INTERNATIONAL STANDARD

ISO/IEC 30134-1

First edition
2016-03-15

Information technology — Data centres — Key performance indicators —

Part 1: Overview and general requirements

Technologies de l'information — Centres de données — Indicateurs de performance clés —

Partie 1: Aperçu et exigences générales

Reference number
ISO/IEC 30134-1:2016(E)

© ISO/IEC 2016



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword ... **iv**

Introduction ... **v**

1 Scope ... **1**

2 Normative references ... **1**

3 Terms, definitions and abbreviations ... **1**
3.1 Terms and definitions ... 1
3.2 Abbreviated terms ... 3

4 Conformance ... **3**

5 Key performance indicators (KPIs) ... **3**
5.1 General ... 3
5.2 Common objectives for KPIs ... 4
5.3 Requirements for KPIs ... 4
5.3.1 General ... 4
5.3.2 Scale ... 4
5.3.3 Evolution ... 4
5.3.4 Formulae ... 5
5.3.5 Definition of boundaries ... 5
5.3.6 Reporting ... 5
5.3.7 Definition of terms ... 5
5.3.8 Measurement points and procedures ... 5
5.3.9 Requirements ... 5
5.3.10 Classifications ... 5
5.4 Elements addressed within ISO/IEC 30134 ... 5
5.5 Use of KPIs ... 6

6 Data centre boundaries ... **6**
6.1 General ... 6
6.2 Spatial and logical boundaries ... 6

7 Data centre spaces and equipment ... **7**
7.1 Data centre spaces ... 7
7.2 Data centre equipment (logical boundaries) ... 7
7.2.1 IT and network telecommunications/infrastructure ... 7
7.2.2 Power generation and distribution infrastructure ... 8
7.2.3 Environmental control/infrastructure ... 8
7.2.4 Security and safety infrastructure ... 8

Annex A (informative) **KPI constraints and data centre criticality** ... **9**

Bibliography ... **11**

© ISO/IEC 2016 – All rights reserved

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 ISO documents 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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO 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).

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

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, SC 39, *Sustainability for and by Information Technology*.

ISO/IEC 30134 consists of the following parts, under the general title *Information technology — Data centres — Key performance indicators*:

— *Part 1: Overview and general requirements*

— *Part 2: Power usage effectiveness (PUE)*[1)]

— *Part 3: Renewable energy factor (REF)*

The following parts are under preparation:

— *Part 4: IT equipment energy efficiency for servers (ITEE)*

— *Part 5: IT equipment utilization for servers (ITEU_SV)*

Additional parts will be developed, each describing a specific KPI for resource usage effectiveness or efficiency.

1) It is recognized that the term "efficiency" should be employed but "effectiveness" provides continuity with earlier market recognition of the term.

 © ISO/IEC 2016 – All rights reserved

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 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 the information and communications technology hardware and, with less than half (in 2014) of the world's population having access to an internet connection, 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 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 enable the optimum resource effectiveness of data centres, a suite of effective KPIs is needed to measure and report on resources consumed in order to develop an improvement roadmap.

The ISO/IEC 30134 series is intended to accelerate the provision of operational infrastructures with improved resource usage effectiveness.

The common objective of the KPIs is the effective or efficient use of resources. Examples are as follows:

a) the minimization of energy and other resource (e.g. water) consumption;

b) the task effectiveness of the IT load (data processing, storage and transport) within the data centre, maximizing the IT output with the minimum energy consumption;

c) the energy reuse in the form of waste heat, if possible;

d) the use of renewable energy, both generated on site and off site.

The ISO/IEC 30134 series do not specify limits or targets for any KPI and do 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.

© ISO/IEC 2016 – All rights reserved

Information technology — Data centres — Key performance indicators —

Part 1: Overview and general requirements

1 Scope

This part of ISO/IEC 30134 specifies the following for the other parts of ISO/IEC 30134:

a) a common structure;

b) definitions, terminology and boundary conditions for KPIs of data centre resource usage effectiveness and efficiency;

c) common requirements for KPIs of data centre resource usage effectiveness and efficiency;

d) common objectives for KPIs of the data centre resource effectiveness and efficiency;

e) general information regarding the use of KPIs of data centre resource usage effectiveness and efficiency.

