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**Information technology — Data centres  
— Server energy effectiveness metric**

*Technologies de l'information — Centres de données — Grandeurs de  
mesure de l'efficacité énergétique des serveurs*

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## Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)) or the IEC list of patent declarations received (see <http://patents.iec.ch>).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 39, *Sustainability, IT & Data Centres*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

The global economy is now totally reliant on information and communication technologies (ICT) and the associated generation, transmission, dissemination, computation and storage of digital data. While the internet backbone carries the traffic, it is data centres which find themselves at the nodes and hubs of a wide variety of both private enterprise and shared/collocation facilities. With the large and continually increasing data capacity demands placed on data centres worldwide, efficient use of data centre energy is an extremely important strategy for managing environmental, cost, electrical grid capacity and other impacts.

The ISO/IEC 30134 series specifies data centre energy effectiveness key performance indicators (KPI) to help data centre operators measure and improve specific aspects of data centre energy effectiveness. ISO/IEC 30134-4 in particular defines a method to measure the peak capacity and utilization of servers operating in a data centre using operator selected benchmarks. However, it does not provide a method for comparing individual server energy effectiveness across data centres, and as stated in ISO/IEC 30134-4, “should not be used to set regulations for a data centre or individual server”. There is stakeholder demand for an international standard to measure the energy effectiveness of servers before procurement and installation, particularly for use in worldwide server energy effectiveness regulations and programmes.

This document provides a server energy effectiveness metric (SEEM) to measure and report the energy effectiveness of specific server designs and configurations. This document will be useful to stakeholders, including vendors, users and governments, from the design verification testing phase all the way through conformance verification, procurement and operation. Organizations that wish to establish conformance or reporting programmes will find that the test methods and scoring specified in this document will save them significant time and effort in implementing such programmes. Standardization across such programmes will allow vendors to comply to stakeholder requirements more quickly and efficiently.

For applicable servers, this document builds upon the widely adopted Server Efficiency Rating Tool (SERT™)<sup>1)</sup> suite developed by the Standard Performance Evaluation Corporation (SPEC®)<sup>2)</sup> benchmark consortium, as the energy effectiveness metric and test method. For servers where SERT is not applicable, this document provides requirements for the creation of alternate server energy effectiveness metrics, referred to as “implementer-specified” metrics.

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1) SERT is a trademark of the Standard Performance Evaluation Corporation. This information is given for the convenience of users of this document. References to SERT do not constitute an endorsement by ISO/IEC.

2) SPEC is a trademark of the Standard Performance Evaluation Corporation. This information is given for the convenience of users of this document. References to SPEC do not constitute an endorsement by ISO/IEC.

# Information technology — Data centres — Server energy effectiveness metric

## 1 Scope

This document specifies a measurement method to assess and report the energy effectiveness of a computer server. This document does not set any pass/fail criteria for servers.

## 2 Normative references

There are no normative references in this document.

## 3 Terms, definitions and abbreviated terms

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

### 3.1 Terms and definitions

#### 3.1.1

##### **64-bit CPU**

*CPU* (3.1.12) which has data path widths, *memory* (3.1.34) addressing, registers, and other architectural features which are 64-bits wide

#### 3.1.2

##### **active state**

operational state in which the *server* (3.1.49) is carrying out data processing

Note 1 to entry: an example is data retrieval from *memory* (3.1.34), cache, or storage while awaiting further input over the network.

#### 3.1.3

##### **auxiliary processing accelerator**

additional compute device installed in the computer *server* (3.1.49) that handles parallelized *workloads* (3.1.60) in conjunction with the *CPU* (3.1.12)

#### 3.1.4

##### **blade chassis**

enclosure that contains shared resources for the operation of *blade servers* (3.1.5), *blade storage* (3.1.6), and other blade form-factor devices

Note 1 to entry: Shared resources provided by a chassis may include power supplies, data storage and hardware for DC power distribution, thermal management, system management and network services.