

Computer Servers Draft 2 Comment Response Summary

Ref. #	Organization	Topic	Stakeholder Comment Summary	EPA Response
1	Comment Summary	Resilient server definition	One stakeholder commented on the resilient server definition. The stakeholder commented that most, but not all, resilient servers will no longer use memory buffer chips. They suggest including a requirement that resilient servers are able to provide a maximum memory capacity of 1.5 terabytes.	EPA is proposing a revised resilient server definition in Draft 3 based on significant industry feedback, and welcomes feedback on the changes.
2	Comment Summary	Product Family definition	Two stakeholders commented on the product family definitions. The first stakeholder appreciates EPA's approach to certifying a server family by identifying the range of configurations which meet the ENERGY STAR active efficiency and idle power thresholds and that the range of certified configurations can be a subset of the total configurations which can be created for a given server product family. The second stakeholder supports defining the capabilities of product family using three configurations, but is not clear on how EPA expects a product family to be assessed. They recommend that a sub-section be added to the specification to clarify how companies should handle certification of a subset of a product family and certification of a single configuration.	EPA thanks stakeholders for the support of the product family structure, and has added additional hardware specific guidance (both socket and memory focused) to better ensure that minimum and maximum performance configurations across different product families are constructed in a similar way.
3	Comment Summary	APA Definition	Two stakeholders commented on the APA definition. The first stakeholder stated that it is important to define expansion and integrated APAs. The stakeholders also suggested changes to the APA definition to ensure the distinction between these two APA types is accurate. One of the two stakeholders also recommends the APA definition be expanded with two sub-definitions to accommodate APA implementations beyond GPUs. The second stakeholder supports this differentiation as well, and the exclusion of integrated APAs from the V3 server requirements. This stakeholder encourages EPA to work with industry to determine the best approach for managing integrated APAs in V4.	After extensive discussion with stakeholders, EPA is maintaining the previously proposed definitions of integrated and expansion APAs proposed in Draft 2. In addition, due to increasing complexity in diverging advanced APA technology approaches and having no way to test the performance of APAs in the test method, EPA is proposing that computer servers which can support expansion APAs shall be tested and certified without them. Computer servers with integrated APAs continue to remain out of scope in Draft 3.
4	Comment Summary	Computer Server Product Categories	Two stakeholders support the consolidating product categories from five to three. The first stakeholder also encourages EPA to revise categories to better align with performance.	After reviewing the latest data set, the proposed active state efficiency requirements in Draft 3 are comprised of 11 categories. This granularity is required to adequately differentiate computer servers with varying performance levels and architectures.
5	Comment Summary	I/O Definition	One stakeholder asks EPA to clarify whether an internal RAID/SAS controller can be considered an I/O device.	The existing definition of I/O device states that RAID/SAS controllers are an example of I/O devices for purposes of the specification.
6	Comment Summary	HPC Definition	Two stakeholders commented on the High Performance Computing definition. The first stakeholder proposed several minor revisions to the definition. The second stakeholder stated that the first stakeholder's revisions were important because of HPC's rapidly advancing sophistication, allowing HPC tasks to be performed with a smaller number of heterogeneous nodes.	EPA has adopted the proposed changes to the HPC definition in Draft 3 and welcomes stakeholder feedback on the changes.
7	Comment Summary	Data Collection	One stakeholder commented on their ongoing data collection efforts. They stated that they have been able to get a reasonable sample of two socket rack products but request an extension to April 2018 to collect SERT active efficiency and idle power data from additional products. They also stated that it may be appropriate to remove server products from the 2013 and 2014 launch years to better match the group of servers likely to be on the market in 2018/2019.	Between Draft 2 and Draft 3, EPA did allow industry to gather additional data on newer computer servers released in 2017, and used those data points in the level setting analysis for Draft 3. Given the changes in the market and the types of products that could be expected to be certified over the lifetime of the specification, EPA has utilized data received between 2014 and November 2017.
8	Comment Summary	New Processors	Two stakeholders commented that a next generation of products will be released soon by both AMD and Intel. The second stakeholder will gather data for these processors so that EPA can assess the value of modifying the proposed active efficiency limits or delaying the release of Draft 3	See comment #7 above.

