

Sensor communication model using cyber-physical system approach for green data center

ABSTRACT

Energy consumption in distributed computing system gains a lot of attention recently after its processing capacity becomes significant for better business and economic operations. Comprehensive analysis of energy efficiency in high-performance data center for distributed processing requires ability to monitor a proportion of resource utilization versus energy consumption. In order to gain green data center while sustaining computational performance, a model of energy efficient cyber-physical communication is proposed. A real-time sensor communication is used to monitor heat emitted by processors and room temperature. Specifically, our cyber-physical communication model dynamically identifies processing states in data center while implying a suitable air-conditioning temperature level. The information is then used by administration to fine-tune the room temperature according to the current processing activities. Our automated triggering approach aims to improve edge computing performance with cost-effective energy consumption. Simulation experiments show that our cyber-physical communication achieves better energy consumption and resource utilization compared with other cooling model.

Keyword: Cyber-physical system; Green data center; Energy consumption; Wireless communication