansion of [cloud computing services](#) has raised significant concerns over their environmental impact. [Cloud computing](#) services should be designed in a green manner, efficient in energy consumption, virtualized, consolidated, and eco-friendly. Green Cloud Computing (GCC) is a significant field of study that focuses on minimizing the environmental impact and energy usage of cloud infrastructures. This survey provides a comprehensive overview of the current state of GCC, focusing on the challenges, strategies, and future directions. The review study begins by identifying important challenges in GCC from practical implementations, identifying GCC-introduced environmental protection and prevention initiatives, and expressing the demand for long-term technical progression. It then addresses GCC's primary concerns, such as energy efficiency, resource management, operational costs, and [carbon emissions](#), and categorizes implementations according to algorithms, architectures, frameworks, general issues, and models and methodologies. Furthermore, enhancements in [virtualization](#), multi-tenancy, and consolidation have been identified, analyzed, and accurately portrayed to address the advancements in GCC. Finally, the survey outlines future research directions and opportunities for advancing the field of GCC, including the development of novel algorithms, technologies for [energy harvesting](#), and energy-efficient and eco-friendly solutions. By providing a comprehensive overview of GCC, this survey aims to serve as documentation for further evolving new emerging technological approaches in the GCC environment.

Keywords: Green Cloud Computing (GCC), Energy Efficiency, Resource Management, Virtualization, Carbon Emissions, Eco-friendly Infrastructure, Energy Harvesting, Sustainable Technologies

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