
**Information technology — Security
techniques — Security assurance
framework —**

**Part 1:
Introduction and concepts**

*Technologies de l'information — Techniques de sécurité — Assurance
de la sécurité cadre —*

Partie 1: Introduction et concepts



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2012

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword	v
Introduction.....	vi
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions	1
4 Abbreviated Terms	6
5 Concepts of security assurance	8
5.1 Security assurance.....	8
5.2 Assurance is distinguishable from confidence	9
5.3 The need for security assurance	9
5.4 Security assurance is intangible	10
5.5 Security assurance reduces security risk	10
5.6 Security assurance provided is related to the effort expended	10
5.7 Security assurance does not improve the product	11
5.8 Security assurance stakeholders	11
5.8.1 Those requiring confidence in SACA results	11
5.8.2 Approval and assurance authorities	11
5.9 Security assurance pervasiveness.....	12
5.9.1 Pass-through security assurance.....	14
5.9.2 Boundaries of deliverables	14
5.9.3 Transfer of deliverables	18
5.10 Organisational aspects of SACA	18
6 The structure of security assurance	19
6.1 Security assurance requirements specification	20
6.2 Security assurance cases	20
6.2.1 Developing a security assurance case	21
6.2.2 Communicating a security assurance case	21
6.3 Security assurance evidence	21
6.4 Security assurance claims	21
6.5 Security assurance arguments	22
7 SACA techniques	23
7.1 Techniques.....	23
7.1.1 Effectiveness (or evaluation)	24
7.1.2 Correctness (or conformance).....	24
7.1.3 Predictive assurance.....	24
7.2 Selecting security assurance techniques.....	24
7.2.1 Optimisation considerations.....	25
8 SACA methods	26
8.1 Security Assurance Conformity Assessment (SACA) Methods.....	26
8.1.2 The composition of a security assurance conformance assessment method	27
8.1.3 Methods specific to security assurance	28
8.1.4 Methods not specific to security assurance	29
8.2 Approaches of SACA methods	29
8.2.1 Approach types	29
8.2.2 Combining approaches.....	30
8.3 Coverage of life cycle phases	31
8.3.1 Security assurance conformity assessors	32
8.3.2 Efficiency of a SACA method	32

8.4	The relationship between security criteria and assessment methods	33
8.5	Security assurance ratings.....	33
8.6	SACA tools	34
8.7	Outputs from the application of SACA methods.....	34
9	CASCO	35
9.1	Standards supporting conformity assessment.....	35
10	SACA Paradigms	36
10.1	SACA schemes	36
10.2	SACA conformity assessment bodies.....	37
10.2.1	Type A conformity assessments.....	37
10.2.2	Second party conformity assessment bodies	37
10.2.3	Third party conformity assessment bodies	38
10.3	Example models of SACA paradigms.....	38
10.3.1	Common Criteria.....	38
10.3.2	The Cryptographic Module Validation Program (CMVP)	39
10.3.3	The Payment Card Industry	40
11	Aspects of the composition of security assurance	41
11.1	Developing an assurance case in a compositional setting.....	42
11.1.1	General problems of composition	43
11.1.2	General aspects of composition re-use	43
11.1.3	Composition using different assurance techniques.....	44
11.2	Types of composition.....	44
11.2.1	Layering	44
11.2.2	Network.....	46
11.2.3	Component.....	48
11.3	Further activities	49
	Bibliography	50

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/IEC TR 15443-1 was prepared by Joint Technical Committee ISO/IEC JTC1, *Information technology*, Subcommittee SC 27, *Security techniques*.

This second edition cancels and replaces the first edition (ISO/IEC TR 15443-1:2005), which has been technically revised. It also replaces ISO/IEC TR 15443-3.

