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Information technology - Data centre facilities and infrastructures - Part 4-31: Key performance indicators for Resilience

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

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English Version

**Information technology - Data centre facilities and infrastructures
- Part 4-31: Key performance indicators for Resilience**

Technologie de l'information - Installation et infrastructures
de centres de traitement de données - Partie 4-31:
Indicateurs-clés de performance pour la résilience

Informationstechnik - Einrichtungen und Infrastrukturen von
Rechenzentren - Teil 4-31: Leistungskennzahlen für die
Resilienz

This Technical Specification was approved by CENELEC on 2024-09-02.

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European Committee for Electrotechnical Standardization
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Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (CLC/TS 50600-4-31:2024) has been prepared by CLC/TC 215, "Electrotechnical aspects of telecommunication equipment".

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document is based on, but not identical to, ISO/IEC TS 22237-31:2023.

This document has been prepared under a standardization request addressed to CENELEC by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

CLC/TS 50600-4-31:2024 (E)**Introduction**

The unrestricted access to internet-based information demanded by the information society has led to an exponential growth of both internet traffic and the volume of stored/retrieved data. Data centres are housing and supporting the information technology and network telecommunications equipment for data processing, data storage and data transport. They are required both by network operators (delivering those services to customer premises) and by enterprises within those customer premises.

Data centres usually provide modular, scalable and flexible facilities and infrastructures to easily accommodate the rapidly changing requirements of the market. In addition, energy consumption of data centres has become critical both from an environmental point of view (reduction of environmental footprint) and with respect to economical considerations (cost of energy) for the data centre operator.

The implementation of data centres varies in terms of:

- a) purpose (enterprise, co-location, co-hosting or network operator facilities);
- b) security level;
- c) physical size;
- d) accommodation (mobile, temporary and permanent constructions).

The needs of data centres also vary in terms of availability of service, the provision of security and the objectives for energy efficiency. These needs and objectives influence the design of data centres in terms of building construction, power distribution, environmental control, telecommunications cabling and physical security as well as the operation of the data centre. Effective management and operational information are important in order to monitor achievement of the defined needs and objectives.

Recognizing the substantial resource consumption, particularly of energy, of larger data centres, it is also important to provide tools for the assessment of that consumption both in terms of overall value and of source mix and to provide Key Performance Indicators (KPIs) to evaluate trends and drive performance improvements.

At the time of publication of this document, the EN 50600 series is designed as a framework of standards, technical specifications and technical reports covering the design, the operation and management, the key performance indicators for energy efficient operation of the data centre as well as a data centre maturity model.

The EN 50600-2 series defines the requirements for the data centre design.

The EN 50600-3 series defines the requirements for the operation and the management of the data centre.

The EN 50600-4 series defines the key performance indicators for the data centre.

The CLC/TS 50600-5 series defines the data centre maturity model requirements and recommendations.

The CLC/TR 50600-99-X Technical Reports cover recommended practices and guidance for specific topics around data centre operation and design.

This series of documents specifies requirements and recommendations to support the various parties involved in the design, planning, procurement, integration, installation, operation and maintenance of facilities and infrastructures within data centres. These parties include:

- 1) owners, operators, facility managers, ICT managers, project managers, main contractors;
- 2) consulting engineers, architects, building designers and builders, system and installation designers, auditors, test and commissioning agents;
- 3) facility and infrastructure integrators, suppliers of equipment;
- 4) installers, maintainers.

At the time of publication of this document, the EN 50600-4 series comprises the following documents:

- EN 50600-4-1, *Information technology — Data centre facilities and infrastructures — Part 4-1: Overview of and general requirements for key performance indicators*

- EN 50600-4-2, *Information technology — Data centre facilities and infrastructures — Part 4-2: Power Usage Effectiveness*
- EN 50600-4-3, *Information technology — Data centre facilities and infrastructures — Part 4-3: Renewable Energy Factor;*
- EN 50600-4-6, *Information technology — Data centre facilities and infrastructures — Part 4-6: Energy Reuse Factor;*
- EN 50600-4-7, *Information technology — Data centre facilities and infrastructures — Part 4-7: Cooling Efficiency Ratio;*
- EN 50600-4-8, *Information technology — Data centre facilities and infrastructures — Part 4-8: Carbon Usage Effectiveness;*
- EN 50600-4-9, *Information technology — Data centre facilities and infrastructures — Part 4-9: Water Usage Effectiveness.*

The inter-relationship of the documents within the EN 50600 series is shown in Figure 1.

