ISO/IEC 27001

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ISO/IEC 27001:2013 — Information technology — Security techniques — **Information security management systems — Requirements** *(second edition)*

Introduction

ISO/IEC 27001 formally specifies an Information Security Management System (ISMS), a suite of activities concerning the management of information risks (called 'information security risks' in the standard). The ISMS is an overarching management framework through which the organization identifies, analyzes and addresses its information risks. The ISMS ensures that the security arrangements are fine-tuned to keep pace with changes to the security threats, vulnerabilities and business impacts - an important aspect in such a dynamic field, and a key advantage of ISO27k's flexible risk-driven approach as compared to, say, PCI-DSS.

The standard covers all types of organizations (*e.g*. commercial enterprises, government agencies, non-profits), all sizes (from micro-businesses to huge multinationals), and all industries or markets (*e.g*. retail, banking, defense, healthcare, education and government). This is clearly a very wide brief.

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ISO/IEC 27001 does *not* formally mandate specific information security controls since the controls that are required vary markedly across the wide range of organizations adopting the standard. The information security controls from ISO/IEC 27002 are noted in annex A to ISO/IEC 27001, rather like a menu. Organizations adopting ISO/IEC 27001 are free to choose whichever specific information security controls are applicable to their particular information risks, drawing on those listed in the menu and potentially supplementing them with other *a la carte* options (sometimes known as extended control sets). As with ISO/IEC 27002, the key to selecting applicable controls is to undertake a comprehensive assessment of the organization's information risks, which is one vital part of the ISMS.

Furthermore, management may elect to avoid, share or accept information risks rather than mitigate them through controls - a risk treatment decision within the risk management process.

History

ISO/IEC 27001 is derived from BS 7799 Part 2, first published as such by the British Standards Institute in 1999.

BS 7799 Part 2 was revised in 2002, explicitly incorporating the Deming-style Plan-Do-Check-Act cycle.

BS 7799 part 2 was adopted as ISO/IEC 27001 in 2005 with various changes to reflect its new custodians.

The 2005 first edition was *extensively* revised and **published in 2013**, bringing it into line with the other ISO management systems standards and dropping explicit reference to PDCA.

Structure of the standard

ISO/IEC 27001:2013 has the following sections:

0 Introduction - the standard describes a process for systematically managing information risks.

1 Scope - it specifies generic ISMS requirements suitable for organizations of any type, size or nature.

2 Normative references - only ISO/IEC 27000 is considered absolutely essential to users of '27001: the remaining ISO27k standards are optional.

3 Terms and definitions - see ISO/IEC 27000.

4 Context of the organization - understanding the organizational context, the needs and expectations of 'interested parties' and defining the scope of the ISMS. Section 4.4 states

ISO/IEC 27040
ISO/IEC 27041
ISO/IEC 27042
ISO/IEC 27043
ISO/IEC 27045
ISO/IEC 27050
ISO/IEC 27070
ISO/IEC 27071
ISO/IEC 27099
ISO/IEC TS 27100
ISO/IEC 27101
ISO/IEC 27102
ISO/IEC TR 27103
ISO/IEC TR 27550
ISO/IEC 27551
ISO/IEC 27553
ISO/IEC 27554
ISO/IEC 27555
ISO/IEC 27556
ISO/IEC TS 27570

very plainly that "The organization shall establish, implement, maintain and continually improve" the ISMS.

5 Leadership - top management must demonstrate leadership and commitment to the ISMS, mandate policy, and assign information security roles, responsibilities and authorities.

6 Planning - outlines the process to identify, analyze and plan to treat information risks, and clarify the *objectives* of information security.

7 Support - adequate, competent resources must be assigned, awareness raised, documentation prepared and controlled.

8 Operation - a bit more detail about assessing and treating information risks, managing changes, and documenting things (partly so that they can be audited by the certification auditors).

9 Performance evaluation - monitor, measure, analyze and evaluate/audit/review the information security controls, processes and management system, systematically improving things where necessary.

10 Improvement - address the findings of audits and reviews (*e.g.* nonconformities and corrective actions), make continual refinements to the ISMS.

