

ENERGY STAR 4.0 Certification Positioning Information

ENERGY STAR® is a U.S. Environmental Protection Agency voluntary program that helps business and individuals through superior energy efficiency. It's a simple choice that makes it easier and making it easy to purchase products that save money and protect environment.

The timeline for implementation of ENERGY STAR 4.0 for server is as follows. Refer to the following page for details:

https://www.energystar.gov/products/spec/energy_star_computer_servers_version_4_0_pd

- 12 April 2023: U.S. EPA published ENERGY STAR Computer Servers Version 4.0 Final Specification for computer server.
- After August 30, 2023, certification bodies of ENERGY STAR will be instructed to stop certifying new product submittals to Version 3.0. The existing certifications to V3.0 will remain valid for the purposes of ENERGY STAR certification until January 12, 2024
- January 12 2024, ENERGY STAR Computer Servers Version 4.0 is/will be in effect. Any computer server manufactured as of January 12, 2024, must meet the Version 4.0 requirements to bear the ENERGY STAR mark. All certifications of products to the Version 3.0 specification will be invalid for purposes of ENERGY STAR and certification bodies (CBs) will only submit product models certified to Version 4.0 to EPA.

Key updates/Criteria comparison between ENERGY STAR 3.0 and 4.0,

- New average pass rates of active state efficiency across the subcategories range between 24% and 34%.
- Add new definitions for Storage Heavy Servers and Hyperconverged Servers.
- Remove storage and I/O from the list of characteristics to define products family.
- Enhance the power supply efficiency and power factor Refer to following chapter Table 3 and Table 4 for detail power supply efficiency and power factor requirements.
- There were small changes made to the scope, to exclude products that would never be sold without an Auxiliary Processing Accelerators (APA) such as a GPU or FPGA.

Requirements for ENERGY STAR 4.0

Topics in this section:

- [Product family](#)
- [Active State efficiency](#)
- [Power supply requirements](#)

For other hardware design requirements, refer to ENERGY STAR Program Requirements for Computer Servers 4.0 for details.

Product family

According to ENERGY STAR Computer Servers Version 4.0 Final Specification, specific configurations within one product family with some specific attributes can be used for processing the certification, to cover hundreds of possible hardware and software configurations. However, all product configurations within a product family must meet ENERGY STAR requirements. The required data in the Version 4.0 specification must be evaluated and submitted to the Environmental Protection Agency (EPA) for certification.

- High-end performance configuration:

This product configuration is intended to represent the highest performance computing platform within the Product Family. This configuration shall include the highest processor performance per socket, as represented by the highest numerical value resulting from the multiplication of the core count by the frequency in GHz, offered for sale and capable of meeting ENERGY STAR requirements.

- Typical configuration:

A product configuration that lies between the Low-end performance and High-end performance configurations and is presentative of a deployed product with high volume sales.

- Low-end performance configuration:

This product configuration is intended to represent the lowest performance computing platform within the Product Family. This configuration shall include the lowest processor performance per socket, as represented by the lowest numerical value resulting from the multiplication of the core count by the frequency in GHz, offered for sale and capable of meeting ENERGY STAR requirements.

Table 1. ENERGY STAR 4.0 - Product family tested configurations

System configuration	Processor	Other commodity
High-end performance configuration	Highest value of core count multiplied by frequency (GHz)	The combination that represents the highest-performance computing platform within the product family
Typical configuration	Between high-end and low-end processor, or high volume sale	A product configuration that lies between the Low-end performance and High-end performance configurations and is presentative of a deployed product with high volume sales
Low-end performance configuration	Lowest value of core count multiplied by frequency (GHz)	The combination that represents the lowest-performance computing platform within the product family

Active State efficiency

There is a key criterion named Active State efficiency score (Eff_{ACTIVE}) for server system, shall be calculated using the equation below and greater than or equal to the minimum Active State efficiency thresholds listed in Table 2. (Refer to the detailed definition of Eff_{CPU} , Eff_{MEMORY} and $Eff_{STORAGE}$).

$$Eff_{ACTIVE} = \text{EXP} (0.65 * \ln (Eff_{CPU}) + 0.30 * \ln (Eff_{MEMORY}) + 0.05 * \ln (Eff_{STORAGE}))$$

Table 2. Active State Efficiency Thresholds for all non-SHS Computer Servers

Product Type	Minimum Eff_ACTIVE
One Installed Processor	
Rack	26.4
Tower	24.4
Resilient	6.6
Two Installed Processors	
Rack	30.4
Tower	26.5
Blade or Multi-Node	29.1
Resilient	6.0
Greater Than Two Installed Processors	
Rack	31.9
Blade or Multi-Node	26.8

Power supply requirements

Power supplies used in products eligible for ENERGY STAR 4.0 must meet the following efficiency and power factor requirements.

