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Information technology — Security techniques — Guidance on assuring suitability and adequacy of incident investigative method

Technologies de l'information — Techniques de sécurité — Directives sur la façon d'assurer l'aptitude à l'emploi et l'adéquation d'une méthode d'investigation d'incident

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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*, SC 27, *IT Security techniques*.

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Introduction

About this International Standard

This International Standard is concerned with providing assurance that the investigative process used is appropriate for the incident under investigation and the results which are required. It also describes, at an abstract level, the concept of breaking seemingly complex processes into a series of smaller atomic parts, which should aid in the development of simple, yet robust, investigation methods. It should be considered by any person authorising, giving instruction for, managing, or conducting an investigation. It should be applied prior to any investigation, in the context of principles and processes (defined in ISO/IEC 27043:2015) and sound preparation and planning (defined in ISO/IEC 27035-2[1)]) to ensure the suitability of methods to be applied in the investigative processes described in ISO/IEC 27037:2012 and ISO/IEC 27042:2015.

Relationship to other standards

This International Standard is intended to complement other standards and documents which give guidance on the investigation of, and preparation to investigate, information security incidents. It is not a comprehensive guide, but lays down certain fundamental principles which are intended to ensure that tools, techniques, and methods can be selected appropriately and shown to be fit for purpose should the need arise.

This International Standard also intends to inform decision-makers that need to determine the reliability of digital evidence presented to them. It is applicable to organizations needing to protect, analyse, and present potential digital evidence. It is relevant to policy-making bodies that create and evaluate procedures relating to digital evidence, often as part of a larger body of evidence.

This International Standard describes part of a comprehensive investigative process which includes, but is not limited to, the following topic areas:

— incident management, including preparation and planning for investigations;

— handling of digital evidence;

— use of, and issues caused by, redaction;

— intrusion prevention and detection systems, including information which can be obtained from these systems;

— security of storage, including sanitization of storage;

— ensuring that investigative methods are fit for purpose;

— carrying out analysis and interpretation of digital evidence;

— understanding principles and processes of digital evidence investigations;

— security incident event management, including derivation of evidence from systems involved in security incident event management;

— relationship between electronic discovery and other investigative methods, as well as the use of electronic discovery techniques in other investigations;

— governance of investigations, including forensic investigations.

These topic areas are addressed, in part, by the following ISO/IEC standards:

— ISO/IEC 27037:2012

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This International Standard describes the means by which those involved in the early stages of an investigation, including initial response, can ensure that sufficient potential digital evidence is captured to allow the investigation to proceed appropriately.

— ISO/IEC 27038:2014

Some documents can contain information that must not be disclosed to some communities. Modified documents can be released to these communities after an appropriate processing of the original document. The process of removing information that is not to be disclosed is called “redaction”.

The digital redaction of documents is a relatively new area of document management practice, raising unique issues and potential risks. Where digital documents are redacted, removed information must not be recoverable. Hence, care needs to be taken so that redacted information is permanently removed from the digital document (e.g. it must not be simply hidden within non-displayable portions of the document).

ISO/IEC 27038:2014 specifies methods for digital redaction of digital documents. It also specifies requirements for software that can be used for redaction.

— ISO/IEC 27040:2015

This International Standard provides detailed technical guidance on how organizations can define an appropriate level of risk mitigation by employing a well-proven and consistent approach to the planning, design, documentation, and implementation of data storage security. Storage security applies to the protection (security) of information where it is stored and to the security of the information being transferred across the communication links associated with storage. Storage security includes the security of devices and media, the security of management activities related to the devices and media, the security of applications and services, and security relevant to end-users during the lifetime of devices and media and after end of use.

Security mechanisms like encryption and sanitization can affect one’s ability to investigate by introducing obfuscation mechanisms. They have to be considered prior to and during the conduct of an investigation. They can also be important in ensuring that storage of evidential material during and after an investigation is adequately prepared and secured.

— ISO/IEC 27042:2015

This International Standard describes how methods and processes to be used during an investigation can be designed and implemented in order to allow correct evaluation of potential digital evidence, interpretation of digital evidence, and effective reporting of findings.

— ISO/IEC 27043:2015

This International Standard defines the key common principles and processes underlying the investigation of incidents and provides a framework model for all stages of investigations.