Annex A Reference control objectives and controls - little more in fact than a list of titles of the control sections in ISO/IEC 27002. The annex is 'normative', *implying* that certified organizations are expected to use it, but the main body says they are free to deviate from or supplement it in order to address their particular information risks. Annex A alone is hard to interpret. *Please refer to ISO/IEC 27002 for more useful detail on the controls, including implementation guidance.*

Bibliography - points readers to five related standards, plus part 1 of the ISO/IEC directives, for more information. In addition, ISO/IEC 27000 is identified in the body of the standard as a normative (*i.e.* essential) standard and there are several references to ISO 31000 on risk management.

Mandatory requirements for certification

ISO/IEC 27001 is a formalized specification for an ISMS with two distinct purposes:

1. It lays out the design for an ISMS, describing the important parts at a fairly high level;
2. It can (optionally) be used as the basis for formal compliance assessment by accredited certification auditors in order to certify an organization compliant.

The following mandatory documentation is explicitly required for certification:

ISO/IEC 27701
ISO 27799
Other ISO27k

1. ISMS scope (as per clause 4.3)
2. Information security policy (clause 5.2)
3. Information risk assessment *process* (clause 6.1.2)
4. Information risk treatment *process* (clause 6.1.3)
5. Information security objectives (clause 6.2)
6. Evidence of the competence of the people working in information security (clause 7.2)
7. Other ISMS-related documents deemed necessary by the organization (clause 7.5.1b)
8. Operational planning and control documents (clause 8.1)
9. The *results* of the [information] risk assessments (clause 8.2)
10. The *decisions* regarding [information] risk treatment (clause 8.3)
11. Evidence of the monitoring and measurement of information security (clause 9.1)
12. The ISMS internal audit program and the results of audits conducted (clause 9.2)
13. Evidence of top management reviews of the ISMS (clause 9.3)
14. Evidence of nonconformities identified and corrective actions arising (clause 10.1)
15. Various others: Annex A mentions but does not fully specify further documentation including the rules for acceptable use of assets, access control policy, operating procedures, confidentiality or non-disclosure agreements, secure system engineering principles, information security policy for supplier relationships, information security incident response procedures, relevant laws, regulations and contractual obligations plus the associated compliance procedures and information security continuity procedures. However, despite Annex A being normative, organizations are *not* formally required to adopt and comply with Annex A: they can use other structures and approaches to treat their information risks.

Certification auditors will almost certainly check that these fifteen types of documentation are (a) present, and (b) fit for purpose.

The standard does not specify precisely what form the documentation should take, but section 7.5.2 talks about aspects such as the titles, authors, formats, media, review and approval, while 7.5.3 concerns document control, implying a fairly formal ISO 9000-style approach. Electronic documentation (such as intranet pages) are just as good as paper documents, in fact better in the sense that they are easier to control and update.

ISMS scope, and Statement of Applicability (SoA)

Whereas the standard is *intended* to drive the implementation of an enterprise-wide ISMS, ensuring that all parts of the organization benefit by addressing their information risks in an appropriate and systematically-managed manner, organizations can scope their ISMS as broadly or as narrowly as they wish - indeed scoping is a crucial decision for senior management (clause 4.3). A documented ISMS **scope** is one of the *mandatory* requirements for certification.

Although the "Statement of Applicability" (**SoA**) is not explicitly defined, it is a *mandatory* requirement of section 6.1.3. SoA refers to the output from the information risk assessments and, in particular, the decisions around treating those risks. The SoA may, for instance, take the form of a matrix identifying various types of information risks on one axis and risk treatment options on the other, showing how the risks are to be treated in the body, and perhaps who is accountable for them. It *usually* references the relevant controls from ISO/IEC 27002 but the organization may use a completely different framework such as NIST SP800-53, the ISF standard, BMIS and/or COBIT or a custom approach. The information security control objectives and controls from ISO/IEC 27002 are provided as a checklist at Annex A in order to avoid 'overlooking necessary controls': they are not *required*.

