EUROPEAN ENVIRONMENTAL CITIZENS ORGANISATION FOR STANDARDISATION

ECOS

ORGANISATION EUROPÉENNE ENVIRONNEMENTALE CITOYENNE POUR LA NORMALISATION

ECOS on behalf of European environmental NGOs
Comments on draft Tasks 3-5 of the preparatory study for Enterprise Servers
(ENTR Lot 09)

November 2014

As explained in the NRDC recent report on data centre efficiency, up to 30 percent of servers in data centres are unused but still powered on and drawing electricity 24/7. Many others are grossly underutilized, with average utilisation levels around 12 percent. Reducing the unnecessary electricity consumed by servers doing little or no work, and the energy used to cool them, is by far the largest opportunity for energy savings in data centres, which could be up to 80%[1].

While part of data centre energy savings opportunities are operational in nature (getting data centre operators to power down unused servers and increase utilization levels of others), there are important ways servers and data equipment can be designed to save energy in the context of the current operational paradigm, as well as to help remove current barriers to more efficient operational behaviours, as described below.

- Reducing idle power consumption

Given the large number of servers which are completely unused and the large share of time others are spending in idle mode waiting for transaction requests, reducing server and data equipment idle power is critical. While there has been good progress by the industry in doing so, much more needs and can be done. For example, memory is often responsible for the majority of consumption in idle mode, because many servers have large amounts of memory, and CPUs now use little power in idle mode. Using lower power memory, and powering down some memory in idle could lead to significant energy reductions in idle mode.

➔ **Include a discussion on the power consumption of servers and data equipment in idle mode, and the technology options for reducing it.**

- Reducing power consumption at low load

Servers and data equipment also spend a lot of their time operating at low load (defined as less than 20% of CPU utilization). Similarly to idle, energy efficiency of equipment operating at low load should be a design priority. Using more efficient memory and powering down some CPUs and memory not needed at low load could help reduce energy consumption substantially.

➔ **Include a discussion of the power consumption of servers and data equipment at low load, and the technology options for reducing it.**

- Encouraging the use of sleep mode, and reducing its power consumption

Sleep mode is a mode where servers and data equipment are in a lower-power mode than idle, but still able to resume operation relatively rapidly. Typically, most components are powered down, but

[1] Masanet et al., "Estimating the Energy Use and Efficiency Potential of U.S. Data Centers," Proceedings of the IEEE 99, no. 8, pp 1440-1453, August 2011.

memory is still active. The use of sleep mode for servers that are not needed to respond to immediate work requests, is a key opportunity for data centre energy efficiency. However this mode is often not enabled by data centre operators, and its power consumption is still relatively high because of the need to keep large amounts of memory energized.

➔ **Analyse power consumption of servers and data equipment in sleep mode, options for reducing it, and ways to encourage its use in data centre operations.**

- Encouraging the use of Standby/Off mode, and improving reactivation latency and reliability

Standby/Off mode, where the equipment is fully powered down with the ability of remote reactivation, has very low power use and would provide the largest opportunity for energy savings for those servers that are required very unfrequently, for example to cope with a few annual or even monthly activity peaks. However this mode is very rarely used in data centre operations, for two main reasons: 1) the long latency for server reactivation, which can go up to 30 minutes; 2) the concern by operators that the server may not power back on successfully and require manually intervention. Enabling the use of Standby/Off mode by servers and data equipment which are not expected to be needed for several hours would yield a large energy savings potential in data centres.

➔ **Describe the current situation relative to Standby/Off mode reactivation latency and reliability, and technology options to enhance the current situation to encourage the operational use of this mode in appropriate circumstances in data centres.**

- Enabling higher utilization

Current mainstream servers are not designed to support utilization levels of 50 percent or higher, they are limited by memory resource issues under heavy utilization (John Clinger, ICFI, ENERGY STAR Program). Resolving these issues would allow operators to achieve higher utilization levels by increasing virtualization.

➔ **Discuss these issues and possible technology solutions.**

- Other comments:

- Resource efficiency aspect

We call upon the consultants to further look into the recycling and secondary use of enterprise servers. We understand there is a lack of data available. However, the preparatory study needs to provide a robust analysis on which the Commission can base its legislative proposals.

➔ **Analyse further the recycling and secondary use aspects and possible improvements.**

- Exclusion of network equipment

We acknowledge the decision to take networking equipment out of the scope because of their diversity of use and protocols. However, networking equipment are a large and rapidly growing segment of data centre energy consumption.

➔ **Should networking equipment be taken out of the ENTR Lot 9 scope, the report should include recommendations on how to best reduce their environmental impacts through existing EU legislations.**