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Information technology — Systems and software engineering — Application management

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee IST/15, Software and systems engineering.

A list of organizations represented on this committee can be obtained on request to its secretary.

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INTERNATIONAL STANDARD

ISO/IEC 16350

First edition
2015-08-01

Information technology — Systems and software engineering — Application management

Technologies de l'information — Gestion d'application — Exigences pour la gestion d'application

Reference number
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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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 document 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 and IEC 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*, Subcommittee SC 7, *Software and systems engineering*.

Its contents are based on the Dutch national standard, NEN 3434, *Information technology — Application management — Requirements for application management*, which will be withdrawn after publication of this International Standard.

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Introduction

Applications can live for decades. Applications that were developed twenty or thirty years ago are still being used and most applications that have recently been developed will still be in use for the many years to come. During their life cycle, these applications and the related data structures will have to be monitored, enhanced, and sometimes renewed or renovated. This means that very often, in total, more money and work is needed for the stage of operation and use than for the initial development stage. But the emphasis very often lies at the initial development stage; there are various frameworks and (international) standards covering initial application development. For the stage of operation and use, there are little frameworks and standards. This International Standard has been developed to fill this gap.

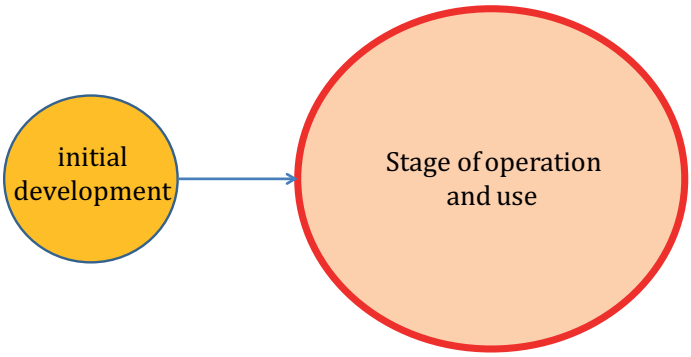

Figure 1 — Stage of the lifecycle in scope

The initial development of applications usually takes place in a rather protected project environment with a relatively small amount of operational interaction with the business processes, as they are not yet supported by the application under development. The project has its own pace and rules, its own governance, and a limited lifespan. In the final development stage, the application is transferred to operation then the rules change. The business processes of the user organizations become largely or fully dependent on the application. In that stage, the following two major types of actions will have to take place:

a) supporting use and operation of the application;

b) adapting the application based on changing demands or based on quality improvements (fixes, patches, and releases).

These actions and all the responsibilities, activities, and tasks around it, we call application management and the stage in which a version of an application actually is in use and in operation is the subject of this International Standard.

This International Standard aims to offer application management organizations a well-defined, directly applicable, and complete standard for their specific activities. Although this International Standard is partially overlapping with ISO/IEC 20000 and ISO/IEC 12207, this International Standard is a standard organized from the viewpoint of application management and contributes to the convenience of users who work in that area.

This International Standard provides a common framework for establishing the processes, tasks, and activities of service providers that enhance, maintain, and/or renew applications or application objects after the initial development (that is at the stage of exploitation and use) and that supports other service providers that run the application in production environments and user organizations that use the applications.

This International Standard also supports the definition, control, assessment, and improvement of such processes. These processes can be applied uniquely, in conjunction, sequentially, or in parallel.

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INTERNATIONAL STANDARD ISO/IEC 16350:2015(E)

Information technology — Systems and software engineering — Application management

1 Scope

1.1 General

This International Standard establishes a common framework for application management processes with well-defined terminology that can be referenced by the software industry. It contains processes, activities, and tasks that apply during the stage of operation and use from the point of view of the supplier organization that enhances, maintains, and renews the application software and the software-related products such as data-structures, architecture, designs, and other documentation.

This International Standard applies to the supply, maintenance, and renewal of applications, whether performed internally or externally with respect to the organization that uses the applications.

Application management comprises all of the tasks, responsibilities, and activities with the aim that the support of business processes by applications continues to meet the requirements and needs of the organizations that use these applications throughout the entire life span of their business processes.

This International Standard therefore focuses on the following:

— day-to-day management of applications (the software) and the related data structures and support of costumer organizations, including handling calls such as incidents and service requests;

— maintenance and renewal of applications and data structures in accordance with changing requirements and needs;

— opportunities, threats, and changes in the business and/or technology that influence the future of the applications and, based on that, the strategy for maintaining and renewing the applications;

— organization and strategy of application management organizations.

Before retirement, the life cycle of an application consists of two important stages: the stage of initial development of the application and the stage of operation and use (when the software is in use, in operation, supported, modified, and renewed). This stage of operation and use is the subject of this International Standard. The initial development of an application is not within the scope of this International Standard, however the project that is responsible for the initial development has to take the requirements of the application management organization that will enhance and maintain the application into consideration. This means that the application management organization will ask the project to deliver initial requirements, architecture products, design, standards, and other documentation, in order to use these products during enhancement and maintenance.

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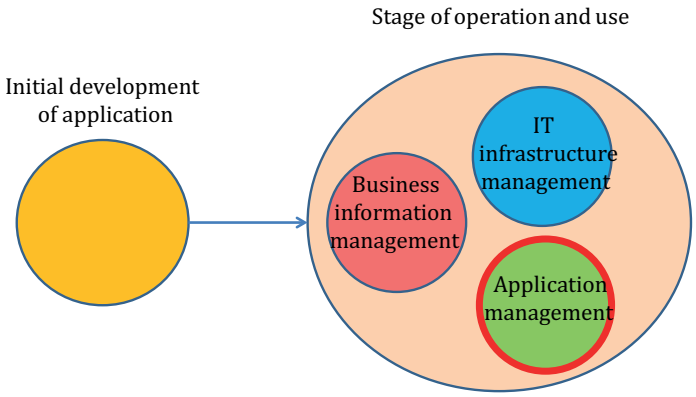

Figure 2 — Domains involved

In the stage of operation and use, the following three domains play a role:

a) business information management representing the business and end users of the application (use);

b) IT infrastructure management hosting the application (operation) and maintaining the technical infrastructure;

c) application management

   1) supporting the use and the operation;

   2) maintaining and renewing the application software and data structures.