The ISMS scope and SoA are crucial if a third party intends to attach any reliance to an organization's ISO/IEC 27001 compliance certificate. If an organization's ISO/IEC 27001 scope only includes "Acme Ltd. Department X", for example, the associated certificate says absolutely nothing about the state of information security in "Acme Ltd. Department Y" or indeed "Acme Ltd." as a whole. Similarly, if for some reason management decides to accept malware risks without implementing conventional antivirus controls, the certification auditors may well challenge such a bold assertion but, *provided* the associated analyses and decisions were sound, that alone would not be justification to refuse to certify the organization since antivirus controls are not in fact mandatory.

Metrics

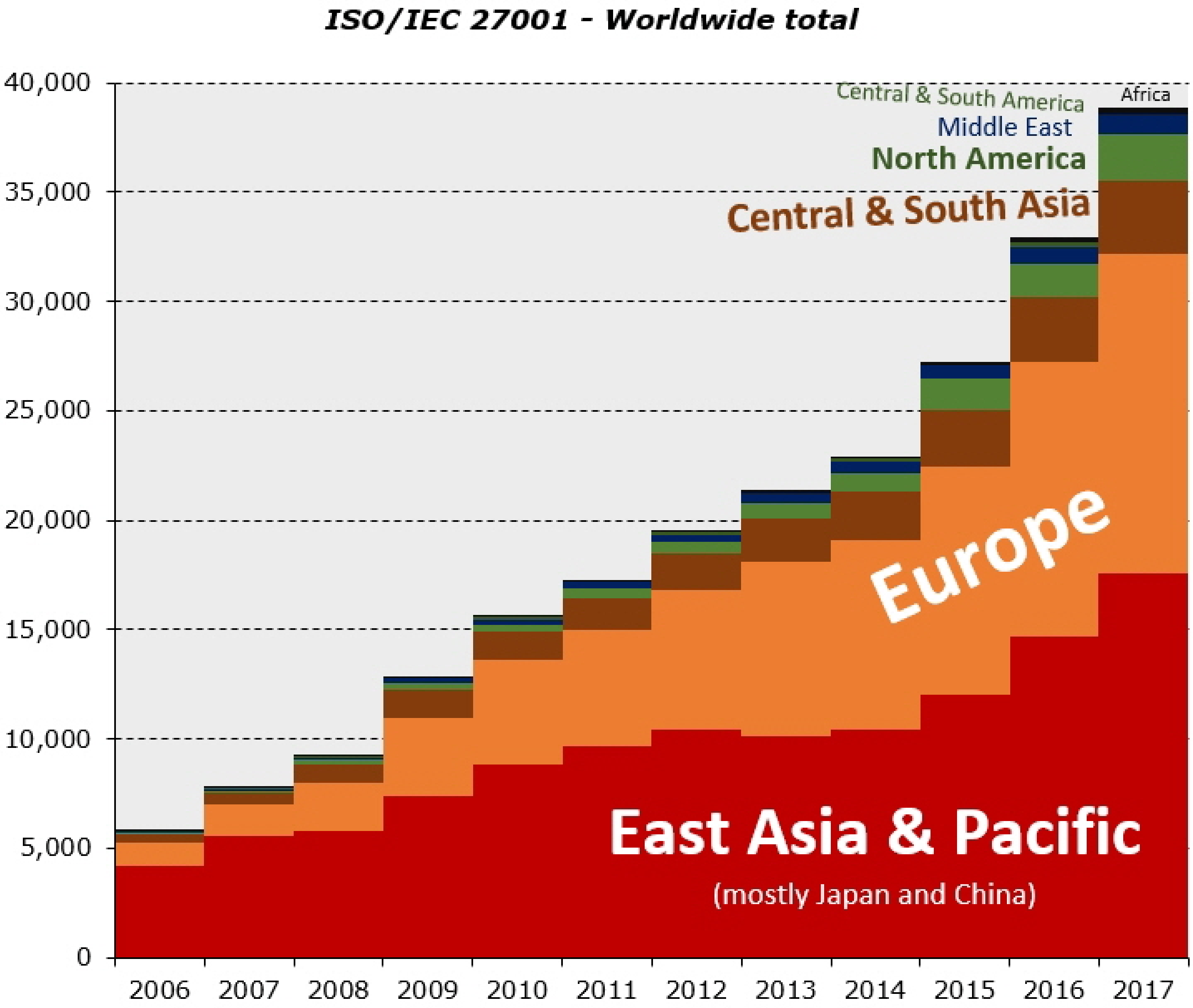
In effect (without actually using the term "metrics"), the 2013 edition of the standard requires the use of metrics on the performance and effectiveness of the organization's ISMS and information security controls. Section 9, "Performance evaluation", requires the organization to determine and implement suitable security metrics ... but gives only high-level requirements.