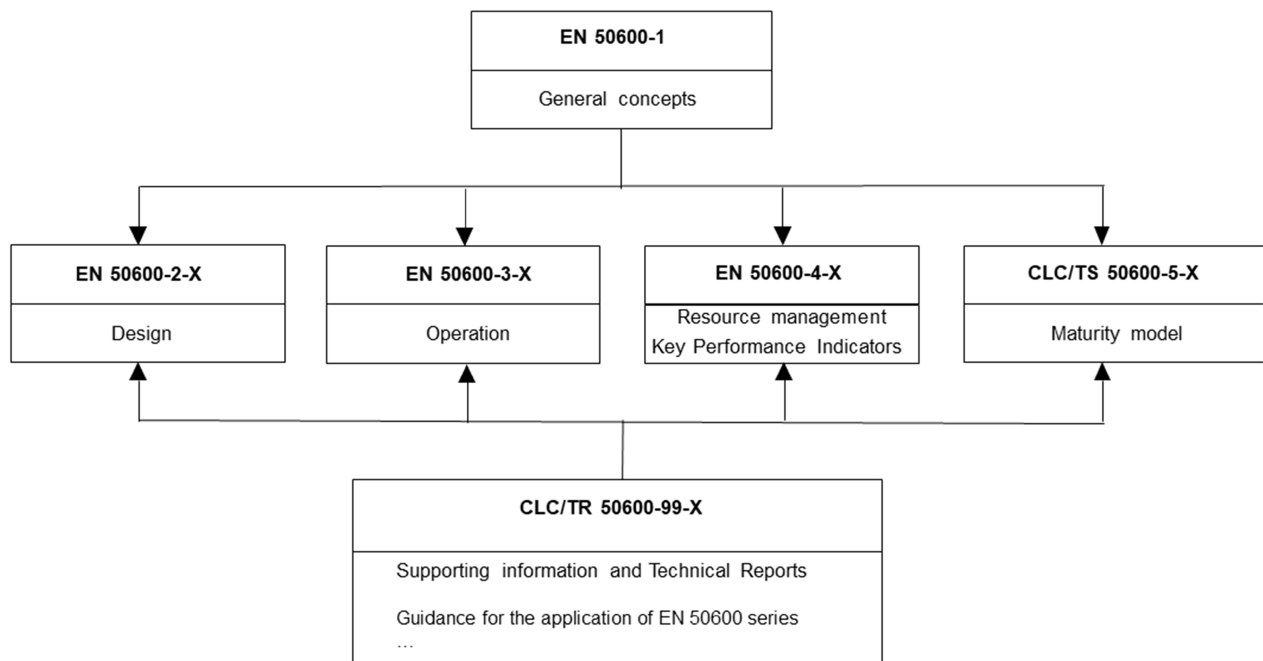


Figure 1 — Schematic relationship between the EN 50600 series documents

EN 50600-2-X documents specify requirements and recommendations for particular facilities and infrastructures to support the relevant classification for “availability”, “physical security” and “energy efficiency enablement” selected from EN 50600-1.

EN 50600-3-X documents specify requirements and recommendations for data centre operations, processes and management.

EN 50600-4-X documents specify requirements and recommendations for key performance indicators (KPIs) used to assess and improve the resource usage efficiency and effectiveness, respectively, of a data centre.

NOTE Within the EN 50600-4-X 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.

The various parts of the EN 50600 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.

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This document introduces quantitative metrics as key performance indicators (KPIs), in order to meet the requirements necessary for evaluating or comparing different designs or to validate service level agreements (SLAs) for data centres. 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 (DCI) with holistic targets. It is recommended to use the KPIs of this document in combination with the efficiency and sustainability KPIs of the EN 50600-4 series.

EN 50600-1:2019, 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, the 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 EN 50600-1 risk analysis, the end user information technology equipment (ITE) process criticality, 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.

Additional standards in the EN 50600-4-X series will be developed, each describing a specific KPI for resource usage effectiveness or efficiency.

The EN 50600-4-X 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.

This document is intended for use by and collaboration between architects, building designers and builders, system and installation designers and main contractors.

This series of documents does not address the selection of information technology and network telecommunications equipment, software and associated configuration issues.

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 metrics 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.

EN 50600-1:2019, *Information technology — Data centre facilities and infrastructures — Part 1: General concepts*

EN 50600-2-2:2019, *Information technology — Data centre facilities and infrastructures — Part 2-2: Power supply and distribution*

EN 50600-2-3, *Information technology — Data centre facilities and infrastructures — Part 2-3: Environmental control*

EN 50600-4-1, *Information technology — Data centre facilities and infrastructures — Part 4-1: Overview of and general requirements for key performance indicators*

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