Power provisioning for a warehouse-sized computer, ISCA 2007

(1) Summary

As the cost of powering data center increase, it is get more important to fully utilize a given power capacity on datacenter system. However, there are three big obstacles on predicting, controlling and managing power consumption of big data center system

1) There is huge gap between the actual peak power consumption and the theoretical peak usage of the system(40% at most)

2) Actual power consumption of servers significantly depends on the amount of activity,

3) The power consuming tendency on large-scale system varies as applications different

With long-term large scale measurement, this paper shows the characteristic of 3 large-scale workloads (Websearch, Webmail, Mapreduce) as well as a workload mix from an actual datacenter. By characterizing power consuming tendency of those workloads on three level (Rack,PDU,Cluster), This paper suggest that it is better to build power provisioning strategy not on rack but on cluster level. Even when the difference between power capacity and power utilization is insignificant on each lack, the difference increases when it aggregated at the cluster level.

and this paper argue that to exploit utilization of power budget, system need to think the power efficiency on activity range(vary over time) not only on peak performance level.

(2) Pros & Cons

strong - First power usage study at data center level on real data center workloads

weak - Precisely measuring the power consumption of large scale cluster on real workloads and shows those measure on multi-level (Rack,PDU,Cluster)

they suggest the new power provisioning strategy but do not shows actual result of applying that.

(3) Ideas

Show the actual difference of power efficiency between conventional one and the one with their own strategy.

Where is the energy spent inside my app? Fine Grained Energy Accounting on Smartphones with Eprof, Eurosys 2012

(1) Summary

This paper is on profiling and accounting the energy consumption of smartphone apps. There is three the main contributions as follows.

They present fine-grained energy profiler called Eprof the first fine-grained energy profiler for smartphone apps. And it map power draw and energy consumption to programmable entity to make it ease of accounting energy.

This paper is the first time analyzing on several actual app people use (popular free apps) and find out those apps use only 10~30% of total app energy for the main purpose. (the others are energy drain).

By presenting the app I/O energy with their new accouting strategy, the app/program developer can easily understand and optimize the energy drain/usage of apps.

(2) Pros & Cons

strong - First in-depth study on smartphone energy consumption

weak - it would be not easy for app developers to apply eprof to their apps. Hope to make it as simple modules.

(3) Ideas

Hope to open the source code of how they made the power draw and energy consumption to program entity and handle them. Hard to catch up with those ideas