Business information management constitutes the demand side of information technology (IT) and information provisioning. Business information management is responsible for supporting users in the use of the information provisioning and represents the business organization as the client of the IT-suppliers. Business information management acts as the customer of the IT organizations (application management plus IT infrastructure management).

Specific tasks of business information management include the following:

— support of end users in how the information provisioning are to be used;

— define how information and IT are to look like (the functionality, the appearance, etc);

— advise and support business management with the prioritization of requirements and management of their budgets for IT;

— assign work to IT providers and monitor their delivered services;

— define long term policy and plans regarding the information provisioning.

IT infrastructure management is responsible for managing the operation of the information system, including maintaining the infrastructure (e.g. network, hardware), running the software, and data processing. In brief, this is the organization that runs the information systems and aims to keep the infrastructure in good order.

The activities of business information management and IT infrastructure management are closely related to application management but not within the scope of this International Standard.

Application management is responsible for the management and maintenance of the application and definition of the data structures used in databases and data files. This form of management requires knowledge of software programming, information system development, design, day-to-day management of applications, and application maintenance. Core qualities of the application management personnel are in-depth knowledge of the customer or (at least) in-depth knowledge of the customer's business processes and in-depth knowledge of the existing applications (application objects), design, architecture, etc.

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This International Standard consists of the following three levels of processes:

— operational;

— managerial;

— strategic.

These process levels and the processes are interconnected with one another.

Figure 3 provides an overview of the processes within each of the process levels.

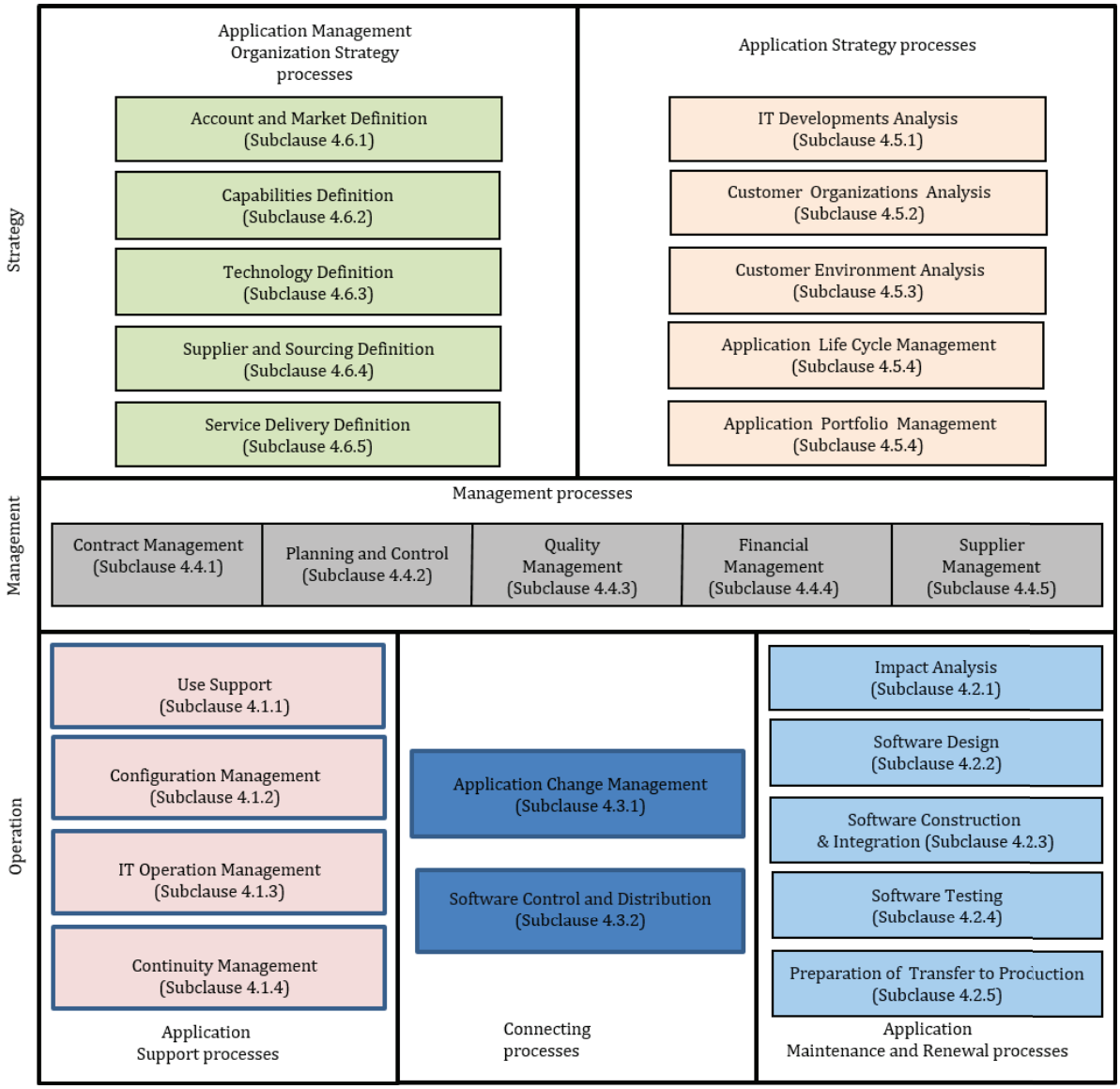

Figure 3 — Process overview

There are no separate processes defined for security, issues, risks, and/or vulnerability. These topics form an important part of the Continuity Management Process, but they are also part of other processes. Security, for instance, is an important part of the functionality of the application, so it is addressed in the Impact Analysis process and dealt with within the specifications of the application and defined in the Software Design Process and also within the service levels and, therefore, specified in the Agreement Management and Supplier Management Processes. Other processes which deal with these topics are the management processes planning and control, quality management and financial management, and, for instance, the strategic process technology definition, where risk and vulnerability are important features.

