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Information technology - Data centre facilities and infrastructures - Part 1: General concepts

Informationstechnik - Einrichtungen und Infrastrukturen von Rechenzentren - Teil 1: Allgemeine Konzepte

Technologie de linformation - Installation et infrastructures de centres de traitement de données - Partie 1: Concepts généraux

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ICS:

35.020	Informacijska tehnika in tehnologija na splošno	Information technology (IT) in general

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Information technology - Data centre facilities and infrastructures - Part 1: General concepts

Technologie de l'information - Installation et infrastructures de centres de traitement de données - Partie 1: Concepts généraux

Informationstechnik - Einrichtungen und Infrastrukturen von Rechenzentren - Teil 1: Allgemeine Konzepte

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European Committee for Electrotechnical Standardization
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Contents

European foreword

This document (EN 50600-1:2019) has been prepared by CLC/TC 215 “Electrotechnical aspects of telecommunication equipment”.

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2020–04–29
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2022–04–29

This document supersedes EN 50600-1:2012.

The following major modifications have been made compared to EN 50600-1:2012:

a) reference to Key Performance Indicators of EN 50600-4-X included;

b) Clause 7 (Availability) has been revised;

c) the design processes (Clause 8) and design principles (Clause 9) have been moved from an annex to the main body of the document;

d) existing Annex A has been removed;

e) new Annexes A and B have been added.

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 has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

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 need to 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 is required 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 European Standard, EN 50600 series is designed as a framework of standards and technical reports covering the design, the operation and management as well as the key performance indicators for energy efficient operation of the data centre.

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

This series of European Standards 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.

The inter-relationship of the standards and technical reports within the EN 50600 series is shown in Figure 1.