The following ISO/IEC projects also address, in part, the topic areas identified above and can lead to the publication of relevant standards at some time after the publications of this International Standard.

— ISO/IEC 27035 (all parts)[2)]

This is a three-part standard that provides organizations with a structured and planned approach to the management of security incident management. It is composed of

— ISO/IEC 27035-1[3)]

2) To be published.

3) To be published.

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This part presents basic concepts and phases of information security incident management. It combines these concepts with principles in a structured approach to detecting, reporting, assessing, responding, and applying lessons learned.

— ISO/IEC 27035-2[4)]

This part presents the concepts to plan and prepare for incident response. The concepts, including incident management policy and plan, incident response team establishment, and awareness briefing and training, are based on the plan and prepare phase of the model presented in ISO/IEC 27035-1[5)]. This part also covers the "Lessons Learned" phase of the model.

— ISO/IEC 27035-3[6)]

This part includes staff responsibilities and practical incident response activities across the organization. Particular focus is given to the incident response team activities such including monitoring, detection, analysis, and response activities for the collected data or security events.

— ISO/IEC 27050 (all parts)[7)]

This addresses activities in electronic discovery, including, but not limited to identification, preservation, collection, processing, review, analysis, and production of electronically stored information (ESI). In addition, it provides guidance on measures, spanning from initial creation of ESI through its final disposition, which an organization can undertake to mitigate risk and expense should electronic discovery become an issue. It is relevant to both non-technical and technical personnel involved in some or all of the electronic discovery activities. It is important to note that this guidance is not intended to contradict or supersede local jurisdictional laws and regulations.

Electronic discovery often serves as a driver for investigations, as well as evidence acquisition and handling activities. In addition, the sensitivity and criticality of the data sometimes necessitate protections like storage security to guard against data breaches.

— ISO/IEC 30121:2015

This International Standard provides a framework for governing bodies of organizations (including owners, board members, directors, partners, senior executives, or similar) on the best way to prepare an organization for digital investigations before they occur. This International Standard applies to the development of strategic processes (and decisions) relating to the retention, availability, access, and cost effectiveness of digital evidence disclosure. This International Standard is applicable to all types and sizes of organizations. The International Standard is about the prudent strategic preparation for digital investigation of an organization. Forensic readiness ensures that an organization has made the appropriate and relevant strategic preparation for accepting potential events of an evidential nature. Actions may occur as the result of inevitable security breaches, fraud, and reputation assertion. In every situation, information technology (IT) has to be strategically deployed to maximize the effectiveness of evidential availability, accessibility, and cost efficiency

Figure 1 shows typical activities surrounding an incident and its investigation. The numbers shown in this diagram (e.g. 27037) indicate the International Standards listed above and the shaded bars show where each is most likely to be directly applicable or has some influence over the investigative process (e.g. by setting policy or creating constraints). It is recommended, however, that all should be consulted prior to, and during, the planning and preparation phases. The process classes shown are defined fully in this International Standard and the activities identified match those discussed in more detail in ISO/IEC 27035-2, ISO/IEC 27037:2012, and ISO/IEC 27042:2015.

4) To be published.

5) To be published.

6) To be published.

7) New project.