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9	Comment Summary	Active and idle efficiency requirements	<p>Four stakeholders commented on EPA's proposal to set both active state and idle state efficiency criteria. Three stakeholders strongly supported EPA's proposal.</p> <p>The fourth stakeholder conducted an analysis that indicates that when comparing deployed power, the combined metric with performance adjusted idle and pure active efficiency limits perform significantly better than the EPA Draft 2 combined metric using idle without the system performance adder. In addition, the average idle power of the configurations which passed the metric is 12% higher of the servers that pass the Draft 2 metric. This suggests that, even if the passed servers operate in idle all of the time, the servers that passed the active metric would have the lowest total power use because fewer servers would be deployed.</p>	<p>After considerable discussion with stakeholders, and evidence provided by Green Grid and accepted by stakeholders, which shows that idle state power is adequately captured within the active state testing within SERT, EPA is proposing to move forward in Draft 3 with active state efficiency requirements only. Due to this change in approach, the active state requirements proposed in Draft 3 are notably more aggressive than those found in Draft 2.</p>
10	Comment Summary	Active efficiency requirement	<p>Two stakeholders commented on the active efficiency requirements. The first stakeholder stated that a separate active efficiency limit should be established for one and two socket servers, because the proposed limit will be more severe on one socket servers. This stakeholder also stated that EPA should use SERT V2.0.0 as the server active efficiency metric. The second stakeholder encouraged EPA to carefully assess the revised V2.0.0 active efficiency scores and ensure that the thresholds are set appropriately for resilient servers.</p>	<p>As noted in Comment #4 above, EPA has expanded the number of categories in the active state efficiency requirements to 11, differentiating by socket count as well as product type. EPA has adopted SERT V2.0.0 and used the data set converted to SERT V2.0.0 values for level setting purposes in Draft 3.</p>
11	Comment Summary	Adders for APAs	<p>One stakeholder proposed an idle adder for APAs, storage devices and I/O devices. They stated that they would provide additional data and input for these adders on Oct 16, 2017. This stakeholder supports that the allowance of 30 watts for each APA device, but wants to make the distinction that the idle limit should be set per device.</p>	<p>Idle allowances for non-APA hardware have been removed since idle state efficiency requirements are no longer found in Draft 3.</p> <p>The separate APA idle allowance of 30 watts proposed in Draft 2 has been removed due to complexity explained in comment #3 above.</p>
12	Comment Summary	APA Idle Limit	<p>One stakeholder commented on the APA idle limit. This stakeholder does not believe the proposed 30 watt idle limit for GPU expansion cards is too conservative for server GPUs.</p>	<p>See comment #3 above.</p>
13	Comment Summary	High-end expansion APAs	<p>This stakeholder proposes exempting high-end expansion APAs from scope. The stakeholder recommends EPA sets exclusion for any APA with a local memory bandwidth of greater than 700 GB/sec. This same stakeholder previously stated that they were undertaking efforts to find idle power data on expansion APAs because they believed the 30 watt maximum value was set too low.</p>	<p>See comment #3 above.</p>
14	Comment Summary	Efficiency requirement for volume servers	<p>One stakeholder stated that it is appropriate to revise both active and idle efficiency requirements for volume servers because these newer products have higher idle power, performance, and active efficiency values.</p>	<p>EPA has included newer data from computer servers released in 2017 to inform the active state efficiency levels proposed in Draft 3.</p>
15	Comment Summary	Internal Power Supply Efficiency Test	<p>One stakeholder commented that the reference to Generalized Internal Power Supply Efficiency Test Protocol refers to two different revisions and suggests that they should be aligned.</p>	<p>EPA has updated the second reference of this protocol to rev. 6.7 to match the first reference in Draft 3.</p>
16	Comment Summary	Memory capacity requirements	<p>Two stakeholders commented on memory capacity requirements. The first stakeholder recommends that EPA set a minimum set of requirements for the memory capacity of the low-end and high-end configurations, and provides suggested requirements for the configurations. The second stakeholder supports the open memory capacity requirements for the 3 test configurations that define the product family.</p>	<p>As noted above, EPA has added both memory capacity and socket population guidance in the product family definition.</p>
17	Comment Summary	Power Management Reporting	<p>One stakeholder commented that the Power and Performance Sheet on the ENERGY STAR website needs to be updated.</p>	<p>EPA will ensure that all ENERGY STAR computer server websites are up to date.</p>