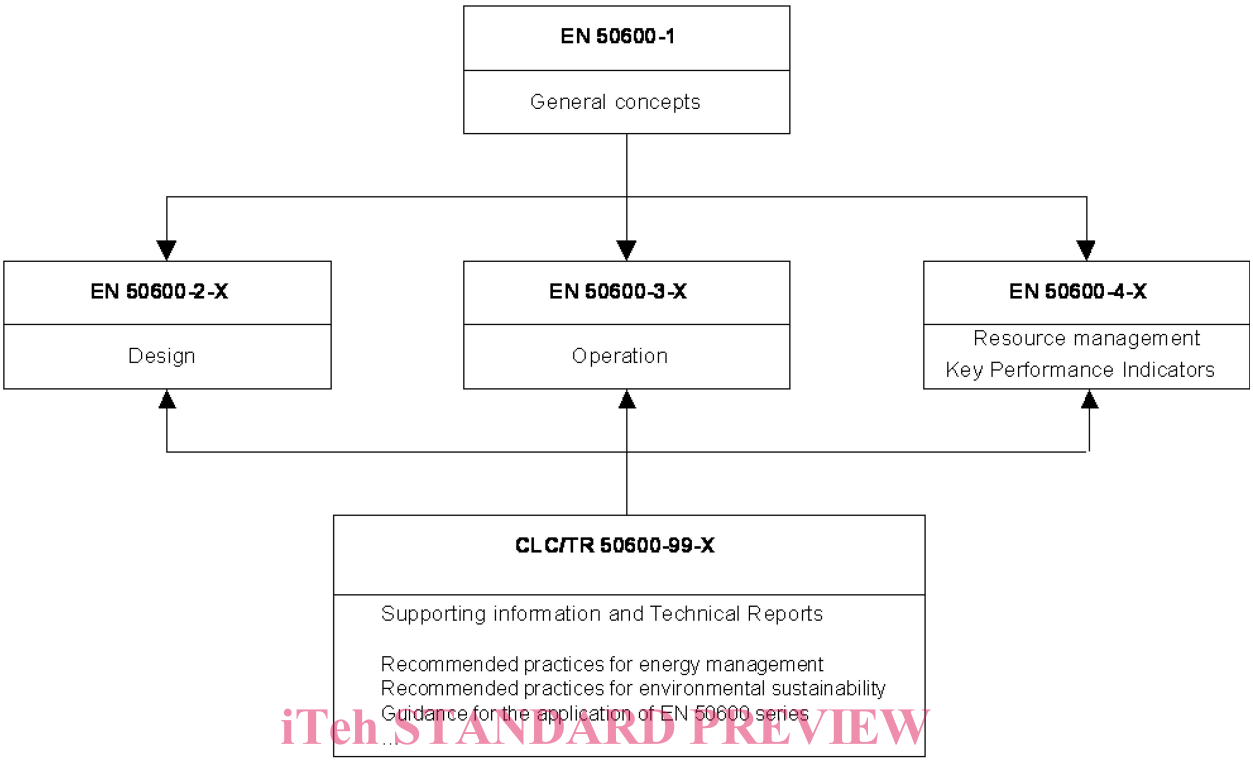

Figure 1 – Schematic relationship between EN 50600 series of standards

This European Standard specifies general requirements for data centres for all kinds of data centres irrespective of their size and physical construction. It introduces a classification system for availability, physical security and energy efficiency enablement.

EN 50600-2-X standards 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.

This European Standard is intended for use by and collaboration between architects, building designers and builders, system and installation designers.

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

1 Scope

This document:

a) describes the general principles for data centres upon which the requirements of the EN 50600 series are based;

b) defines the common aspects of data centres including terminology, parameters and reference models (functional elements and their accommodation) addressing both the size and complexity of their intended purpose;

c) describes general aspects of the facilities and infrastructures required to support data centres;

d) specifies a classification system, based upon the key criteria of “availability”, “security” and “energy-efficiency” over the planned lifetime of the data centre, for the provision of effective facilities and infrastructure;

e) details the issues to be addressed in a business risk and operating cost analysis enabling application of the classification of the data centre;

f) provides reference to operation and management of data centres;

g) introduces the concepts of Key Performance Indicators (KPIs) for resource management of data centre facilities and infrastructures.

The following topics are outside of the scope of this series of European Standards:

1) the selection of information technology and network telecommunications equipment, software and associated configuration issues are outside the scope of this European Standard;

2) quantitative analysis of overall service availability resulting from multi-site data centres;

3) safety and electromagnetic compatibility (EMC) requirements (covered by other standards and regulations. However, information given in this European Standard can be of assistance in meeting these standards and regulations).

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 50600-2-1, *Information technology - Data centre facilities and infrastructures - Part 2-1: Building construction*

EN 50600-2-2, *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 50600-2-4, *Information technology - Data centre facilities and infrastructures - Part 2-4: Telecommunications cabling infrastructure*

EN 50600-2-5, *Information technology - Data centre facilities and infrastructures - Part 2-5: Security systems*

EN 50600-3-1, *Information technology - Data centre facilities and infrastructures - Part 3-1: Management and operational information*

EN 50600-4-X (all parts), Information technology – Data centre facilities and infrastructures – Part 4-X

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

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

• IEC Electropedia: available at http://www.electropedia.org/

• ISO Online browsing platform: available at http://www.iso.org/obp

3.1.1
availability
ability of an item to be in a state to perform a required function under given conditions at a given instant of time or over a given time interval, assuming that the required external resources are provided

[SOURCE: IEC 60050-191:1990, 191-02-05]

3.1.2
building entrance facility
facility that provides all necessary mechanical and electrical services and which complies with all relevant regulations for the entry of specific services or infrastructures into a building

[SOURCE: EN 50173-1:2018, 3.1.18 – modified: replaced “telecommunication cables” with “specific infrastructures or services” and deleted „and which can enable transmission from outdoor to indoor cable”]

3.1.3
building security
facilities and systems necessary to provide the required levels of security at the entrance to and within the building containing the data centre

3.1.4
cabinet
enclosed construction for housing closures and other information technology equipment

[SOURCE: EN 50174-1:2018, 3.1.7]

3.1.5
co-hosting data centre
data centre in which multiple customers are provided with access to network(s), servers and storage equipment on which they operate their own services/applications

Note 1 to entry: Both the information technology equipment and the support infrastructure of the building are provided as a service by the data centre operator.

