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Technologies de l'information — Approvisionnement, prévision et gestion —

Partie 2: Infrastructure de site des centres de traitement de données

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Foreword

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This document was prepared by Joint Technical Committee ISO/TC JTC 1, *Information technology*, Subcommittee SC 39, *Sustainability, IT and data centres*.

A list of all parts in the ISO/IEC 8236 series can be found on the ISO website.

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Introduction

The global economy is increasingly more reliant on information and communication technologies and the associated generation, transmission, compute and storage of digital data. All markets have experienced growth in the digital data for social, educational, medical and business sectors. There are a wide variety of data centres within private enterprise, shared/collocation and cloud service providers that meet the growing demands of the digital data. The growth of this digital data will continue at a rapid pace with the development of devices within the "Internet of Things" category, artificial intelligence applications, and the increased ability to generate and transmit data while mobile with the deployment of 5G technology. With the transition from air-cooled information technology (IT) equipment to liquid-cooling technologies, with the advent of processors requiring higher power demands, it is also important to coordinate IT air-cooled vs liquid-cooled provisioning plans with facility provisioning plans.

Compute and storage technologies and requirements continue to change rapidly. This creates challenges for IT professionals who are responsible for planning for the provisioning compute and storage systems, and the networks interconnecting the systems. Data centre IT systems and platform ecosystems typically have life-cycles of 3 to 5 years. However, IT provisioning planners are challenged to identify provisioning requirements beyond even 1 year. This results in significant challenges for data centre facility provisioning planners who are responsible for identifying requirements for data centre facility systems that have life cycles of 10 to 25 years.

Data centre IT personnel responsible for provisioning IT systems are often unfamiliar with how the IT systems impact facility planning. They are also often unfamiliar with the abundance of information that is available to them that can help the facility planning personnel to develop a holistic, long-term plan for provisioning data centre facilities. This has resulted in reactive provisioning. This has also impeded data centre facilities personnel responsible for planning power, cooling and space provisioning. The data centre facilities personnel have little or no knowledge of IT requirements or advanced notice of facility system capacities required to support IT systems that are to be deployed within the data centre.

With this background, growth of digital data is inevitable, and the reactive planning status quo will result in greater frustration for both the IT and facilities provisioning planners. There is therefore a need for a method to benchmark and trend IT provisioning using standard indicators, processes, and reporting.

A data centre provisioning key performance indicator (KPI) will provide a method to profile future IT system and platform requirements over the life of the infrastructure. This method is based on the data centre's current IT applications and systems, the assets of the IT equipment platform, their expansion or contraction trends, and the impact of future changes in technology network, compute and storage processing density and efficiency. Coordinating the DCitP with the DCfP KPI will help develop long range forecasts that extend beyond the current IT equipment life-cycle. This will help guide designers and planners to optimize the capacity of the facility infrastructure, providing greater efficiency of the resources implemented.

This document, in combination with ISO/IEC TS 8236-1, defines the benchmarking, trending and reporting methodologies to be used to develop a holistic long-term provisioning plan.

The data centre provisioning KPI will be influential in guiding data centre designers and planners when developing a design power usage effectiveness (dPUE) defined in ISO/IEC 30134-2. The data centre provisioning KPI can be used in place of an arbitrary estimated IT load to develop the dPUE. The data centre provisioning KPI will provide owners, designers and planners the opportunity to forecast IT loads using a consistent methodology based on the provisioning profile.

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Information technology — Provisioning, forecasting and management —

Part 2:
Data centre facility infrastructure

1 Scope

This document specifies a standardized method of optimizing facility provisioning within data centres by utilizing KPIs that enable the development of facility profiles for individual systems or platforms. The combination of the system and platform KPIs are used to establish a facility provisioning profile, establishing standard forecasting methods to optimize data centre resource effectiveness.

This document:

a) defines a method for identifying benchmarks and trends in facility provisioning;

b) provides capability assessment/indicators of facility infrastructure over the infrastructure life-cycle including preparatory, commissioning, expansion/contraction and/or retirement of IT equipment;

c) describes the relationship of DCfP to dPUE (ISO/IEC 30134-2), providing a common methodology to base dPUE.

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/TS 8236-1, *Information Technology — Provisioning, forecasting and management — Part 1: Data centre IT equipment*

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 TS 8236-1 and the following apply.

ISO and IEC maintain terminological 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
IT platform
subset of equipment within an IT system to differentiate between various type of equipment, or a subset of equipment across multiple IT systems grouped to associate various types of equipment, by physical, logical or function characteristics such as form factor, class, generation, application, etc.

