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Part 6: Energy Reuse Factor (ERF)

Technologies de l'information — Indicateurs de performance clés des centres de données —

Partie 6: Indicateur de réutilisation de l'énergie (ERF)

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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 or www.iec.ch/members_experts/refdocs).

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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. In the IEC, see www.iec.ch/understanding-standards.

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

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 these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

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Introduction

The global economy is today 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 that data for social, educational and business sectors and, 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.

The historical data generation growth rate exceeds the capacity growth rate of information and communications technology hardware and, with less than half of the world's population having access to an internet connection (in 2014), that growth in data can only accelerate. In addition, with many governments having "digital agendas" to provide both citizens and businesses with ever-faster broadband access, the very increase in network speed and capacity will, by itself, generate ever more usage (Jevons Paradox). Data generation and the consequential increase in data processing and storage are directly linked to increasing power consumption.

With this background, data centre growth, and power consumption in particular, is an inevitable consequence; this 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 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.

The energy reuse factor (ERF) provides the data centre practitioner with greater visibility into energy efficiency in data centres that make beneficial use of any reused energy from the data centre.

In order to determine the overall resource efficiency of a data centre, a holistic suite of metrics is required. This document is one of 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 efficiency. This document does not specify limits or targets for the KPI and does not describe or imply, unless specifically stated, any form of aggregation of this KPI into a combination with other KPIs for data centre resource efficiency. The document presents specific rules on ERF's use, along with its theoretical and mathematical development. The document concludes with several examples of site concepts that can employ the ERF metric.

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Information technology — Data centres key performance indicators —

Part 6: Energy Reuse Factor (ERF)

1 Scope

This document specifies the energy reuse factor (ERF) as a KPI to quantify the reuse of the energy consumed in a data centre. ERF is defined as the ratio of energy being reused divided by the sum of all energy consumed in a data centre. The ERF does reflect the efficiency of the reuse process; the reuse process is not part of a data centre.

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 30134-1:2016, *Information technology — Data centres — Key performance indicators — Part 1: Overview and general requirements*

ISO 8601-1:2019, *Date and time — Representations for information interchange — Part 1: Basic rules*

3 Terms, definitions, abbreviated terms and symbols

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 30134-1 and the following apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1.1
reused energy
reuse of energy
utilization of energy used in the data centre for an alternate purpose outside the data centre boundary

Note 1 to entry: Energy ejected to the environment does not constitute reused energy.

3.1.2
handoff point
point at the boundary of the data centre where energy is measured and is handed off to another party

Note 1 to entry: An example is an energy company which utilizes the energy outside the data centre boundary.

3.2 Abbreviated terms

For the purposes of this document the abbreviated terms of ISO/IEC 30134-1 and the following apply.

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