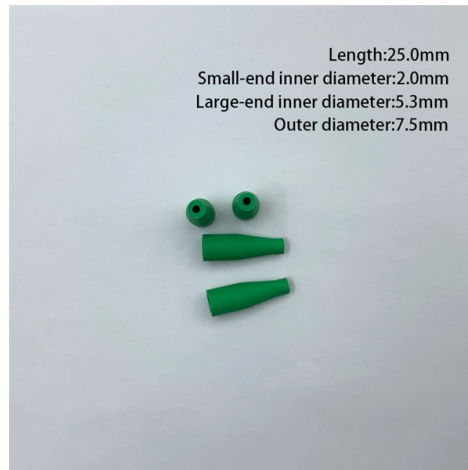


New Energy Management System for Cloud Computing



AI Overview

Next-generation energy management systems in cloud computing leverage AI, real-time analytics, and renewable integration to optimize energy efficiency and sustainability while maintaining service quality. Overview Cloud computing data centers (DCs) are major energy consumers, with global DCs consuming more electricity than most countries, and their energy demand is projected to grow annually by over 12%. New energy management systems aim to reduce energy consumption, carbon footprint, and operational costs while ensuring high service quality. These systems integrate AI-driven optimization, advanced cooling, virtualization, and renewable energy sources to achieve sustainable cloud operations.

.AI-Driven Energy Optimization Artificial Intelligence (AI) plays a pivotal role in modern energy management for cloud computing:

- Workload Prediction:** Machine Learning models like LSTM and Random Forest forecast server demand, enabling proactive resource allocation.
- Dynamic Resource Allocation:** Deep Reinforcement Learning (DRL) models, including Deep Q-Networks (DQN) and Proximal Policy Optimization (PPO), adjust computing resources in real-time to match fluctuating workloads.
- Energy-Aware VM Placement:** AI optimizes virtual machine placement to minimize energy usage while maintaining performance.
- Cooling Optimization:** Predictive analytics guide advanced cooling systems, including liquid cooling, to reduce power consumption.

These AI-driven strategies can reduce data center energy consumption by 20% to 40%, improving both efficiency and sustainability.

.Cloud Integration with Smart Energy Systems Cloud computing enables real-time, large-scale energy management for smart grids and distributed energy resources (DERs):

- IoT Sensor Data Processing:** Thousands of sensors across grids and substations feed data into...

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AI-Driven Energy Management in Green Cloud Computing: A

AI-based energy management plays a vital role in promoting sustainability within cloud computing environments by optimizing resource usage and reducing energy consumption.

CLOUD COMPUTING BASED POWER AND ENERGY

Abstract: A centralised smart supervisor (CSS) controller with enhanced electrical energy management (E2-EM) capability has been developed for an Iron Bird Electrical Power Generation

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Features

As enterprises move from prompting chatbots to orchestrating AI agents, IT leaders must rethink governance, data architecture and cost management to avoid chaotic deployments and runaway

Energy-Efficiency and Sustainability in New Generation Cloud

In this paper, we propose a vision for learning-centric approach for the integrated management of new generation Cloud computing environments to reduce their energy consumption and carbon footprint

Optimizing energy consumption in centralized and distributed cloud ...

Comparing different architectural models and demonstrating the energy efficiency of distributed and semi-distributed systems is of great importance due to the high energy consumption

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Energy Efficiency in Cloud Computing Infrastructure

Objectives: This research aimed to conduct an in-depth review of existing energy-efficient cloud computing approaches and explore potential novel methods for enhancing energy efficiency without

Green Cloud Computing: Energy-Efficient Solutions for

Through a combination of literature review, industry benchmarking, and simulation modeling focused on key IT regions in Pune, India, we assess the effectiveness of strategies such as...

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A novel approach for energy consumption management in cloud

Efficient resource utilization is essential for mitigating energy consumption in cloud centers. In our research, we adopted a novel hybrid approach to dynamically allocate resources in

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