[SOURCE: EN 50174-2:2018, 3.1.2]

3.1.6
co-location data centre
data centre in which multiple customers locate their own network(s), servers and storage equipment

Note 1 to entry: The support infrastructure of the building (such as power distribution and environmental control) is provided as a service by the data centre operator.

[SOURCE: EN 50174-2:2018, 3.1.3]

3.1.7
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

3.1.8
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

3.1.9
data centre
structure, or group of structures, dedicated to the centralised 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.

3.1.10
data centre security
facilities and systems that provide the required levels of security at the entrance to and within the data centre

3.1.11
demarcation point
point where the operational control or ownership changes

3.1.12
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

3.1.13
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 systems (UPS) etc.)

3.1.14
enterprise data centre
data centre that is operated by an enterprise which has the sole purpose of the delivery and management of services to its employees and customers

[SOURCE: EN 50174-2:2018, 3.1.8]

3.1.15
external premises security
facilities and systems that provide the required levels of security for the area between the building and the boundary of the premises

3.1.16
energy efficiency enablement
ability to measure the energy consumption and to allow calculation and reporting of energy efficiency of the various facilities and infrastructures

3.1.17
facility
spaces and pathways that accommodate a specific infrastructure

3.1.18
functional capability
ability of the data centre (or system or subsystem) to deliver its intended function

3.1.19
functional element
source of supply, device or path

3.1.20
generator space
area used for housing the installation of electrical power supply generation equipment together with control systems, storage of associated fuels or energy conversion equipment

3.1.21
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

3.1.22
infrastructure
technical systems providing functional capability of the data centre (e.g. power distribution, environmental control and physical security)

3.1.23
main distributor
distributor used to make connections between the main distribution cabling subsystem, network access cabling subsystem and active equipment

[SOURCE: EN 50173-5:2018, 3.1.10]

3.1.24
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)

3.1.25
network operator data centre
data centre that has the primary purpose of the delivery and management of broadband services to the operators' customers

[SOURCE: EN 50174-2:2018, 3.1.18]

3.1.26
physical security
active and passive measures (combining physical and technological controls), procedures and responsibilities to maintain the desired level of availability for the facilities and infrastructures of the data centres in relation to access control and environmental events

3.1.27
planned downtime
period of time during which a system or subsystem does not provide functional capability whilst it undergoes maintenance or is switched off to test the response of a related system or subsystem

3.1.28
premises entrance facility
space that provides all necessary mechanical and electrical services for the entry of cables into the premises

3.1.29
storage space
area where general goods and/or data centre goods to be used in the premises and data centre are stored

3.1.30
system
set of interrelated functional elements considered in a defined context as a whole and separated from their environment

3.1.31
telecommunications
technology concerned with the transmission, emission, and reception of signs, signals, writings, images, and sounds, by cable, radio, optical, or other electromagnetic systems

Note 1 to entry: The term telecommunications has no legal meaning when used in this document

[SOURCE: EN 50173-1:2018, 3.1.49]

3.1.32
telecommunications cabling
telecommunications cabling infrastructure from the telecommunications space(s) to the premises entrance facility

3.1.33
telecommunication equipment
equipment within the data centre that provides telecommunication services within the data centre

3.1.34
telecommunications space
area which may house demarcation points and telecommunication equipment associated with the building entrance facility and which may allow service providers restricted access to the data centre

3.1.35
testing space
area within the data centre used for the testing and configuring of equipment prior to being brought into service

Note 1 to entry: Testing space is sometimes called staging area.