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18	Comment Summary	Power Supply Requirement	<p>Three stakeholders commented on the power supply requirement. Two stakeholders recommended that EPA increase low-load energy efficiency requirements, due to the fact that servers often share load on redundant power supplies, and may spend most of their operating lives loaded to 10-20% rated capacity.</p> <p>The second stakeholder stated that the average server power supply spends most of its time in 3-20% load range, and recommends revising the power supply efficiency requirements to better represent real-world working conditions. They state that a 4% improvement in PSU efficiency at low levels results in a 4% system-level efficiency gain. This stakeholder also requests that EPA sets a 10% load requirement for PSUs, and that this requirement is 86%. Finally, they recommend aligning the power factor requirement of .9 at 50% to the 80-PLUS Platinum requirement of .95</p> <p>One stakeholder agreed that EPA should consider giving greater weight to low load points. They stated that the efficiency requirements for PSUs at the ten and twenty percent load points above the current levels of 83% and 90% is worth consideration. They also would like EPA to consider a requirement at ten percent for multi-output and supply units.</p>	<p>Industry provided evidence during the March 12 stakeholder meeting showing that typical computer server power supply loads do not drop below 10%. Draft 2 already contained a requirement for the 10% load for single-output power supplies, and EPA does not have data to support setting a 10% load requirement for multi-output power supplies. Therefore, EPA is proposing to continue harmonizing with the 80Plus Platinum levels in Draft 3.</p>
19	Comment Summary	Power Supply Requirement Question	<p>Stakeholder requested clarification if the 80Plus standard report would be sufficient for a worldwide valid server certificate.</p> <p>In addition, the stakeholder requested clarification as to the voltage the power supply should be tested at for a global valid server certificate and if there are defined efficiency requirements independent from the test voltage.</p> <p>The stakeholder also noted that the efficiency requirements are easier to maintain at 230V than for 115V.</p>	<p>For ENERGY STAR certification, internal power supplies are only required to meet the 115V power supply efficiency requirements. In order to list markets for products outside the U.S., the products are required to be tested and meet the efficiency requirements at all relevant voltages.</p>
20	Comment Summary	Power Supply Requirement Question	<p>One stakeholder asked if the platinum certified power supply 80Plus standard test report is sufficient for a worldwide valid server certificate. They also asked the voltage required to test for a global valid certificate, and if the defined efficiency requirements are independent from the test voltage. The stakeholder also stated that the 83% efficiency at 10% load required for a single-output PSU does not match the 80Plus platinum requirement, and asks for the origin of this requirement. They also state that power factor requirements in table 2 do not match the platinum requirement.</p>	<p>An 80Plus test report is sufficient for EPA ENERGY STAR certification.</p> <p>The 10% load requirement for single-output power supplies does not harmonize with the 80Plus Platinum requirement, because there is no 10% load requirement for 80Plus Platinum. Rather it is an increase in the 10% load required in Version 2.0, with a raise in magnitude similar to the increases at the 20%, 50%, and 100% load points from Version 2.0 to Version 3.0.</p> <p>Similarly, the ENERGY STAR power factor requirements are more granular than what is provided at 80Plus, but the requirements do align where possible (0.95 @ 50% load for single-output).</p>

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21	Comment Summary	SERT conversion	<p>Two stakeholders commented on SERT conversion. One stakeholder commented that the changes to the calculation of the flood and capacity memory workload performance values mean that SERT activity efficiency scores will change based on the memory capacity of the given configuration. In order to set active efficiency thresholds, it will be necessary to convert V1.1.1 scores to V2.0.0. This stakeholder is working to complete this conversion. Once this conversion is complete, this stakeholder states that it will be necessary to reset the active efficiency and idle power thresholds to ensure a 25% passing rate. This stakeholder does not feel that the modifications to the memory workload score calculations have affected the ability of the SERT test to assess servers for energy efficiency</p> <p>The other stakeholder stated that additional analysis is required to determine whether EPA analysis of server data is capable of representing active server energy performance. This stakeholder states that so far they have seen an insufficient basis for belief that this is so.</p>	As noted above, EPA has adopted SERT V2.0.0 and worked with the adjusted data set for level setting purposes in Draft 3.
22	Comment Summary	Sleep power management	Two stakeholders proposed a provision and incentive for very low-power, "sleep" state servers.	EPA is open to the idea of incentivizing this behavior, but with the removal of idle state requirements is unsure of a tangible way to reward the behavior. EPA welcomes additional stakeholder feedback on a pathway forward in this area.
23	Comment Summary	Test methods	One stakeholder commented on the requirement that UUTs have all processor sockets populated during testing. They asked if this means that tests of a low-end performance configuration with one CPU are not allowed by servers with more than one processor socket.	EPA has clarified in the product family definition that product families certified and shipped as ENERGY STAR must match the populated socket count used in testing, which according to the requirements in Section 6.1.2 means that in most cases all sockets must be populated for ENERGY STAR purposes.