ISO/IEC TR 15443 consists of the following parts, under the general title *Information technology — Security techniques — Security assurance framework*:

- *Part 1: Introduction and concepts*
- *Part 2: Analysis*

Introduction

At the plenary meeting of ISO/IEC JTC 1/SC 27 in November 1994, a study group was set up to consider the question of testing and assessment methods which contribute to assurance that IT products and systems conform to security standards from SC 27 and elsewhere (e.g. SC 21 and ETSI; and some Internet standards contain security aspects). In parallel, the Common Criteria project created a working group on assurances approaches in early 1996. ISO/IEC TR 15443 resulted from these two activities. Since then the subject of security assurance has advanced and matured. This second edition of ISO/IEC TR 15443 reflects the current state of the art in this topic.

Assurance in general may extend to include many properties of IT systems such as usability, interoperability, quality, reliability and so on and are discussed in other complementary documents such as ISO/IEC 15026 "Systems and software engineering — Systems and software assurance". Hence a detailed discussion of these properties is outside the scope of this Technical Report which focuses on IT security assurance.

The objective of ISO/IEC TR 15443 is to describe the topic of security assurance, providing the fundamental concepts of the topic and present the various security assurance techniques. Provision of a framework in which an appropriate security assurance case can be made is given. The framework provides guidance to the IT Security Professional in the use of security assurance to achieve confidence that a given deliverable satisfies its stated IT security assurance requirements. This report examines security assurance techniques, and security assurance methods proposed by various types of organisations whether they are de-jure or de-facto in nature.

In pursuit of this objective, ISO/IEC TR 15443 comprises the following:

- a) the terms and definitions relating to the topic of security assurance
- b) the fundamental concepts relating to security assurance
- c) guidance to the selection, application, composition and recognition of assurance methods.
- d) a presentation of common and unique properties specific to assurance methods;
- e) a framework model to position existing assurance methods and to show their relationships;

ISO/IEC TR 15443 is organised in two parts to address the analysis of security assurance techniques as follows:

In this part, the introduction and concepts provides an overview of the definitions, fundamental concepts and a general description of security assurance. This material is aimed at providing the fundamental knowledge necessary to use the framework for analysis presented in ISO/IEC TR 15443-2 appropriately.

This part of ISO/IEC TR 15443 targets:

- a) security assurance authorities, i.e. those responsible for decisions related to a deliverable's security assurance,
- b) those responsible for developing deliverables with security functionality, such as security officers, IT security architects, developers and integrators,
- c) those who are responsible for determining the security assurance of a deliverable, for example through the use of SACA methods such as those offered by ISO/IEC 27001, ISO/IEC 15408 and ISO/IEC 19790, This audience may include government agencies, suppliers and integrators.

- d) consumers of IT security assurance such as those acquirers and end-users who are responsible for procuring or using deliverables that make claims about their security properties.

ISO/IEC TR 15443 -2, Analysis, describes a security assurance framework model that can be used to assess a variety of assurance methods and approaches and relates them to ISO/IEC TR 15443-1. The emphasis is to identify qualitative properties of the security assurance methods that contribute to security assurance. This material is catering to an IT security professional to provide understanding of how to obtain security assurance in a given life cycle stage of a deliverable.

ISO/IEC TR 15443 is relevant to security assurance methods that may not be unique to IT security; however, guidance given in ISO/IEC TR 15443 will be limited to IT security requirements. A Technical Report, ISO/IEC TR 15026, covers the related topic of systems and software assurance.

Similarly, additional terms and concepts defined in other International standardisation initiatives (i.e. CASCO) and International guides (e.g., ISO/IEC 17000) will be incorporated; however, guidance will be provided specific to the field of IT security and is not intended for general quality management and assessment, or IT conformity.

Information technology — Security techniques — Security assurance framework —

Part 1: Introduction and concepts

1 Scope

This part of ISO/IEC TR 15443 defines terms and establishes an extensive and organised set of concepts and their relationships for understanding IT security assurance, thereby establishing a basis for shared understanding of the concepts and principles central to ISO/IEC TR 15443 across its user communities. It provides information fundamental to users of ISO/IEC TR 15443-2.

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 TR 15026-1:2010, *Systems and software engineering — Systems and software assurance — Part 1: Concepts and vocabulary*

ISO/IEC 17000:2004, *Conformity assessment — Vocabulary and general principles*