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1.2 Applicability

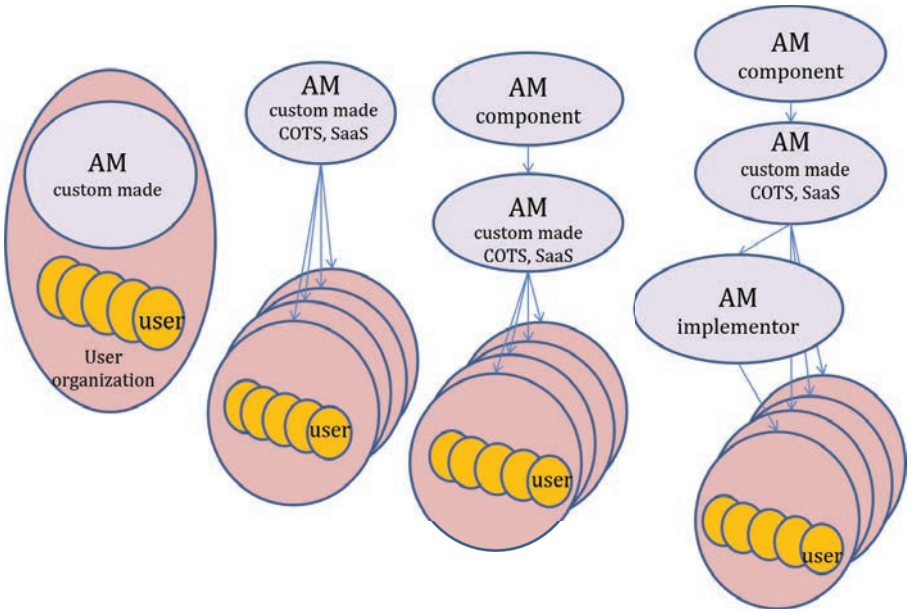
1.2.1 Audience

This International Standard is intended to be used by application management organizations. The application management service providers that enhance, maintain, and/or renew applications or application objects and that support infrastructure management organizations and user organization in the stage operation and use.

Other users of this International Standard can be application software developers, quality assurance managers (or consultants), and customers of application management organizations.

The purpose of this International Standard is to provide a defined set of processes to facilitate communication among all parties involved in application management.

Different parties can carry out different activities in the field of application management. For example, some parties are responsible for maintenance of the application after the development stage while others also support the user organization and the IT infrastructure management organization. Some parties just change the software items while others are responsible for the entire chain of impact analysis, design, build, test, and release of changes. These different parties can be all in one organization or in different internal and external organizations.



Key

AM application management

COTS commercial off-the-shelf

SaaS software as a service

Figure 4 — Examples of application management organizations

The following are examples of different types of application management organizations shown in Figure 4:

— organization that produces and maintains a specific component;

— organization that supplies and maintains standard products or standard components;

— organization that delivers custom services to an individual customer, either with or without integration with other systems or the infrastructure;

— organization that manages and maintains a custom application;

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— organization that implements software.

The following are other examples of application management organizations:

— integrator that merges or combines services;

— producer of configurable software platforms;

— organization that configures and maintains such platforms for customers.

These types of application management organizations have a strong impact on the way in which the processes are implemented and operated. The processes shown in Figure 3 therefore vary in importance and characteristics.

1.2.2 Field of application

This International Standard is applicable to all the following organizations using the processes that play a role in application management within the scope mentioned in 1.1:

— anyone performing application management activities;

— those responsible for establishing and continuously improving application management processes;

— those responsible for executing application management processes at a project level;

— customers and suppliers involved in subcontracting application management activities;

— those responsible for assessing application management processes.

Annex C provides information regarding the use of the application management processes as a process reference model. It defines the basic activities needed to perform tailoring of this International Standard. It has to be noted that tailoring might diminish the perceived value of a claim of conformance to this International Standard. An organization asserting a single-party claim of conformance to this International Standard might find it advantageous to claim full conformance to a smaller list of processes rather than tailored conformance to a larger list of processes.

1.3 Limitations

The initial development of an application is not within the scope of this International Standard.

The activities of business information management and IT infrastructure management are not within the scope of this International Standard.

This International Standard does not detail the application management processes in terms of methods or working procedures required to meet the requirements and outcomes of a process.

This International Standard does not detail documentation to be used or produced within the activities described in the processes in Clause 5 in terms of name, format, explicit content, and recording media. The International Standard might require development of documents of similar class or type. The International Standard, however, does not imply that such documents have to be developed or packaged separately or combined in some fashion. These decisions are left to the user of this International Standard.

This International Standard does not prescribe a specific application management methodology, design methodology, development methodology, test methodology, project management method, or other methods, models, or techniques. The users of this International Standard are responsible for selecting these methods and mapping the processes, activities, and tasks in this International Standard onto those methods. The users of this International Standard are also responsible for selecting and applying the methods and for performing the activities and tasks suitable for application management.

This International Standard is not intended to be in conflict with any organization's policies, procedures, and standards or with any national laws and regulations. Any such conflict has to be resolved before using this International Standard.

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2 Conformance

2.1 Intended usage

The requirements in this International Standard are contained in Clause 5 and Annex B. This International Standard provides requirements for a number of processes suitable for usage in the field of application management. It is recognized that particular projects or organizations might not need to use all of the processes provided by this International Standard. Therefore, implementation of this International Standard typically involves selecting and declaring a set of processes suitable to the organization or project.

There are two ways that an implementation can be claimed to conform to the provisions of this International Standard: full conformance and tailored conformance.

There are two criteria for claiming full conformance. Achieving either criterion suffices for conformance, although the chosen criterion (or criteria) is to be stated in the claim.

