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Information technology — Data centre facilities and infrastructures —

Part 31: Key performance indicators for resilience

Technologie de l'information — Installation et infrastructures de centres de traitement de données —

Partie 31: Indicateurs clés de performance pour la résilience

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Foreword

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This 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 TS 22237-31:2023), which has been technically revised.

The main changes are as follows:

— Annex B was added to provide dependability data for items of data centre infrastructures;

— all subsequent annexes were reviewed and reordered;

— terms and definitions were clarified.

A list of all parts in the ISO/IEC 22237 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.

Introduction

The various parts of the ISO/IEC 22237 series reference four qualitative Availability Classes as well as structural definitions to categorize different designs. The documents also refer to resilience criteria in order to improve structural requirements for a qualitative approach.

In order to meet the requirements for evaluating or comparing different designs or for validating service level agreements (SLAs) for data centres, this document introduces quantitative metrics as key performance indicators (KPIs). The proposed KPIs cover resilience attributes, including dependability and fault tolerance metrics. The characteristics of aging of infrastructures are covered by reliability criteria.

Through the use of KPIs, the comparison of designs, functional elements and components of infrastructure designs becomes possible. In addition, it is possible to optimize data centre infrastructures (DCIs) with holistic targets. It is recommended to use the KPIs of this document in combination with the efficiency and sustainability KPIs of the ISO/IEC 30134 series.

ISO/IEC 22237-1:2021, Annex A, demonstrates that a single KPI, such as Availability, is not sufficient to describe the complexity of a DCI. In recognition, this document has been developed in order to compare and value different designs with different Availability Classes of DCIs based on a set of selected KPIs.

Furthermore, this document has been created to establish KPIs for resilience of DCIs with defined resilience levels. The resilience objectives can vary depending on the outcome of the ISO/IEC 22237-1 risk analysis, the process criticality of the end user's information technology equipment (ITE), and the data centre type of business.

Using the different stages of a data centre design process, this document describes in which phases the application of KPIs for resilience is appropriate. With its assistance, data centre designers, planners and operators will be supported in defining resilience levels, performing theoretical assessments and designing and operating DCIs which are able to meet SLAs.

Information technology — Data centre facilities and infrastructures —

Part 31: Key performance indicators for resilience

1 Scope

This document:

a) defines metrics as key performance indicators (KPIs) for resilience, dependability, fault tolerance and availability tolerance for data centres;

b) covers the data centre infrastructure (DCI) of power distribution and supply, and environmental control;

c) can be referred to for covering further infrastructures, e.g. telecommunications cabling;

d) defines the measurement and calculation of the KPIs and resilience levels (RLs);

e) targets maintainability, recoverability and vulnerability;

f) provides examples for calculating these KPIs for the purpose of analytical comparison of different DCIs.

This document does not apply to IT equipment, cloud services, software or business applications.

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 22237-1, *Information technology — Data centre facilities and infrastructures — Part 1: General concepts*

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

ISO/IEC 22237-4, *Information technology — Data centre facilities and infrastructures — Part 4: Environmental control*

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

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[2] IEEE Institute of Electrical and Electronics Engineers. Power & Energy Society, Industry Technical Support Task Force, Technical Report PES-TR65, April 2018, *The Definition and Quantification of Resilience*

[3] ITIC Information Technology Industry Council, CBEMA Computer Business Equipment Manufacturers Association curve

[4] IEEE Institute of Electrical and Electronics Engineers Std 493, 2007, *Design of reliable industrial and commercial power systems*

[5] IEC 60050-192:2015, *International Electrotechnical Vocabulary (IEV)*

[6] IEC 60300, *Dependability management*

[7] IEC 60605-4, *Equipment reliability testing - Part 4: Statistical procedures for exponential distribution - Point estimates, confidence intervals, prediction intervals and tolerance intervals*

[8] IEC 60812, *Failure modes and effects analysis (FMEA and FMECA)*

[9] IEC 61025, *Fault tree analysis*

[10] IEC 61165, *Application of Markov techniques*

[11] IEC 62551, *Analysis techniques of Dependability – Petri net techniques*

[12] ISO/IEC/TS 22237-7:2018, *Information technology — Data centre facilities and infrastructures — Part 7: Management and operational information*

[13] ISO/IEC 22237-5, *Information technology — Data centre facilities and infrastructures — Part 5: Telecommunications cabling infrastructure*

[14] Hale P.S., Arno R.G., Dylis D.D. *Reliability and availability data collection program for power distribution, power generation, and HVAC components of commercial industrial, and utility installations*, IEEE Systems Technical Conference on Industrial and Commercial Power 2005, Saragota Springs, NY, USA, 2005, pp. 199-203, © 2005 IEEE

[15] IEC 61078, *Reliability block diagrams*