24	Comment Summary	General	One stakeholder stated that the data underlying Draft 2 of this specification has not been revealed that demonstrates that servers certified to this specification would provide cost-effective energy savings to customers without compromising performance. The stakeholder requests that EPA shares the data, analysis, and assumptions it used to create this specification.	EPA is releasing a public data set with the release of Draft 3 with all the information pertinent to level settings and determine energy usage of proposed ENERGY STAR vs. non-ENERGY STAR products.
25	Comment Summary	General	One stakeholder stated that there are two main opportunities for reduction in server energy consumption in data centers: ensuring servers operate efficiently and consolidating lightly-loaded servers into fewer servers.	EPA agrees with this statement and is planning to update its buying guidance and the ENERGY STAR website to provide more up to date tips for end users. Any stakeholder interested in working with the Agency should reach out to ENERGY STAR to express this interest.
26	Comment Summary	Storage device categories	One stakeholder suggests that EPA create 6 categories of storage devices with different idle allowances.	
27	Comment Summary	Component Idle Adders	One stakeholder commented that there is a wide variation in idle power between and within storage devices due to differences in form factor, device speed or SSD, communications protocol used and capacity. The stakeholder suggests an idle allowance for storage components for this reason	
28	Comment Summary	Idle adders for higher throughput I/O Ports	<p>One stakeholder collected additional data on the idle power of I/O ports and determined the following: The 8W idle limit for >10 Gbit active ports should be extended to less than 50 Gbit. An additional category, greater than or equal to 50 Gbit and less than or equal to 100 bit should be added with a value of 13 W per active port. Ports with over 100Gbit of throughput should be excluded from certification and verification testing because they are specialty ports. Testing of in-scope servers can be done without installing over 100 Gbit Ethernet cards.</p>	
29	Comment Summary	Idle allowance for network ports	One stakeholder recommends creating four additional network port categories with idle allowances	
30	Comment Summary	Memory Adder	One stakeholder thanks EPA for reducing the idle state efficiency adder limits for additional memory above 4GB of Installed Memory to .125 W/GB	

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31	Comment Summary	Idle Power Allowances	One stakeholder commented that on Table 5, line 492, the footnote numbering does not match with the referring explanation starting on line 450.	EPA thanks stakeholders for their comments on the idle allowances. As noted in comment #9 above, EPA has removed idle state efficiency requirements from Draft 3. EPA held lengthy discussions with stakeholders, including two meetings, to discuss if SERT Version 2.0.0 sufficiently incorporates idle test results within the overall active state metric. These discussions resulted in agreement across stakeholders that the active state efficiency metric adequately incorporates and drives idle state efficiency as well. As such, the idle requirements were removed from the specification, thereby precluding the need for idle allowances. Although the active state metric was used to set ENERGY STAR levels identifying the top quartile of the market, EPA will continue to provide idle information on the product finder and certified product list for those stakeholders interested in that information.
32	Comment Summary	I/O Adders	Two stakeholders commented on I/O adders. The first stakeholder requests to increase the active port adder for 40Gbit+ network cards. The second stakeholder also proposes additional adders for higher capacity ports. Both stakeholders support EPA's proposal for ports up to 10 Gb/s.	
33	Comment Summary	Memory adder	One stakeholder commented that EPA's proposed memory adder is too restrictive. This stakeholder requested that EPA share the data set used to determine this memory allowance. This stakeholder commented that the memory adder in W/GB should be set with consideration to memory technology and DIMM size. They also propose an adder for new memory technologies. The stakeholder is concerned that establishing strict idle adders will result in delays or prohibition of more efficient, high powered memory technologies.	
34	Comment Summary	Memory Adder	One stakeholder commented that the memory adder is far higher than required by mainstream technology. They state that half of the models on the QPL have more than 64GB of memory, and a quarter have 300GB. They propose to use a hyperbolic tangent equation to show that power draw does not scale linearly with capacity, or, alternatively to implement a 2-step linear allowance. This stakeholder conducted an analysis of the additional memory adder of .125 watts _ AdditionalMem(GB) beyond 4 GB of installed memory and found that this approach resulted in higher allowances than justified by the calculations. This in effect provides a giveaway to high-end configurations	
35	Comment Summary	Idle requirement	One stakeholder encourages EPA to set a low idle level with an adder for high-performance servers. This would allow better differentiation on the basis of idle and active state efficiencies, which still allowing efficient high-performance servers to meet the specification	
36	Comment Summary	System Performance Adder	One stakeholder commented on the need for a system performance adder. This is especially important due to the recent release of the new AMD and Intel processors. This stakeholder proposed new base idle and system performance multiplier values to respond to EPA's concerns and better balance the number of high performance systems removed due to the idle limits. The stakeholder suggests that the adder be assessed based on CPU Peak Performance and system performance multiplier.	