— Claiming "full conformance to tasks" asserts that all of the requirements of the activities and tasks of the declared set of processes are achieved.

— Alternatively, claiming "full conformance to outcomes" asserts that all of the required outcomes of the declared set of processes are achieved.

Full conformance to outcomes permits greater freedom in the implementation of conforming processes and can be useful for implementing processes to be used in the context of an innovative application management organization.

2.2 Full conformance

2.2.1 General

A claim of full conformance declares the set of processes for which conformance is claimed. Full conformance is achieved by demonstrating that all of the requirements of the declared set of processes have been satisfied using the outcomes as evidence.

2.2.2 Full conformance to outcomes

A claim of full conformance declares the set of processes for which conformance is claimed. Full conformance to outcomes is achieved by demonstrating that all of the outcomes of the declared set of processes have been achieved. In this situation, the provisions for activities and tasks of the declared set of processes are guidance rather than requirements, regardless of the verb form that is used in the provision.

2.2.3 Full conformance to tasks

A claim of full conformance declares the set of processes for which conformance is claimed. Full conformance to tasks is achieved by demonstrating that all of the requirements of the activities and tasks of the declared set of processes have been achieved. In this situation, the provisions for the outcomes of the declared set of processes are guidance rather than requirements, regardless of the verb form that is used in the provision.

2.3 Tailored conformance

When this International Standard is used as a basis for establishing a set of processes that do not qualify for full conformance, the clauses of this International Standard are selected or modified in accordance with the tailoring process prescribed in Annex B. The tailored text, for which tailored conformance is

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claimed, is declared. Tailored conformance is achieved by demonstrating that the outcomes, activities, and tasks, as tailored, have been achieved.

NOTE 1 When this International Standard is used to help develop an agreement between an acquirer and a supplier, clauses of this International Standard can be selected for incorporation in the agreement with or without modification. In this case, it is more appropriate for the acquirer and supplier to claim compliance with the agreement than conformance with this International Standard.

NOTE 2 Any organization (for example, national, industrial association, company) imposing this International Standard as a condition of trade has to specify and make public the minimum set of required processes, outcomes, activities, and tasks which constitute suppliers' compliance with the conditions of trade.

NOTE 3 Requirements of this International Standard are marked by the use of the verb "shall". Recommendations are marked by the use of the verb "should". Permissions are marked by the use of the verb "may". However, despite the verb that is used, some requirements do not apply depending on which criteria are to be applied in claiming conformance.

NOTE 4 A claim of full conformance to tasks can be appropriate in contractual situations where an acquirer or a regulator requires detailed understanding of the suppliers' processes.

3 Normative references

No normative reference cited in this document.

4 Terms and definitions

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

4.1
application
system for collecting, storing, processing, and presenting data by means of a computer

[SOURCE: ISO/IEC 24570:2005]

Note 1 to entry: The generic term system in context of this International Standard is used to mean a software system.

4.2
application management
domain responsible for all of the tasks and activities that are aimed at managing, supporting, maintaining, and renewing existing applications and related data structures

Note 1 to entry: Application management includes all of the tasks, responsibilities, and activities that serve to bring applications into a state where they meet the requirements and needs of their owners throughout the entire life cycle of the business processes that are supported by the applications.

4.3
application management organization
organizational unit that is responsible for application management for one or more applications

Note 1 to entry: An application management organization may be an internal or external unit in relation to the user organization.

4.4
application object
component that is directly related to or forms part of an application

EXAMPLE Programs, sources, databases, documentation, data structures, test files, and scripts.

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4.5
application portfolio
collection of applications managed by an application management organization or an entity within that application management organization

Note 1 to entry: The scope of the application portfolio may be the entire portfolio of that application management organization, but it may also be the applications of one or some customer organizations of entity within part of a certain customer organization.

4.6
application software
software of an application

Note 1 to entry: Application software is the software that the application management organization produces, services, and maintains. There is also system software: the software to produce and maintain the application software and to run the application software on its platform. The application management organization is one of the users of the system software.

4.7
availability
ability of an application object to perform its required function at an agreed instant or over an agreed period of time

[SOURCE: ISO/IEC 20000–1:2011, modified]

Note 1 to entry: This concerns the start and finish (execution) of the application, the processing at the correct times and in the correct order, the execution of incidental processing, the opening times of online processing, and the storage period of files.

4.8
business information management
domain responsible for all of the tasks and activities that are aimed at supporting the end users in the use of the application and at acting as the customer of the IT organizations

Note 1 to entry: Business information management represents the business as the customer organization or client of the application management and IT infrastructure management organizations in maintaining the functionality of the information provisioning and the information systems. It is the demand side of the information provisioning.

Note 2 to entry: An information system may have non-automated elements such as forms and user guides. Those elements are usually maintained by the business information management organization.

4.9
call
request for service(s) or action(s) with respect to an application or a related service

Note 1 to entry: A call might concern a

— request for service, information or advice,

— disruption or error reporting (incident),

— request for change,

— assignment(for instance an instruction to start an off-schedule production run), and

— complaint.

4.10
change package
collection of objects that have been changed and approved and will be transferred to the production environment

Note 1 to entry: The current system documentation is also included in a change package.

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Note 2 to entry: In case of multiple releases, there are (similarly) multiple change packages.

4.11
change set
collection of objects which can undergo change as the result of a release

Note 1 to entry: These are the objects that are potentially allocated to a release or change.

4.12
configuration item
CI
item or aggregation of software that is designed to be managed as a single entity and its underlying components such as documentation, data structures, scripts, etc

[SOURCE: ISO/IEC 19770–1:2006, modified]

4.13
configuration management database
CMDB
database containing all the relevant details of each configuration item and details of the important relationships between them

[SOURCE: ISO/IEC 19770–2:2009]

4.14
customer
organization or part of an organization that receives a service or services or products of the application management organization

[SOURCE: ISO 9000:2005, modified]

Note 1 to entry: An application management organization may have the following two types of customers, whether these customers are within the same organization or not is of no importance; in both cases, the application management organization has the role of supplier:

— internal or external business information management organizations;

— other application management organizations.