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3.1.2
IT system
set of one or more ITE providing network, compute or storage, or any combination of network, compute or storage

3.1.3
system
components grouped together to provide increased capacity or redundancy, or components integrated together to provide required functionality

3.1.4
thermal design power
maximum amount of heat a CPU or GPU generates

3.2 Abbreviated terms

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

DCfP data centre facility provisioning

DCitP data centre IT provisioning

ITE information technology equipment

LC-IT liquid cooled information technology

LFF large form factor server with a profile greater than 2RUs

P platform, data illustrating historic trends or forecasts

PUE power usage effectiveness

dPUE designed power usage effectiveness derivative

RU rack unit

SFF small form factor server with a profile of 2RU or less

TDP thermal design power

V2P quantity of virtual machine guests on a virtual machine host expressed as a ratio

3.3 Symbols

For the purposes of this document, the following symbols apply.

β linear regression model

C_{LC} life-cycle

D_{R} normal quantity of platform devices per rack or cabinet

m number of platform trends

n number of historic data points in a platform trend

P platform, data illustrating historic trends or forecasts

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$P_{i,j,k}$ platform where "i" represents the quantity of platforms within DCitP or DCfP, "j" represents the quantity of variables within the platform and "k" represents the quantity of data points in the trend or forecast

$R_{\mathrm{RU},i}$ height of single chassis of platform "i", measured in rack units

R_{TRU} total rack units

R_{CRU} consumed rack units within rack or cabinet

R_{RUD} rack units per platform device

s number of data points in a platform provisioning forecast

S_{RS} refresh space

t time

W weighting factor

y one or more variables used to establish a unique trend for the provisioning profile

η_{f} data centre facility provisioning

4 Integration of DCitP with DCfP

The development of a data centre facility provisioning (DCfP) profile requires the integration of a data centre IT provisioning (DCitP) profile as illustrated in Figure 1. The DCitP profile consists of various platform provisioning forecasts. DCfP cannot be developed in isolation of DCitP, DCitP is a pre-requisite.

The DCitP analysis and reports will be forwarded by the IT provisioning team to the facilities provisioning team. The facilities provisioning team will incorporate the provided data into the DCfP. The DCfP cannot be developed without meaningful and useful data from the IT provisioning team, therefore it is important that the IT and facilities team collaborate early in the planning stages as the IT provisioning team establishes the platforms, the attributes and units of measure that the DCitP reports will forward to the facilities provisioning team. The facilities provisioning team should verify the data to be provided by the IT provisioning team can be utilized within the DCfP analysis.

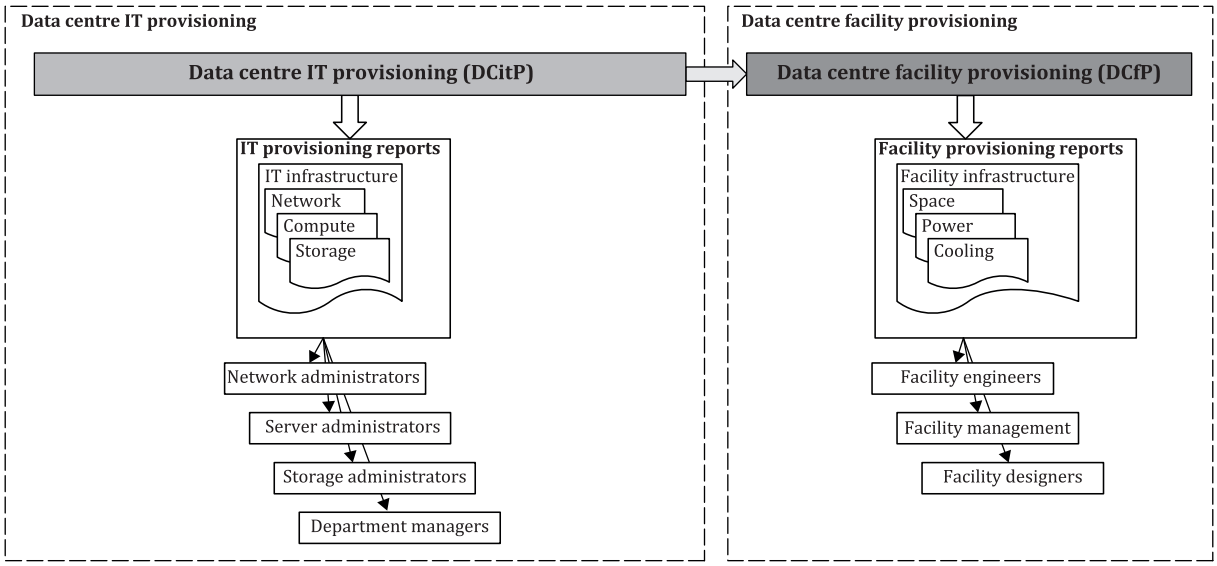


Figure 1 — Integration of DCitP with DCfP

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