International Standard

ISO/IEC 30134-2

Information technology — Data centres key performance indicators —

Part 2: Power usage effectiveness (PUE)

Second edition
2026-01

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Foreword

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The document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 39, *Sustainability, IT and data centres*.

This second edition cancels and replaces the first edition (ISO/IEC 30134-2:2016), which has been technically revised.

The main changes are as follows:

— required measurements at the data centre boundary have been updated;

— on-site electricity generation has been changed to be measured in kWh;

— 12 months recording and documentation of E_{DC} and E_{IT} has changed;

— use of watt meters to measure E_{DC} and E_{IT} has changed;

— requirement for electrical energy required to export other non-electric energy sources outside the data centre boundary has been added;

— new requirement has been added for situations when E_{DC} or E_{IT} cannot be accounted for, or measured, as specified;

— mixed use PUE (mPUE) derivative has been added for mixed use buildings;

— additional provisioning examples of calculating designed PUE (dPUE) have been added.

A list of all parts in the ISO/IEC 30134 series can be found on the ISO and IEC websites.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of those bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

Introduction

The global economy is now reliant on information and communication technologies and the associated generation, transmission, dissemination, computation and storage of digital data. All markets have experienced exponential growth in digital data, for social, educational and business sectors. While the internet backbone carries the traffic, there are a wide variety of data centres at nodes and hubs within both private enterprise and shared/collocation facilities.

With many governments having "digital agendas" to provide both citizens and businesses with ever-faster broadband access, the increase in network speed and capacity will, by itself, generate ever more usage (Jevons Paradox). Data generation and the consequential increase in data manipulation and storage are directly linked to increasing power consumption.

With this background, it is clear that data centre growth, and power consumption in particular, is an inevitable consequence and that growth will demand increasing power consumption despite the most stringent energy efficiency strategies. This makes the need for key performance indicators (KPIs) that cover the effective use of resources (including but not limited to energy) and the reduction of CO_2 emissions essential.

Within the ISO/IEC 30134 series, the term "resource usage effectiveness" is more generally used for KPIs in preference to "resource usage efficiency", which is restricted to situations where the input and output parameters used to define the KPI have the same units.

In order to determine the overall resource effectiveness or efficiency of a data centre, a holistic suite of metrics is required. This document specifies power usage effectiveness (PUE), which has become a popular metric to determine the efficient utilization and distribution of energy resources within a data centre.

NOTE 1 The term "efficiency" is employed for PUE but "effectiveness" provides continuity with earlier market recognition of the term.

This document belongs to a series of standards for such KPIs and has been produced in accordance with ISO/IEC 30134-1, which defines common requirements for a holistic suite of KPIs for data centre resource usage effectiveness or efficiency.

The ISO/IEC 30134 series does not specify limits or targets for any KPI and does not describe or imply, unless specifically stated, any form of aggregation of individual KPIs into a combined nor an overall KPI for data centre resource usage effectiveness or efficiency.

NOTE 2 The PUE KPI was originally developed by The Green Grid.

Information technology — Data centres key performance indicators —

Part 2:
Power usage effectiveness (PUE)

1 Scope

This document specifies power usage effectiveness (PUE) as a key performance indicator (KPI) to quantify the efficient use of energy.

This document:

a) defines the PUE of a data centre;

b) introduces PUE measurement categories;

c) describes the relationship of this KPI to a data centre's infrastructure, information technology equipment and information technology operations;

d) defines the measurement, the calculation and the reporting of the parameter;

e) provides information on the correct interpretation of the PUE.

PUE derivatives are described in Clause 9.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 30134-1, *Information technology — Data centres — Key performance indicators — Part 1: Overview and general requirements*

IEC 62052 (all parts), *Electricity metering equipment (AC) — General requirements, tests and test conditions*

IEC 62053 (all parts), *Electricity metering equipment (a.c.) — Particular requirements*

ISO 8601-1, *Date and time — Representations for information interchange — Part 1: Basic rules*

Bibliography

[1] WP#49 - *PUE, a Comprehensive Examination of the Metric — The Green Grid*,https://www.thegreengrid.org/en/resources/library-and-tools/237-WP%2349---PUE%3A-A-Comprehensive-Examination-of-the-Metric

[2] ISO/IEC 30134-6, *Information technology — Data centres key performance indicators — Part 6: Energy Reuse Factor (ERF)*

[3] ISO/IEC/TR 23050, *Information technology — Data centres — Impact on data centre resource metrics of electrical energy storage and export*

[4] EN 1434 (series), *Thermal energy meters*

[5] ASTM E3137/E3137M-18, *Standard Specification for Heat Meter Instrumentation*

[6] ISO/IEC 30134-7, *Information technology — Data centres key performance indicators — Part 7: Cooling efficiency ratio (CER)*

[7] ISO/IEC 22237-3, *Information technology — Data centre facilities and infrastructures — Part 3: Power distribution*

[8] ISO/IEC 22237-1, *Information technology — Data centre facilities and infrastructures — Part 1: General concepts*

[9] ISO/IEC/TS 8236-1, *Information technology – Provisioning, forecasting & management – Part 1: Data centre IT equipment*

[10] ISO/IEC/TS 8236-2, *Information technology – Provisioning, forecasting & management -Part 2: Data centre facility*