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Performance and energy consumption tradeoff in server consolidation: state-of-the-art and challenges

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Green Seminar Room, D Floor

Abstract: Information Technologies (IT) are currently responsible for 15% of energy consumption, having an untenable growth in the coming years. One of the main contributors to this energy consumption is data centers, for which demand is increasing daily by users who access services through the Internet. To mitigate this effect, a set of techniques to minimize energy consumption was proposed within the Green IT framework. Server consolidation is one of the most widely used among the proposed techniques. This technique has an inherent trade-off between the performance and the energy consumption, due to the fact of allocating the maximum number of virtual machines in the minimum number of physical machines.

There is a set of metrics related to the balance between performance and the energy consumed, such as PUE, CUE, SWaP, ITEEsv. However, none of them reflects the server consolidation behavior. That is, all of them are not considering the number of consolidated virtual machines.

During this seminar, we will explore the CiS² metric, which quantifies the tradeoff between performance degradation and energy consumption of server consolidation. Also, we will depict the use of this metric for system's administrators knowing the mentioned tradeoff and be able to carry out actions in this regard, for example, a change in the virtualization hypervisor.

Bio: Dr. Belen Bermejo is a lecturer on Computer and Architecture Technology and a member of the ACSIC research group at the University of the Balearic Islands (Spain). Her research is focused on improving the balance between energy consumption and the performance of virtualized servers and cloud computing data centers. In addition, she is currently also focusing her efforts on studying the energy consumption of surveillance capitalism. She is also chair of Women in Engineering of the IEEE Spain section. In addition, she has numerous publications in indexed journals, international conferences, and book chapters. Her teaching is focused on performance engineering, computer architecture, and innovation and research management.

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