ISO/IEC 27004 offers advice on what and how to measure in order to satisfy the requirement - an approach not dissimilar to that described in **PRAGMATIC** Security Metrics.

Certification

Certified compliance with ISO/IEC 27001 by an accredited and respected certification body is entirely optional but is increasingly being demanded from suppliers and business partners by organizations that are (quite rightly!) concerned about the security of their information, and about information security throughout the supply chain or network.

According to the ISO survey for 2017, there are about 40,000 ISO/IEC 27001 certificates worldwide, increasing by about 20% annually:



Certification brings a number of benefits above and beyond mere compliance, in much the same way that an ISO 9000-series certificate says more than just “We are a quality organization”. Independent assessment necessarily brings some rigor and formality to the implementation process (implying improvements to information security and all the benefits that brings through risk reduction), and invariably requires senior management approval (which is an advantage in security awareness terms, at least!).

The certificate has marketing potential and demonstrates that the organization takes information security management seriously. However, as noted above, the assurance value of the certificate is highly dependent on the ISMS scope and SoA - in other words, **don’t put too much faith in an organization’s ISO/IEC 27001 compliance certificate if you are highly dependent on its information security.** In just the same way that certified PCI-DSS compliance does *not* mean “We guarantee to secure credit card data and other personal information”, certified ISO/IEC 27001 compliance is a positive sign but *not* a cast-iron guarantee about an organization’s information security. It says “We have a compliant ISMS in place”, not “We are secure”. That’s an important distinction.

Status of the standard

The standard was first published in 2005.

ISO/IEC 27001 was completely rewritten and **published in 2013**. This was far more than just tweaking the content of the 2005 edition since ISO/IEC JTC1 insisted on substantial changes to align this standard with other management systems standards covering quality assurance, environmental protection *etc.* The idea is that managers who are familiar with any of the ISO management systems will understand the basic principles underpinning an ISMS. Concepts such as certification, policy, nonconformance, document control, internal audits and management reviews are common to all the management systems standards, and in fact the processes can, to a large extent, be standardized within the organization.

ISO/IEC 27002 was extensively revised and re-issued at the same time, hence Annex A to ISO/IEC 27001 was completely updated too: see the ISO/IEC 27002 page for more.

A 2014 **technical corrigendum** clarified that *information* is, after all, an asset. Golly.

A second **technical corrigendum** in 2015 clarified that organizations are formally *required* to identify the implementation status of their information security controls in the SoA.

A proposed third technical corrigendum jumped the shark: SC 27 resisted the urge to carry on tweaking the published standard unnecessarily with changes that should have been proposed when it was in draft, and may not have been accepted anyway. Despite not being addressed, the concern is valid: the standard does indeed confuse information [security] risk with risks relating to the management system. It *should* have addressed the latter but instead took on the former.

A Study Period looked at the value and purpose of Annex A in relation to the SoA, concluding that Annex A is a useful link to ISO/IEC 27002 but the main body wording should make it clear that **Annex A is entirely optional**: users can choose whatever set of controls (or other risk treatments) they deem suitable to address their information risks.

A systematic review of 27001 has ‘confirmed’ the current standard. The *next* revision will be complicated by the significant changes coming up in the next release of ISO/IEC 27002 (which will mean rewriting Annex A) plus main body changes likely to be imposed on all the management systems standards by JTC1, as well as the intention (hopefully) to resolve the confusion of information [security] risks with ISMS risks.

Personal comments

SC 27’s confusion over the intended meaning of “information asset” lingers on: the decision to drop the definition of “information asset” from ISO/IEC 27000 rather than truly bottom out this issue may prove to have been a tactical error, especially having reverted to the very general term “asset”. A brick is an asset, whereas a bricked smartphone is a liability.

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