Note 2 to entry: Sometimes, the term *User* is also used. A user or end user is a person that actually uses the application software, where a customer is a person or organization that decides about and acquires the products or services.

Note 3 to entry: The customer or user organization is, in its relationships with application management, represented by business information management.

4.15
data model
graphical and/or lexical representation of data, specifying their properties, structures, and interrelationships

[SOURCE: ISO/IEC 19778-1:2008]

Note 1 to entry: In this International Standard, a distinction is made between a logical (or functional) and a technical data model. A logical data model is a representation of an organization's data, organized in terms of entities and relationships and is independent of any particular data management technology. In a technical data model, it is determined in what form data are recorded in the database and in which way the data are approached.

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4.16
data structure
physical or logical relationship among data elements, designed to support specific data manipulation functions

[SOURCE: ISO/IEC/IEEE 24765:2010]

Note 1 to entry: The data structures are usually documented in technical and logical data models.

4.17
efficiency
relationship between the result achieved and the resources used

[SOURCE: ISO 9000:2005]

Note 1 to entry: Efficiency is the degree to which an information system efficiently uses the technical infrastructure and thus becomes useable for the customer. The most important underlying topic here is the capacity of the platform in relation to the demand.

4.18
final transfer set
collection of changed objects that are to be transferred integrally to one or more production environments, including implementation instructions

Note 1 to entry: See also 5.3.2 and Figure 5.

Note 2 to entry: Transfer means to transfer from one environment to another. Application management transfers the objects from development environment *A* to development environment *B*, from development to test and from test to the infrastructure management organization(s). Application management doesn't manage the final production environment. Deployment to the production environment is done by the infrastructure management organization. So application management does not deploy (to the user environment) but finally transfers the new release to the various (internal and external) IT infrastructure management organizations.

Note 3 to entry: The distribution to an IT infrastructure management organization that deploys to the production environment can also take place in steps. This means that multiple distributions (transfers) might be necessary or desirable.

4.19
functional system design
specification of the functions of the components of a software system and of the working relationships between them

[SOURCE: ISO/IEC 2382-20:1990, modified]

4.20
information provisioning
collection of all the infrastructure tools, software applications, non-automated elements, data sets, user documentation, and organizational structures which serve to supply information to the business

4.21
information system
all of the functions (input, output, transport, processing, and storage) of an application, databases, technical facilities, and manual procedures which support business processes

4.22
IT infrastructure
all the technical components, system software, databases and data files and deployed application software, technical procedures, and technical documentation used to make the information available

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4.23
IT infrastructure management
domain responsible for all of the tasks and activities aimed at managing, maintaining, and renewing the IT infrastructure of the information system, including the operation of the information system

Note 1 to entry: IT infrastructure management includes all of the tasks, responsibilities and activities that aim for a correct technical operation of the information system, consisting of hardware, (system) software, and data sets.

Note 2 to entry: The IT infrastructure management organization is responsible for running the application software in the production environment.

4.24
manageability
degree to which IT infrastructure management can attain and keep an application in its operational state

Note 1 to entry: Manageability involves the transparency and manageability of applications from an infrastructure point of view. Production documentation (including the requirements, control and adjustment abilities of the application in processing, and various other aspects) provides much of the information here.

Note 2 to entry: It is a task of the IT infrastructure management organization to keep the software in operation in the production environment. The application management organization delivers software that can be managed by the IT infrastructure organization and supports the IT infrastructure organization, if necessary. Means of support are documentation, scripts, and personal assistance.

4.25
organization chain
constellation of organizations that have business relationships with one another

Note 1 to entry: The following are two types of chains identified:

— supply chains of the IT organizations that are involved in the management and operation of the application (application manager, computer centre, workspace manager, network manager, business information manager, suppliers, etc.);

— business chains in which the user organization using the application participates (the business process supported by the application forms part of a chain across several organizations; for example the chain of criminal justice, the healthcare chain, etc.).

Note 2 to entry: An organization chain can be a supply chain, but does not necessarily have to be one. For example, a hospital has to report data to, for instance, the National Tax Office, the National Health Office, and the National Bureau of Statistics. These organizations are chain partners but not supply chain partners.

4.26
performance
extent to which the execution of an application in the production environment achieves its purpose in terms of speed of input, transfer, processing, storage and output (the response speed of an application observed by an end user)

[SOURCE: ISO/IEC 33001, modified]

4.27
problem
undesirable situation concerning an application, the application management organization, its processes or working methods, which demands structural analysis of the cause and a structural solution

Note 1 to entry: A problem might concern a service or product or a process (-step) or any other element of the application management organization.

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4.28
release
set of grouped change requests, established in the Application Change Management Process, that are designed, developed, tested, and deployed as a cohesive whole

Note 1 to entry: The term release is also used for the following:

— work process in which a new release is designed, realized, tested, and introduced;

— new version of the application that is taken into production on a certain date (for example, the release of May 1th.).

4.29
reliability
degree to which an object or an object's services provide agreed or expected functionality during a defined time period under specified conditions

4.30
request for change
proposal for a functional or non-functional change to be made to an existing application

[SOURCE: ISO 20000-1:2011, modified]

Note 1 to entry: Synonyms are change request and modification request.

4.31
service level agreement
SLA
documented agreement between the service provider and customer that identifies services and service targets

[SOURCE: ISO/IEC 20000-1:2011]

Note 1 to entry: In this International Standard, the Application Management organization can be the service provider, but it can also be a customer itself, of another supplier. See also NOTE 3 of 5.4.5.1.

4.32
service management
set of capabilities and processes to direct and control the service provider's activities and resources for the design, transition, delivery, and improvement of services to fulfil the service requirements

[SOURCE: ISO 20000-1:2011]

4.33
software product
set of computer programs, procedures, database- and other data structure descriptions and associated documentation

[SOURCE: ISO 12207:2008]

Note 1 to entry: In this International Standard, a software product may vary from large customized application software for one customer to standard software packages that are sold off the shelf to millions of customers.

