

Comments from European Commission on ENERGY STAR specification for Computer Servers Version 3.0 Draft 1

We support revising the specification based on the four key elements mentioned in the cover letter i.e. more stringent power supply efficiency requirements, add Active State requirements, extend and revise the Idle State efficiency requirements, and lowering the Auxiliary Processing Accelerator (APA) maximum idle state power requirement.

We propose to consider additional elements in this revision, which also add to the energy efficiency of servers and data centres.

In the following, we provide detailed comments on these topics.

Power supply efficiency requirements

We support the proposal of including more stringent PSU efficiency requirements for PSUs by basing the requirements on 80Plus platinum levels.

Active State requirements

The European Commission looks forward to discuss Active State Efficiency Requirements in order to use a metric, which is closer to typical real life usages than the Idle State Efficiency Criteria.

The European Commission is currently working with possible ecodesign and energy labelling regulation of servers and storage equipment. As part of this, a dedicated study on servers and storage standards has been performed, which also aims at developing an efficiency metric: www.server-standards.eu. In addition, an Impact Assessment of these products is ongoing.

The comments below on the three points requested from the EPA are partly based on conclusions achieved so far from these activities.

1) EPA question: *Should Active State and Idle State criteria remain separated as is currently proposed in Draft 1, or are there technical merits to combining them into a single metric?*

We believe that idle power is an important issue whether or not it is integrated into a single metric. On one side, a single metric offers more flexibility, and allows some trade-off between idle power and efficiency at high performance levels. Moreover, a single metric also avoids some of the issues when setting idle power allowances for individual components, which has not always been as effective as desired. On the other side, the introduction of idle power-related factors into a metric for the active state at product (i.e. server) level could be potentially seen as favouring products with low idle power, without taking into consideration the idle power consumption as system level. The work carried out by the European Commission on developing a metric could be informative regarding how – and if – to consider idle levels.

2) EPA question: *What guidance can industry provide end-users to better correlate the SERT workload scores shown on the ENERGY STAR computer servers qualified product list with customer's real life workloads and applications? EPA would like to work with industry to develop and/or disseminate guidance for purchasers as part of the Version 3.0 process.*

We will recommend using a metric, which combines the performance, power and efficiency for each component workload (tested using SERT worklets) into an average server power, performance and efficiency metric. The European Commission is studying the possibility to use such a metric developed as part of the Server and Storage Standards study (www.server-standards.eu) as an information requirement in a future server regulation. The principle is to develop the metric through 3 steps:

1. Aggregate multiple testing values for each worklet into worklet efficiency
2. Combine worklets into their workload groupings to arrive at results for each workload efficiency (CPU, storage, memory)
3. Aggregate workload results to arrive at an average server efficiency

These results should be representative of real life situations, and they can provide relevant guidance for the purchasers. More information on the metric can be provided by the European Commission.

3) EPA question: *Are the two storage worklets scores in SERT sufficient to differentiate computer server configurations from storage products? EPA welcomes feedback on how to more clearly handle computer server products which are performing heavy storage duties, particularly in light of the Version 1.1 revision of the ENERGY STAR Data Center Storage specification planned for later this year that is expected to expand the scope to include network attached storage products.*

Storage products should as such not be tested with SERT, because the storage worklets only measure efficiency as a function of data access speed and not capacity, both of which are important in defining storage. It also does not measure RAID performance or COMs (Capacity Optimisation Methods). This means they are not effective as a way to measure efficiency of a server performing storage duties. However, we cannot see how SERT could be used to differentiate computer server configurations from storage products and will recommend that the differentiation of servers and storage products is secured through the product type definitions.

Server configurations for in-use efficiency testing

When recommending server configurations, it must be remembered that additional I/O cards, graphics cards and even some SSDs will increase power consumption while not contributing to the performance of the server under SERT testing. This applies to any analysis based on current ES qualified server database.

For this reason, the draft of the EC metrics under formulation recommends no IO cards and a fixed number of drives are configured to enable more direct comparison. It also avoids the need to develop power adders (or subtractors) under multiple worklets and load levels for in-use efficiency metrics. However, it is noted that this may not fully represent a typical configuration.

Idle State efficiency requirements

We support to extend the criteria as proposed to include all one and two socket servers.

We need though to do further data analyses on the EPA dataset to further verify this and to review the levels proposed including the adders. We would therefore like you to make the dataset and other relevant data and information available for us in order to perform these analyses.

Preliminary analysis¹ of the current ENERGY STAR dataset suggests that approximately 70 % of server models first made available on the market in 2015-16 will qualify. Earlier models are not considered

¹ There may be small errors relating to allowances for IO ports

relevant due to the rate of technology development. Preliminary analysis suggests that both the base allowance and RAM allowance are not sufficiently stringent to qualify only 25 % of products. There also appears to be a correlation between the server total CPU frequency (CPUS*cores*frequency) and the baseload. This means that the baseload may need additional allowances or risk penalising higher performance configurations.

In addition, higher performance servers tend to be more efficient in use (based on metrics developed to support EC). Therefore, requiring a server meet both idle and in-use efficiency metrics could effectively exclude both the high and low performance server configurations. More analysis is needed to determine the effect of this. Investigating the development of performance categories, rather than categorising by sockets may offer a solution to this.

Auxiliary Processing Accelerator (APA) maximum idle state power requirement

The information stated in the note box in the draft 1 specification looks to be completely up to date and in line with the latest AMD/Nvidia GPUs released in the past two months. These use the latest 16 nm manufacturing and therefore represents a big improvement in efficiency. However, 30 W seems high based on this data since the data suggests the average (temporal) idle is under 10 W.

However, there is a risk in lowering power too far because the idle power can depend heavily on the OS and software drivers (e.g. Windows OS vs Linux). Additional testing is recommended to clarify this.

The European Commission need also here to do more analyses to verify our comments and would like to receive the data and information used for setting these levels.

Revised definitions

Managed vs unmanaged servers: There are definitely on the market low-end tower and rack servers not designed for redundant power supplies and therefore not considered to be managed. Furthermore, currently, there are 4 out of 195 registered servers in the EU ENERGY STAR database (www.eu-energystar.org/db-currentlists.htm), which are declared to be unmanaged.

We recommend keeping the differentiation between managed and unmanaged servers to ensure all server products on the market are covered.

Consolidating the previous HDD and SSD definitions into “Storage Device”: We agree in the change, but would suggest writing “hard disk drives” instead of “disk drives” in the first sentence. Consider also to revise the text in other places in the specification with reference to “hard drives” or “internal drives”.

Product Family Tested Product Configurations: We support analysing further how to minimize the test burden and at the same time be sure that all products within a compliant product family are compliant. We propose that the industry submit sufficient data to verify that fewer test configurations are sufficient to cover the whole family. We would like to receive the datasets to analyse the issue.

Additional elements considered

ASHRAE thermal classes: When the datacentre ICT equipment can withstand broader temperature and humidity ranges, free cooling principles and utilization of excess heat for useful heating purposes-

es may provide a higher energy saving potential. We therefore recommend to analyse and consider reference to which ASHRAE thermal class the server can be working in – at least as part of the Standard Information Reporting Requirements. This can be a valuable source of information for a potential server purchaser, who wants to use free datacentre cooling or use of excess datacentre heat.

Incentivized dc servers: Dc servers may increase energy efficiency due to reduction of losses in UPS and power supplies. These may be incentivized. We recommend the EPA to further consider this option.