Table 3. Efficiency requirements for PSUs

Power supply type	Rated output power (W)	10% Load*	20% Load*	50% Load*	100% Load*
Multiple output (Ac-Dc)	750W or greater	N/A	90%	92%	89%
Multiple output (Ac-Dc)	Less than 750W	N/A	87% (-3%)	90% (-2%)	87% (-2%)
Single output (Ac-Dc)	750W or greater	90% (+7%)	94% (+4%)	96% (+2%)	91%
Single output (Ac-Dc)	Less than 750W	83%	90%	94%	91%

* Number in parentheses indicates a change from ENERGY STAR V3.0

Table 4. Power factor requirements for PSUs

Power supply type	Rated output power (W)	10% Load	20% Load	50% Load	100% Load
Multiple output (Ac-Dc)	All output rating	N/A	0.80	0.90	0.95
Single output (Ac-Dc)	Output rating \leq 500W	N/A	0.80	0.95	0.95
	Output Rating > 500W and Output Rating \leq 1,000W	0.65	0.80	0.95	0.95
	Output rating > 1,000W	0.80	0.90	0.95	0.95

Status of Lenovo ThinkSystem and ThinkEdge support

Lenovo ThinkSystem and ThinkEdge servers meet all the criteria for ENERGY STAR 4.0 when using the High-End Performance or Typical configurations.

For the Low-End Performance configurations, due to multi offerings for different use case through industry, some low-cost CPU SKUs with a low number of cores and/or low frequency cannot meet the minimum Active State efficiency criteria, and are therefore not ENERGY STAR 4.0 compliant. These exception SKUs are listed in the following table.

Note, even if a compliant processor SKU is installed, the server may still not be ENERGY STAR 4.0 compliant if a PSU is installed that doesn't meet the minimum PSU efficiency and power factor requirements, as listed in the tables in the [Power supply requirements](#) section.

Table 5. ENERGY STAR 4.0 compliance status

Lenovo ThinkSystem or ThinkEdge Server	Exceptions or comments for ENERGY STAR 4.0 certified
Servers with Intel Xeon 6 processor	
SR630 V4	No restriction (all processors qualify)
SR650 V4	No restriction (all processors qualify)
SR650a V4	No restriction (all processors qualify)
SC750 V4	Not applicable for ENERGY STAR 4.0
Servers with 4th Gen or 5th Gen Intel Xeon Scalable processors	
SR630 V3	1P config: 3408U, 3508U, 5415+, 4410Y, 6434, 6434H 2P config: 5415+, 4410T, 6434, 6434H, 8444H

Lenovo ThinkSystem or ThinkEdge Server	Exceptions or comments for ENERGY STAR 4.0 certified
SR650 V3	1P config: 3408U, 3508U, 5415+, 4410T, 6434, 6434H, 8444H, 5515+, 6534 2P config: 5415+, 4410Y, 4410T, 6434, 6434H, 8444H, 5515+, 6534
SR850 V3, SR860 V3	2P config & 4P config: 6434H, 8444H
ST650 V3	1P config: 5415+, 4410Y, 4410T, 6434, 6434H, 3408U, 3508U 2P config: 6434, 6434H
SD650 V3, SD650-N V3	No restriction (all processors qualify)
SR950 V3	Not applicable for ENERGY STAR 4.0
SD550 V3, SD530 V3	No restriction (all processors qualify)
HS350X V3	Not certified for ENERGY STAR 4.0
SR680a V3	Not applicable for ENERGY STAR 4.0
SR780a V3	Not applicable for ENERGY STAR 4.0
Servers with 3rd Gen Intel Xeon Scalable processors	
SR630 V2	1P config: 4309Y, 4310T, 5315Y, 6334 2P config: 4309Y, 4310T, 4310, 5315Y, 6334
SR650 V2	1P config & 2P config: 4309Y, 4310T, 4310, 5315Y, 6334, 5317, 6346
SR670 V2	2P config: 4309Y, 4310T, 4310, 5315Y, 6334, 5317, 4314, 6326, 6346, 6354
SE450	4310T, 4314
Servers with 1st and 2nd Gen Intel Xeon Scalable processors	
ST550	Not certified for ENERGY STAR 4.0
SR950	Not certified for ENERGY STAR 4.0
Servers with Intel Pentium and Xeon E processors	
SR250 V3, ST250 V3	G7400, G7400T, E-2414, E-2434
ST50 V3	G7400, G7400T
Servers with Intel Ultra 7 and Ultra 5	
SE100	No restriction (all processors qualify)
Servers with Intel Xeon D processors	
SE350 V2, SE360 V2	Not applicable for ENERGY STAR 4.0
Servers with AMD EPYC 9004 Series or 9005 Series processors	
SR635 V3, SR655 V3	No restriction (all processors qualify)
SR665 V3, SR645 V3, SR675 V3	No restriction (all processors qualify)
SD665 V3, SD665-N V3	No restriction (all processors qualify)
SD535 V3	No restriction (all processors qualify)
SR685a V3	Not applicable for ENERGY STAR 4.0
Servers with AMD EPYC 8004 series processor	
SE455 V3	No restriction (all processors qualify)
Servers with AMD EPYC 7003 Series and AMD EPYC 7002 Series processors	
SR645	1P config: 7232P, 7203, 7203P, 72F3, 7262 2P config: 72F3
SR665	1P config & 2P config: 72F3
Servers with AMD EPYC 4004 Series processors	

Lenovo ThinkSystem or ThinkEdge Server	Exceptions or comments for ENERGY STAR 4.0 certified
ST45 V3	No restriction (all processors qualify)

References

For more information, see these links:

- Servers certified for ENERGY STAR:
<https://www.energystar.gov/productfinder/product/certified-enterprise-servers/results>
- [ENERGY STAR Version 4.0 Computer Servers Final Specification](#)

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