2 Normative references

There are no normative references cited in this document.

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

3.1.1
building entrance facility
facility that provides all necessary mechanical and electrical services for the entry of telecommunications cables into a building and which may allow for transition from external to internal cable

3.1.2
computer room space
area within the data centre that accommodates the data processing, data storage and telecommunication equipment that provides the primary function of the data centre

3.1.3
control room space
area within the data centre used to control the operation of the data centre and to act as a central point for all control and monitoring functions

© ISO/IEC 2016 – All rights reserved

3.1.4
data centre
structure, or group of structures, dedicated to the centralized accommodation, interconnection and operation of information technology and network telecommunications equipment providing data storage, processing and transport services together with all the facilities and infrastructures for power distribution and environmental control together with the necessary levels of resilience and security required to provide the desired service availability

Note 1 to entry: A structure can consist of multiple buildings and/or spaces with specific functions to support the primary function.

Note 2 to entry: The boundaries of the structure or space considered the data centre, which includes the information and communication technology equipment and supporting environmental controls, can be defined within a larger structure or building.

3.1.5
electrical distribution space
area used for housing facilities to distribute electrical power between the transformer space and electrical spaces within the data centre or elsewhere within the premises or individual buildings within the premises

3.1.6
electrical space
area within the data centre used for housing facilities to deliver and control electrical power to the data centre spaces (including switchboards, batteries, uninterruptible power supplies (UPS), etc.)

3.1.7
generator space
area used for housing the installation of electrical power supply generation equipment together with associated storage of fuels or energy conversion equipment

3.1.8
holding space
area within the data centre used for the holding of equipment prior to being brought into service or having been taken out of service

3.1.9
information technology equipment
equipment providing data storage, processing and transport services including telecommunications network equipment dedicated to providing direct connection to core and/or access networks

3.1.10
key performance indicator
number representing the resource usage effectiveness or efficiency of a given system

3.1.11
mechanical space
area that is used for housing mechanical equipment and infrastructure that provides environmental control for the data centre spaces (including chillers and water treatment, air handling and fire suppression systems)

3.1.12
resource usage effectiveness
ratio of resulting output to a resource consumed to produce that output when the input and output units are not the same

Note 1 to entry: The term is used generically to describe the conversion of a resource to an output or outcome, such as litres of water per kWh.

© ISO/IEC 2016 – All rights reserved

3.1.13
resource usage efficiency
ratio of output to the resource used by the device or system when the input and output units are the same

Note 1 to entry: Resources in this context include, but are not limited to, electricity and water, and each will be defined within the same boundary conditions.

3.1.14
storage space
secured area where general goods and/or data centre goods can be stored

3.1.15
telecommunications space
area which may house demarcation points and information technology equipment associated with the building entrance facility and which may allow service providers restricted access to the data centre

3.1.16
testing space
area within the data centre used for the testing and configuring of equipment prior to being brought into service

3.1.17
transformer space
area used for housing equipment necessary to convert primary electrical circuits to levels appropriate for connection to the equipment within the premises or individual buildings within the premises

3.2 Abbreviated terms

For the purposes of this document, the following abbreviated terms apply:

AC	Alternating Current
DC	Direct Current
IT	Information Technology
KPI	Key Performance Indicator
SLA	Service Level Agreement
UPS	Uninterruptible Power Supply

4 Conformance

In order for a KPI of data centre resource usage effectiveness or efficiency to be included in the ISO/IEC 30134 series, it should

a) meet the common objectives outlined in 5.2,

b) meet the requirements of 5.3,

c) meet the structure requirements of 5.4, and

d) meet the use requirements of 5.5.

5 Key performance indicators (KPIs)

5.1 General

The ISO/IEC 30134 series defines requirements for the KPIs that are used to address aspects of data centre resource usage effectiveness or efficiency.

© ISO/IEC 2016 – All rights reserved