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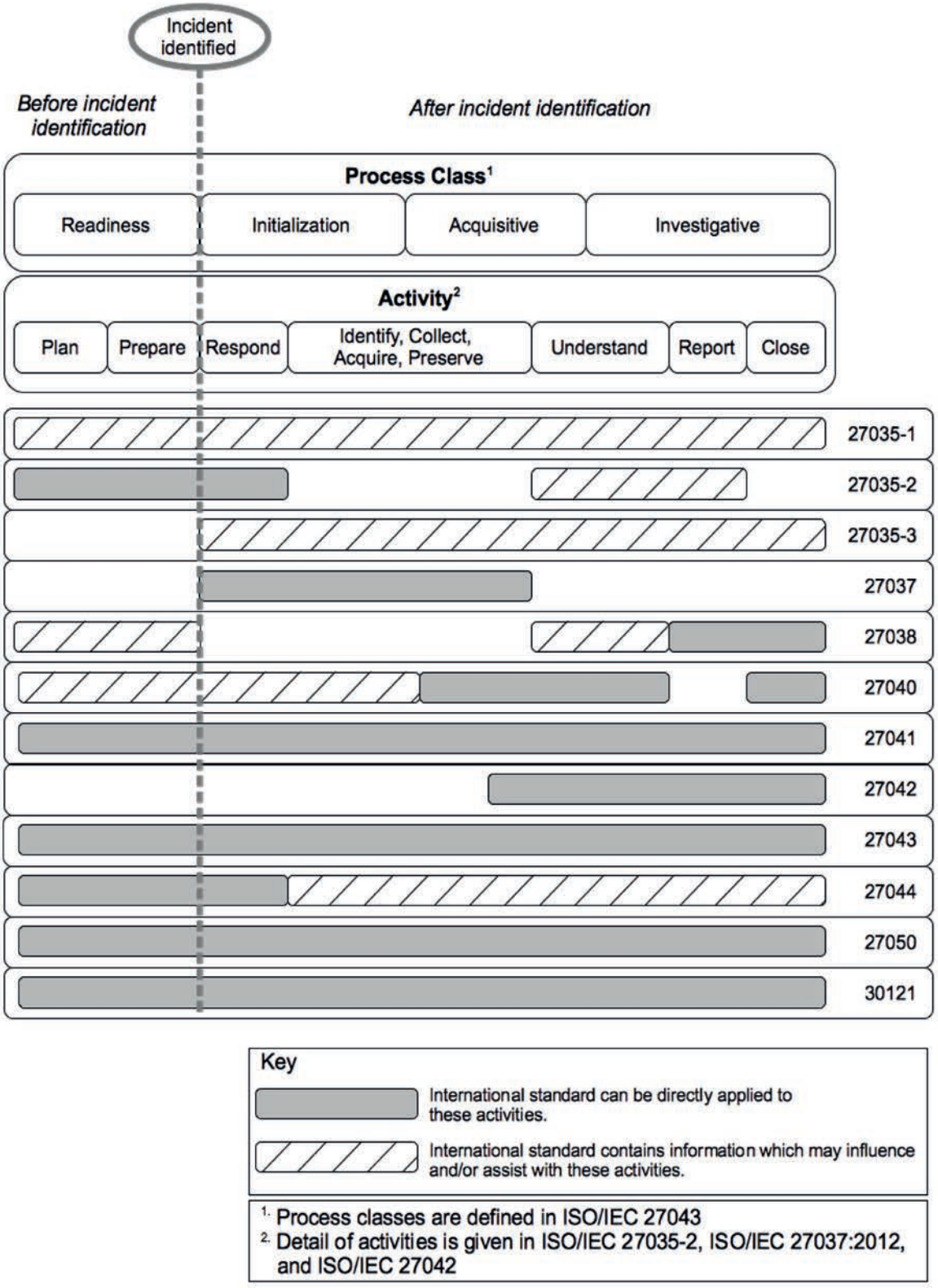


Figure 1 — Applicability of standards to investigation process classes and activities

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Information technology — Security techniques — Guidance on assuring suitability and adequacy of incident investigative method

1 Scope

This International Standard provides guidance on mechanisms for ensuring that methods and processes used in the investigation of information security incidents are "fit for purpose". It encapsulates best practice on defining requirements, describing methods, and providing evidence that implementations of methods can be shown to satisfy requirements. It includes consideration of how vendor and third-party testing can be used to assist this assurance process.

This document aims to

— provide guidance on the capture and analysis of functional and non-functional requirements relating to an Information Security (IS) incident investigation,

— give guidance on the use of validation as a means of assuring suitability of processes involved in the investigation,

— provide guidance on assessing the levels of validation required and the evidence required from a validation exercise,

— give guidance on how external testing and documentation can be incorporated in the validation process.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 27000:2013, *Information technology — Security techniques — Information security management systems — Overview and vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions in ISO/IEC 27000:2013 and the following apply.

3.1
atomic
performing a single function only

Note 1 to entry: A *method* (3.11) for recovery of all live files from a device can be atomic if it relies solely on the use of filesystem meta-data. A method for recovery of all deleted files is unlikely to be atomic as it will require sub-methods which identify and extract particular file structures from the data on the storage device based on knowledge of file contents (e.g. .jpg, .png, .odt, XML, etc.).

3.2
black box testing
examining a process by using it to process known inputs and comparing the results against predicted outputs which reflect the requirements for the process

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