

IBM Comments: REVISED DEFINITIONS FOR COMPUTER SERVERS  
Based on Draft 1 Specification Comments

Thank you for the opportunity to provide comments on the proposed definitions for the ENERGY STAR® server specification. IBM will continue to participate in EPA's efforts to develop an ENERGY STAR® server specification, recognizing the significance of ENERGY STAR® brand and the importance of establishing a single, global energy efficiency specification for IT equipment.

IBM submits the following comments on the server definitions that were released on April 25, 2008. Also included is an update to some of the comments IBM submitted on March 14, 2008, following EPA's request for comment.

Generally, IBM continues to encourage EPA to qualify the full range of servers in its Tier 1 specification. As was mentioned in IBM's March 14, 2008 comments, IBM believes that EPA can provide a Tier 1 spec with broader applicability which will help encourage companies to consider the full range of energy efficiency opportunities offered by more efficient hardware and software. Larger systems offer better use of shared resources and improved virtualization capability, which can result in significantly more work being done for each unit of energy used when compared to a high volume server.

IBM recognizes that creating a specification with broader applicability is more challenging because of the diversity and complexity of server systems. IBM believes that there are common attributes for power supplies, power management capabilities, and power and workload reporting that provide the opportunity to create a meaningful specification which can measure performance and facilitate EPA's goal of maximizing the workload completed by a server for each unit of energy applied. IBM's comments to the draft Tier 1 specification attempted to provide a basic outline of a useful specification which covers small, medium, and blade servers and which could further be applicable to larger, more efficient servers (as measured by performance per watt) if properly constructed.

If EPA decides to limit the initial Tier 1 specification to small or high volume servers and blade servers, then EPA needs to make that limitation clear and communicate that the specification is intended to provide comparison of the energy efficiency capabilities within the defined class of servers and is not intended to cover the entire spectrum of computer servers. The ENERGY STAR® label is recognized and valued by IBM's customer base. Without this clarification, the specification may create the incorrect impression that only high volume or blade servers can offer an energy efficient solution. To avoid confusion, EPA needs to make several key points:

- EPA has chosen to limit the application of the specification to high volume and blade servers, as it captures 2/3 of the IT energy use in the data center<sup>1</sup>. By beginning with a specification for these two classes of servers, EPA will influence a large segment of the server market.
- The specification provides for the comparison of energy efficiency capabilities of servers within the two specific product definitions designated as being qualified to achieve an ENERGY STAR® rating.

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<sup>1</sup> "Report to Congress on Server and Data Center Energy Efficiency", August 2, 2007, p.26, Figure 2-1.

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- The specification does not provide a means to compare the overall energy efficiency of a range of IT data center solutions, some of which may use ENERGY STAR® qualified products and others which may not.
- The EPA recognizes that systems from other categories of servers may offer comparable or superior energy efficiency and that the limitation of the ENERGY STAR® specification to high-volume and blade servers does not imply an endorsement of them as the appropriate choice when compared to those categories for an energy-efficient operation.
- Provide an anticipated time frame in which a specification will be developed for other server categories, preferably within 6 to 12 months of the completion of the high volume server and blade server specification.

With these considerations in mind, IBM provides the following specific comments to the definition proposals:

1. Definition A, "Computer Server," needs to be broadened to define the full universe of servers. We propose the following modifications:

- The sentence reading: Designed and capable of having at most four processors (i.e., 1-4 individual processor sockets); should be changed to read "Designed and capable of supporting one or more processor sockets and one or more processor boards in the device." This should be done to properly define a computer server to include large, medium, small, and blade servers. Definitions then need to be added for small or "high volume" servers and medium and large servers to allow clear explanation of which servers are included and excluded by the tier 1 specification.
- In the third bullet, buffered memory should be removed as a defining attribute. Servers can operate without buffered memory.
- In the fourth bullet, Wake On LAN should not be a distinguishing attribute of a server. Many IT devices have the capability to Wake On LAN.
- In the fifth bullet, change the statement to read "Designed to be configurable for multiple ports for network....."
- The technical team does not believe that the EMC classification is critical to defining a server and should be removed. If it is retained, then both Class A and B EMC designations should be referenced as some data center servers may be designed to the more stringent Class B designation.

2. Add the following Server Definitions:

**Volume Server:** A computer server packaged in either a 1U or 2U high rack-mount chassis having one processor board with up to 4 processor sockets.

**Medium and Large Server:** A computer server which has more than 4 processor sockets, either as a result of more than 4 processor sockets on a board or as a result of having multiple processor boards in the server system, rack, or enclosure.

**Super Computer:** An evolved computer server with performance measured against benchmarks rated among the top 500 systems in the world.

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The addition of these definitions provides a full listing of the subcategories of computer servers, which allows EPA to define which server categories are included and excluded from the specifications.

3. The blade server definition C needs to be linked to the computer server definition. In addition, the definition should be more precise and linked to recognized standards of blade and blade chassis design. We would recommend the following definition:

Blade Server: A computer server consisting of, at minimum, a processor and system memory that relies on certain shared resources (as defined in B. "Blade Chassis").

Blade Servers are designed to be installed in a Blade Chassis and are incapable of operating independent of the chassis. The Blade Servers and Blade Chassis must conform to one of the recognized standards for blade design. (*We will propose applicable, recognized standards in a subsequent communication to EPA*).

4. Reword the Computer Server Power Supply definition to read: **"A self contained server component designed to convert a voltage input to one or more DC voltage levels. The input voltage can be from either an AC or DC source. The outputs either may be higher or lower voltages than the input.** A computer server power supply must be separable . . . .

5. We propose a definition for a fully redundant power supply.

We would propose that a third power supply definition be added: **"Fully Redundant Power Supply"**: a multi-voltage power supply with fully redundant regulators.

A separate definition for Fully Redundant Power Supply is important when the power supply efficiency requirements are increased above 90%. The impact of the fully redundant regulators does not affect the ability of a power supply to meet the ECOS "Bronze" level specification. However, it will become a detractor once efficiency standards increase to the "Silver" or as-yet undefined "Gold" levels. These fully redundant power supplies are used on mid-range and high end servers where the customer needs extremely high level of reliability.

6. For the various definitions for Power Supplies, remove the words "lower voltage DC output(s)" and replace with "one or more DC output voltages."

In some cases, typically on medium or large servers, the voltage is boosted during the AC to DC conversions. This needs to be recognized in the definitions.

7. Qualifying Products: Modify the paragraph to read: A computer server must meet the definition of a Volume Server (new definition) or a Blade Server (C) and Blade Chassis (B) to be eligible for the ENERGY STAR® Qualification under this specification. **Medium and Large Servers, Supercomputers, Service Appliances, Direct Current Servers**, Storage equipment, blade storage, and network equipment, as defined above, are not eligible for ENERGY STAR® Qualification under this specification."

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It is critical that EPA clearly define which products are included and excluded in the ENERGY STAR® specification as federal, state, and company procurement specifications increasingly require that only ENERGY STAR® qualified products be purchased or used.