4.34
supplier
organization or part of an organization or individual that enters into an agreement with the application management organization for the supply of a product, service, materials, or human capacity

[SOURCE: ISO 12207:2008, modified]

Note 1 to entry: The application management organization may have internal or external suppliers. A supplier can be another application management organization, but also IT infrastructure management organizations or consultants. This International Standard makes no distinction between internal or external customers. Similarly, no distinction is made between internal or external suppliers.

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5 Application Management Processes

NOTE The outcomes and tasks of ISO/IEC 16350 overlapping with ISO/IEC 20000 and ISO/IEC 12207 which are shown in Annex E are boxed. The text in the box is the original text of ISO/IEC 20000 or ISO/IEC 12207 which is shown by the clause/subclause number in the box. For the relationship with ISO/IEC 15504-8:2012 see Annex D (informative)

5.1 Application Support Processes

5.1.1 Use Support

5.1.1.1 Purpose

The purpose of the Use Support Process is to give support to customers in the use of applications through:

— Proactive communication. This is communication from application management to customers in order to improve the use of the applications/applications objects.

— Management of calls.

NOTE 1 This process includes all activities that are meant to support the customer organization and the user representatives once the applications are in use. The reason to include the sub-process of proactive communication, next to incident and service request management, is that there should be emphasis on proactive communication activities, in order to prevent incidents.

NOTE 2 See Annex A.1 for an explanation of the name of the Use Support Process

5.1.1.2 Outcomes

As a result of successful implementation of the Use Support Process:

a) Customers are proactively informed about the current situation and developments: changes and releases, known problems, workaround's, suggestions regarding the use of the application, changes in services etc.

b) Incidents and service requests are recorded and classified.

c) Incidents and service requests are prioritized and analyzed.

d) A plan including work load estimation to resolve incidents and service requests is developed with users.

NOTE There are some incidents which are not resolved at once. In those cases, it is necessary to adjust the timing and duration for working on them with users.

e) Incidents and service requests are resolved and closed.

f) Possible relationships with problems are registered.

g) Incidents and service requests which are not progressed according to agreed service levels are escalated

h) Reports on Use Support activities and process results are produced on a regular basis.

5.1.1.3 Activities and tasks

The organization shall implement the following activities in accordance with applicable organization policies and procedures with respect to the Use Support Process.

a) **Proactive communication.**

This activity consists of the following tasks:

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1) The application management organization shall maintain contact with customers or customer processes regarding the agreed services.

2) The application management organization shall provide support to customers with respect to the use of the application.

3) The application management organization shall provide information to customers regarding changes in services and the impact of those changes.

b) **Incident and service request management.**

This activity consists of the following tasks:

1) There shall be a documented procedure for all incidents to define:

— recording;

— allocation of priority;

— classification;

— updating of records;

— escalation;

— resolution;

— closure.

2) There shall be a documented procedure for managing the fulfilment of service requests from recording to closure. Incidents and service requests shall be managed according to the procedures.

3) When prioritizing incidents and service requests, the service provider shall take into consideration the impact and urgency of the incident or service request.

4) The service provider shall ensure that personnel involved in the incident and service request management process can access and use relevant information. The relevant information shall include service request management procedures, known errors, problem resolutions and the CMDB. Information about the success or failure of releases and future release dates, from the release and deployment management process, shall be used by the incident and service request management process.

5) The service provider shall document and agree with the customer the definition of a major incident. Major incidents shall be classified and managed according to a documented procedure. Top management shall be informed of major incidents. Top management shall ensure that a designated individual responsible for managing the major incident is appointed. After the agreed service has been restored, major incidents shall be reviewed to identify opportunities for improvement.

[ISO/IEC 20000-1:2011, 8.1.]

6) Incidents shall be escalated in to a problem, if necessary.

NOTE Problem management is part of the Quality Management Process.

c) **Monitoring and reporting of calls.**

This activity consists of the following tasks:

1) The progress of the call handling activities shall be monitored.

2) Reports shall be made on the statuses of calls and on time aspects: time span, time spent etc.

3) The service provider shall keep the customer informed of the progress of their reported incident or service request. If service targets cannot be met, the service provider shall inform the customer and interested parties and escalate according to the procedure.

[ISO/IEC 20000-1:2011, 8.1.]

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4) The service provider shall report on the realization of service agreements regarding the Use Support activities.

d) **Process control and reporting.**

This activity consists of the following tasks:

1) The Use Support Process shall be implemented, controlled, monitored, evaluated and improved.

2) Quality reports about the Use Support Process shall be provided to the stakeholders and other application management processes.

5.1.2 Configuration Management

5.1.2.1 Purpose

The purpose of the Configuration Management Process is to have continuous insight in the application objects and the application configurations within the responsibility of the application management organization that have been provided to their customers and in the services provided by the application management organization.

NOTE 1 Executables (code suitable for running on hardware) may be distributed to various internal and external organizations. One of the main activities of Configuration Management is managing the CMDB. Within application management a CMDB is neither a software management system nor a software version management system. The CMDB does not store the sources or executables, or information on the software structures. It only contains information on the identification of the application version that is currently in use.

The CMDB contains information about which versions of the application are operational on which platforms.

The executables are generated using underlying sources and components. These sources are stored and controlled in the Software Control and Distribution Process. For every executable on a platform the translation to the sources and or the structure of the executable are be traceable. That is why the method in which the executables are structured to form an executable is recorded. But this information, which is often complex and comprehensive, is not recorded within the Configuration Management Process but within the Software Control and Distribution Process: with the help of the Software Control and Distribution Process, the types of sources, modules, and data used are identified using a specified and verifiable identification scheme.

NOTE 2 CMDB's are also used within the IT infrastructure management domain.

In the Configuration Management Process within the IT infrastructure management domain objects like hardware, system software, networks, etc. are recorded. Application management is only concerned with the application software. So there is a relationship between these types of configuration management. Separate administrations may occur, because separate organizations or organizational units may be responsible for the IT infrastructure and for the application software. This will be the choice of that organization / those organizations.

In the case of commercial off-the-shelf software and distributed systems, the application runs on multiple platforms of multiple customers and in multiple IT infrastructure management organizations. Different versions of the application can be active in these different locations. IT infrastructure management's CMDB can, for that reason, very often not be used by the application management organization. This is why there is a separate administrative system for application management in which references can be made to the technical infrastructures.

NOTE 3 The logistics of application objects between various build/maintenance, test, and acceptance environments is not handled in the Configuration Management Process but in the Software Control and Distribution Process. The Software Control and Distribution Process keeps track of the status of objects in the maintenance stages and of which objects are delivered to production. The Configuration Management Process keeps track of the status of CI's transferred to various customers for deployment in their production environments.

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5.1.2.2 Outcomes

As a result of successful implementation of the Configuration Management Process:

a) a configuration management strategy is defined;

[ISO/IEC 12207:2008, 6.3.5.2.]

b) Items requiring configuration management are identified.

NOTE Configuration items (CI's) include all relevant application objects but also all objects containing information regarding services.

c) The status of the configuration items and modifications are recorded and reported.

d) Changes to items under configuration management are controlled.

e) The integrity of applications, application objects and service components is assured.

f) The configuration of released items is controlled.

g) configuration baselines are established.

[ISO/IEC 12207:2008, 6.3.5.2.]

5.1.2.3 Activities and tasks

The organization shall implement the following activities in accordance with applicable organization policies and procedures with respect to the Configuration Management Process.

a) **Configuration management planning.**

This activity consists of the following tasks:

1) The project shall define a configuration management strategy.

[ISO/IEC 12207:2008, 6.3.5.3.1]

NOTE In the working field of Application Management properties of a configuration item (CI) include subjects such as version, storage location, exploitation platform, relationship(s) with other CI's, relationship(s) with application objects and service components."

NOTE 2 In this International Standard the term "project" should be interpreted as "application management organization".

b) **Definition of configuration items.**

This activity consists of the following tasks:

1) There shall be a documented definition of each type of CI. The information recorded for each CI shall ensure effective control and include at least:

— description of the CI;

— relationship(s) between the CI and other CIs;

— relationship(s) between the CI and service components;

— status;

— version;

— location.

[ISO/IEC 20000-1:2011, 9.1.]

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— exploitation characteristics, including location of use, platform descriptions, contact person, etc.

c) **Registration of configuration items.**

This activity consists of the following tasks:

1) CIs shall be uniquely identified and recorded in a CMDB.

2) The CMDB shall be managed to ensure its reliability and accuracy, including control of update access.

3) There shall be a documented procedure for recording, controlling and tracking versions of CIs. The degree of control shall maintain the integrity of services and service components taking into consideration the service requirements and the risks associated with the CIs.

4) The service provider shall audit the records stored in the CMDB, at planned intervals. Where deficiencies are found, the service provider shall take necessary actions and report on the actions taken.

5) Changes to CIs shall be traceable and auditable to ensure integrity of the CIs and the data in the CMDB.

6) Master copies of CIs recorded in the CMDB shall be stored in secure physical or electronic libraries referenced by the configuration records.

[ISO/IEC 20000-1:2011, 9.1.]

NOTE 1 CI's containing information on services (i.c. service items) are recorded in a CMDB as well. This (part of the) CMDB is in practice often referred to as a Service Delivery Database (SDDB). This SDDB contains an overview of documented agreements such as contracts, SLA's, service definitions etc. and their status. It contains information about where those documents are stored. It is an internal registration. It is not to be confused with the service catalogue. The service catalogue is external: it contains an overview over the services that may be delivered.

NOTE 2 A service item is the part of the set of services delivered to a customer, for which one or more service levels apply. Examples of service items are opening hours, availability, reaction time, repair time. A service item is not to be confused with a service component. Examples of service components are impact analysis report, release, and hotfix.

7) A configuration baseline of the affected CI's shall be taken before transferral of a release to a customer.

d) **Reporting on configuration items.**

This activity consists of the following tasks:

1) The progress of the Configuration Management activities shall be monitored.

2) Management records and status reports that show the status and history of controlled configuration items shall be prepared.

3) Information about versions of the configuration items and their use shall be provided, both on demand and on a regular basis.

e) **Process control and reporting.**

This activity consists of the following tasks:

1) The Configuration Management Process shall be implemented, controlled, monitored, evaluated and improved.

2) Quality reports about the Configuration Management Process shall be provided.

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5.1.3 Application Operation Management

5.1.3.1 Purpose

The purpose of the Application Operation Management Process is to manage that the applications or components display the correct and agreed-upon behaviour in operational situations and that the services of the application management organization are delivered as agreed.

NOTE 1 In this International Standard the availability and capacity management processes are not described separately. The Application Operation Management Process covers both availability and capacity issues. The reasons are:

— Availability, capacity (and reliability) features have mutual relationships: a lack of computer capacity may lead to availability problems and vice versa.

— Availability problems and capacity problems are handled and managed in a similar way and the activities and contacts between the application management organization and the IT infrastructure management teams are similar on these types of problem.

— By combining the similar aspects in one process the implementation and execution of this process is more efficient.

NOTE 2 Capacity management comprises the monitoring and allocation of the correct resources at the right time with the correct capacity to the services that concern the application support, use and production of the software system. The purpose of capacity management is to realize and maintain a cost-effective use of capacity at present and in relation to the future needs of the organization.

NOTE 3 Capacity of human resources is outside the scope of this process. It is part of the Planning and Control Process.

NOTE 4 Capacity of financial resources is outside the scope of this process. Financial resources are addressed in the Financial Management Process.

5.1.3.2 Outcomes

As a result of the successful implementation of the Application Operation Management Process:

a) Reliability requirements are identified.

b) Availability requirements are identified.

c) Current and future capacity and performance requirements are identified and agreed.

NOTE Reliability and availability are non-functional requirements and they are also input for software design and software construction & integration and also for software testing. Also see for instance section 5.2.1.3, c) 1) where capacity and availability are mentioned in relation to estimating the impact of proposed changes.

d) An operations plan is developed, which includes:

— detailed reliability, availability and capacity demands and their feasibility;

— operations administrations: reliability, availability and capacity measurement results;

— demands and restrictions regarding the operation in the context of the IT infrastructure management and customer organizations;

— demands and restrictions regarding the operation in the context of the maintenance and renewal processes.

e) A processing planning is developed which includes:

— regular application production planning;

— incidental production runs.

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f) Service availability is tested against the service availability requirements to validate the plan.

g) Service availability is monitored.

h) Underlying causes of unplanned service non-availability are identified and analyzed.

i) Corrective actions are taken to address identified underlying causes.

j) Changes to service availability requirements are reflected in the service availability plan.

k) Capacity is provided to meet current capacity and performance requirements;

l) Capacity usage is monitored, analyzed and performance is tuned.

m) Capacity is prepared to meet future capacity and performance needs.

n) Changes to capacity and performance are reflected in the capacity plan.

o) Reports on operations are produced on a regular basis:

— progress- and planning reports;

— availability- and reliability reports.

5.1.3.3 Activities and tasks

The organization shall implement the following activities in accordance with applicable organization policies and procedures with respect to the Application Operation Management Process.

a) **Operation planning: development of an operations plan.**

This activity consists of the following tasks:

1) The service provider shall identify and agree capacity and performance requirements with the customer and interested parties.

[ISO/IEC 20000-1:2011, 6.5.]

2) The service provider shall identify and agree with the customer and interested parties service availability requirements.

[ISO/IEC 20000-1:2011, 6.3.1]

3) The general demands for reliability shall identified and agreed with the customer and interested parties.

4) The regular production runs shall be described.

5) The effects of changes of software, hardware or services on availability, reliability and capacity shall be predicted.

6) An operations plan shall be created, implemented, maintained and reassessed on a regular basis. The plan shall include at least:

— current and forecast demand for services;
— expected impact of agreed requirements for availability, service continuity and service levels;
— time-scales, thresholds and costs for upgrades to service capacity;
— potential impact of statutory, regulatory, contractual or organizational changes;
— potential impact of new technologies and new techniques;
— procedures to enable predictive analysis, or reference to them.

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[ISO/IEC 20000-1:2011, 6.5.]

— availability requirements and targets

[ISO/IEC 20000-1:2011, 6.3.2]

— reliability requirements and targets.

b) **Operation realization: determination of the specifications and measures necessary to meet the demands.**

This activity consists of the following tasks:

1) The demands regarding the necessary infrastructure and the necessary functionality to be obtained externally (components) shall be defined.

2) The demands to be placed upon subcontractors shall be defined.

3) The possible service moments or service windows for the IT infrastructure management organizations for housekeeping or implementing new releases shall be identified.

c) **Monitoring of the effectiveness of measures and processing of results.**

This activity consists of the following tasks:

1) Availability of services shall be monitored, the results recorded and compared with agreed targets. Unplanned non-availability shall be investigated and necessary actions taken.

[ISO/IEC 20000-1:2011, 6.3.3]

2) Reliability, manageability and efficiency of production runs and services shall be measured by: determining whether production runs have been executed completed as expected, on time and without errors and whether applications are online.

NOTE The application management organization does not run the application software in the production environment. Data on production runs and problems with production runs, performance problems etc. shall be requested from the parties that run the software.

3) Availability plans shall be tested against the availability requirements.

[ISO/IEC 20000-1:2011, 6.3.3]

4) If necessary, the Use Support Process shall be informed concerning any problems and measures.

d) **Capacity management.**

This activity consists of the following tasks:

1) The IT infrastructure organizations shall be informed about resource demands.

2) The service provider shall monitor capacity usage, analyze capacity data and tune performance.

[ISO/IEC 20000-1:2011, 6.5.]

NOTE The application management organization does not run the application software in the production environment nor do they monitor capacity usage in the production environment. Data on capacity usage shall be requested from the parties that run the software.

3) Improvements shall be undertaken or actions shall be suggested to IT infrastructure management if needed.

NOTE Improvement actions can be:

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— tuning means, resources, runs and/or software;

— de-normalization;

— access optimization.

e) **IT services control and reporting.**

This activity consists of the following tasks:

1) Schedules, progress, time spent, etc. shall be monitored.

2) (Changes in) Capacity, usage, performance, workload, availability and reliability against targets, detected nonconformities and trends shall be reported.

f) **Process reporting and control.**

This activity consists of the following tasks:

1) The Application Operation Management Process shall be implemented, controlled, monitored, evaluated and improved;

2) Quality reports about the Application Operation Management Process shall be provided.

5.1.4 Continuity Management

5.1.4.1 Purpose

The purpose of the Continuity Management Process is to manage the continuity of the business process using the application(s) by ensuring the continuity of the application(s) or components in the long term and during exceptional circumstances.

NOTE Security is one of the topics of the Continuity Management Process because the continuity and vulnerability of the information systems are also addressed in this process. Security is also an important part of the functionality of the application, so it is dealt with within the specifications of the application and defined in the Software Design Process and within the service levels and therefore specified in the Agreement Management and Supplier Management Processes.

5.1.4.2 Outcomes

As a result of the successful implementation of the Continuity Management Process:

a) Service continuity requirements are identified.

b) A service continuity plan is developed using the service continuity requirements.

c) Continuity measures are taken and the results of the measures are recorded and presented.

d) Service continuity is tested against the service continuity requirements to validate the plan.

e) Reports on continuity aspects are produced on a regular basis.

f) Changes to service continuity requirements are reflected in the service continuity plan.

NOTE ISO/IEC 20000 addresses service availability and service continuity in one process. In this International Standard the topic of service availability is addressed in the Application Operation Management Process.

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